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(54)发明名称

用于调节肝细胞核因子4α(HNF4α)基因表达的组合物和方法

(57)摘要

本发明提供用于通过靶向HNF4α表达控制区来调节肝细胞核因子4α(HNF4α)基因的表达(例如增加或降低的表达)的试剂和组合物及其用于治疗HNF4α相关病症(例如肝硬化)的使用方法。

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1.一种位点特异性HNF4α破坏剂,其包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分。

2.根据权利要求1所述的位点特异性HNF4α破坏剂,其中所述位点特异性HNF4α靶向部分包含聚合物分子。

3.根据权利要求2所述的位点特异性HNF4α破坏剂,其中所述聚合物分子包含聚酰胺。

4.根据权利要求2所述的位点特异性HNF4α破坏剂,其中所述聚合物分子包含多核苷酸。

5.根据权利要求1所述的位点特异性HNF4α破坏剂,其中所述表达控制区包含HNF4α特异性转录控制元件。

6.根据权利要求5所述的位点特异性HNF4α破坏剂,其中所述转录控制元件包含HNF4α启动子。

7.根据权利要求6所述的位点特异性HNF4α破坏剂,其中所述HNF4α启动子包含HNF4α启动子1的核苷酸序列或其片段。

8.根据权利要求6所述的位点特异性HNF4破坏剂,其中所述HNF4α启动子包含HNF4α启动子2的核苷酸序列或其片段。

9.根据权利要求5所述的位点特异性HNF4α破坏剂,其中所述转录控制元件包含转录增强子。

10.根据权利要求5所述的位点特异性HNF4α破坏剂,其中所述转录控制元件包含转录阻遏物。

11.根据权利要求1-10中任一项所述的位点特异性HNF4α破坏剂,其包含与表2、3、4和9的任一个中的任何核苷酸序列的完整核苷酸序列具有至少85%核苷酸同一性的核苷酸序列。

12.根据权利要求2所述的位点特异性HNF4α破坏剂,其中所述聚合物分子包含编码特异性结合所述HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

13.根据权利要求12所述的位点特异性HNF4α破坏剂,其中所述TALE或ZNF多肽的DNA结合域包含与表6A的第5栏或表10的第4栏中列出的任何一个氨基酸序列的完整氨基酸序列具有至少约85%氨基酸同一性的氨基酸序列。

14.根据权利要求1所述的位点特异性HNF4α破坏剂,其中所述表达控制区包含在含有第一和第二HNF4α相关锚定序列的锚定序列介导的结合体内的一个或多个HNF4α相关锚定序列。

15.根据权利要求14所述的位点特异性HNF4α破坏剂,其中所述锚定序列包含CCCTC结合因子(CTCF)结合基序。

16.根据权利要求14或15所述的位点特异性HNF4α破坏剂,其中所述锚定序列介导的结合体包含所述结合体内部的一个或多个转录控制元件。

17.根据权利要求14或15所述的位点特异性HNF4α破坏剂,其中所述锚定序列介导的结合体包含所述结合体外部的一个或多个转录控制元件。

18.根据权利要求14-17中任一项所述的位点特异性HNF4α破坏剂,其中所述第一和/或第二锚定序列位于所述转录控制元件的约500kb内。

19.根据权利要求18所述的位点特异性HNF4α破坏剂,其中所述第一和/或第二锚定序列位于所述转录控制元件的300kb内。

20.根据权利要求1-19中任一项所述的位点特异性HNF4α破坏剂,其包含核苷酸修饰。

21.根据权利要求2所述的位点特异性HNF4α破坏剂,其中所述聚合物分子包含肽核酸(PNA)。

22.一种包含根据权利要求1-21中任一项所述的位点特异性HNF4α破坏剂的载体。

23.根据权利要求22所述的载体,其中所述载体是病毒表达载体。

24.一种包含根据权利要求1-21中任一项所述的位点特异性HNF4α破坏剂或根据权利要求22或23所述载体的细胞。

25.根据权利要求1-21中任一项所述的位点特异性HNF4α破坏剂,其中所述位点特异性HNF4α破坏剂存在于组合物中。

26.根据权利要求25所述的位点特异性HNF4α破坏剂,其中所述组合物包括药物组合物。

27.根据权利要求26所述的位点特异性HNF4α破坏剂,其中所述药物组合物包含脂质制剂。

28.根据权利要求27所述的位点特异性HNF4α破坏剂,其中所述脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质,或前述的任何组合。

29.根据权利要求27所述的位点特异性HNF4α破坏剂,其中所述药物组合物包含脂质纳米颗粒。

30.一种位点特异性HNF4α破坏剂,其包含编码融合蛋白的核酸分子,所述融合蛋白包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子。

31.根据权利要求30所述的位点特异性HNF4α破坏剂,其中所述位点特异性HNF4α靶向部分包含编码特异性结合所述HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

32.根据权利要求31所述的位点特异性HNF4α破坏剂,其中所述TALE或锌指多肽的DNA结合域包含与选自表6A的第5栏或表10的第4栏中列出的氨基酸序列的氨基酸序列的完整氨基酸序列具有至少85%氨基酸同一性的氨基酸序列。

33.根据权利要求30所述的位点特异性HNF4α破坏剂,其中所述效应分子包含多肽或编码多肽的核酸分子。

34.根据权利要求30所述的位点特异性HNF4α破坏剂,其中所述融合蛋白包含肽-核酸融合物。

35.根据权利要求30-34中任一项所述的位点特异性HNF4α破坏剂,其中所述效应物选自由核酸酶、物理阻断剂、表观遗传募集剂和表观遗传CpG修饰剂及前述的任何组合组成的组。

36.根据权利要求35所述的位点特异性HNF4α破坏剂,其中所述效应物包含CRISPR相关蛋白(Cas)多肽或编码Cas多肽的核酸分子。

37.根据权利要求36所述的位点特异性HNF4α破坏剂,其中所述Cas多肽是无酶活性的Cas多肽。

38.根据权利要求36所述的位点特异性HNF4α破坏剂,其进一步包含人核酸外切酶1(hEXO1)的催化活性结构域。

39.根据权利要求35所述的位点特异性HNF4α破坏剂,其中所述表观遗传募集剂包含转录增强子或转录阻遏物。

40.根据权利要求39所述的位点特异性HNF4α破坏剂,其中所述转录增强子是VPR(VP64-p65-Rta)。

41.根据权利要求40所述的位点特异性HNF4α破坏剂,其中所述VPR包含与

DALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRK
VGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQP

YPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPV
LAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEF
QQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIA
DMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLP
ASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVI
PQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHA
MHISTGLSIFDTSLF.

的完整氨基酸序列具有至少约85％氨基酸同一性的氨基酸序列。

42.根据权利要求40或41所述的位点特异性HNF4α破坏剂,其中所述转录增强子包含2个、3个、4个或5个VPR。

43.根据权利要求39所述的位点特异性HNF4α破坏剂,其中所述转录增强子是p300。

44.根据权利要求43所述的位点特异性HNF4α破坏剂,其中所述p300包含与

IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQY
QEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSP
QTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRK
NDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRL
GTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKA
LFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLE
YVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYK
DIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKN
AKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANS
LPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQD.

的完整氨基酸序列具有至少约85％同一性的氨基酸序列。

45.根据权利要求35所述的位点特异性HNF4α破坏剂,其中所述表观遗传CpG修饰剂包含DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶。

46.根据权利要求30-35中任一项所述的位点特异性HNF4α破坏剂,其中所述效应分子包含锌指多肽。

47.根据权利要求30-35中任一项所述的位点特异性HNF4α破坏剂,其中所述效应分子包含转录激活物样效应物核酸酶(TALEN)多肽。

48.根据权利要求30-47中任一项所述的位点特异性HNF4α破坏剂,其进一步包含编码

第二融合蛋白的第二核酸分子,其中所述第二融合蛋白包含靶向第二HNF4α表达控制区的第二位点特异性HNF4α靶向部分和第二效应分子,其中所述第二HNF4α表达控制区不同于所述HNF4α表达控制区。

49.根据权利要求48所述的位点特异性HNF4α破坏剂,其中所述HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT,且所述第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

50.根据权利要求49所述的位点特异性HNF4α破坏剂,其中所述第二效应物不同于所述效应物。

51.根据权利要求50所述的位点特异性HNF4α破坏剂,其中所述第二效应物与所述效应物相同。

52.根据权利要求49-51中任一项所述的位点特异性HNF4α破坏剂,其中所述融合蛋白和所述第二融合蛋白可操作地连接。

53.根据根据权利要求52所述的位点特异性HNF4α破坏剂,其中所述融合蛋白和所述第二融合蛋白包含与选自由ZF5.3-VPR-tPT2a-ZF7-VPR(SEQ ID NO:176);ZF7-VPR-tPT2a-ZF5.3-VPR(SEQ ID NO:178);ZF5.3-VPR-tPT2a-ZF7-p300(SEQ ID NO:180)和ZF7-p300-tPT2a-ZF5.3-VPR(SEQ ID NO:182)组成的组的多肽的完整氨基酸序列具有至少约85%氨基酸序列同一性的氨基酸序列。

54.根据权利要求30-53中任一项所述的位点特异性HNF4α破坏剂,其中所述融合蛋白包含与ZF5.3-VPR(SEQ ID NO:116)的完整氨基酸序列具有至少约85%氨基酸序列同一性的氨基酸序列。

55.根据权利要求54所述的位点特异性HNF4α破坏剂,其中所述融合蛋白是由包含与选自由ZF5-VPR mRNA(SEQ ID NO:117)、ZF5.1-VPR mRNA(SEQ ID NO:160)、ZF5.2-VPR mRNA(SEQ ID NO:161)、ZF5.3-VPR mRNA(SEQ ID NO:162)、ZF5.4-VPR mRNA(SEQ ID NO:163)、ZF5.5-VPR mRNA(SEQ ID NO:164)和ZF5.6-VPR mRNA(SEQ ID NO:165)组成的组的多核苷酸的完整核苷酸序列具有至少约85%核苷酸序列同一性的核苷酸序列的多核苷酸编码的。

56.一种位点特异性HNF4α破坏剂,其包含编码融合蛋白的核酸分子,其中所述融合蛋白包含与选自由ZF1-VPR(SEQ ID NO:100)、ZF2-VPR(SEQ ID NO:104)、ZF3-VPR(SEQ ID NO:108)、ZF4-VPR(SEQ ID NO:112)、ZF5-VPR(SEQ ID NO:116)、ZF5.3-VPR(SEQ ID NO:116)、ZF6-VPR(SEQ ID NO:120)、ZF7-VPR(SEQ ID NO:124)、ZF8-VPR(SEQ ID NO:128)、ZF9-VPR(SEQ ID NO:132)、ZF10-VPR(SEQ ID NO:136)、ZF11-VPR(SEQ ID NO:140)、ZF12-VPR(SEQ ID NO:144)、ZF13-VPR(SEQ ID NO:148)、ZF14-VPR(SEQ ID NO:152)和ZF15-VPR(SEQ ID NO:156)组成的组的多肽的完整氨基酸序列具有至少约85%氨基酸同一性的氨基酸序列。

57.根据权利要求56所述的位点特异性HNF4α破坏剂,其中所述多肽选自由ZF5-VPR(SEQ ID NO:116)、ZF5.3-VPR、ZF7-VPR(SEQ ID NO:124)、ZF14-VPR(SEQ ID NO:152)和ZF15-VPR(SEQ ID NO:156)组成的组。

58.根据权利要求57所述的位点特异性HNF4α破坏剂,其中所述多肽是ZF5.3-VPR(SEQ ID NO:116)。

59.一种包含编码根据权利要求30-58中任一项所述的位点特异性HNF4α破坏剂的核酸

分子的载体。

60.根据权利要求59所述的载体,其中所述载体是病毒表达载体。

61.一种包含根据权利要求30-58中任一项所述的位点特异性HNF4α破坏剂或根据权利要求59或60所述的载体的细胞。

62.根据权利要求30-58中任一项所述的位点特异性HNF4α破坏剂,其中所述位点特异性HNF4α破坏剂存在于组合物中。

63.根据权利要求62所述的位点特异性HNF4α破坏剂,其中所述组合物包括药物组合物。

64.根据权利要求63所述的位点特异性HNF4α破坏剂,其中所述药物组合物包含脂质制剂。

65.根据权利要求64所述的位点特异性HNF4α破坏剂,其中所述脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质、或前述的任何组合。

66.根据权利要求64所述的位点特异性HNF4α破坏剂,其中所述药物组合物包含脂质纳米颗粒。

67.一种调节细胞中肝细胞核因子4α(HNF4α)的表达的方法,所述方法包括使所述细胞与位点特异性HNF4α破坏剂接触,所述破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子,从而调节细胞中HNF4α的表达。

68.根据权利要求67所述的方法,其中表达的所述调节是细胞中HNF4α的表达增加。

69.根据权利要求67所述的方法,其中表达的所述调节是细胞中HNF4α的表达降低。

70.根据权利要求67所述的方法,其中所述位点特异性HNF4α靶向部分包括聚合物分子。

71.根据权利要求70所述的方法,其中所述聚合物分子包括聚酰胺。

72.根据权利要求71所述的方法,其中所述聚合物分子包含多核苷酸。

73.根据权利要求70所述的方法,其中所述表达控制区包含HNF4α特异性转录控制元件。

74.根据权利要求73所述的方法,其中所述转录控制元件包含HNF4α启动子。

75.根据权利要求74所述的方法,其中所述HNF4α启动子包含HNF4α启动子1的核苷酸序列或其片段。

76.根据权利要求74所述的方法,其中所述HNF4α启动子包含HNF4α启动子2的核苷酸序列或其片段。

77.根据权利要求73所述的方法,其中所述转录控制元件包括转录增强子。

78.根据权利要求73所述的方法,其中所述转录控制元件包括转录阻遏物。

79.根据权利要求67-78中任一项所述的方法,其中所述位点特异性HNF4α破坏剂包含与表2、3、4和9的任一个中的任何核苷酸序列的完整核苷酸序列具有至少85%核苷酸同一性的核酸苷序列。

80.根据权利要求49-60中任一项所述的方法,其中所述位点特异性HNF4α破坏剂包含编码特异性结合所述HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

81.根据权利要求80所述的方法，其中所述TALE或ZNF的DNA结合域包含与选自表6A第5栏或表10第4栏中列出的氨基酸序列的氨基酸序列的完整氨基酸序列有至少85％氨基酸同一性的氨基酸序列。

82.根据权利要求67所述的方法，其中所述表达控制区包含含有第一和第二HNF4α相关锚定序列的锚定序列介导的结合体内的一个或多个HNF4α相关锚定序列。

83.根据权利要求82所述的方法，其中所述锚定序列包含CCCTC结合因子(CTCF)结合基序。

84.根据权利要求82或83所述的方法，其中所述锚定序列介导的结合体包含所述结合体内部的一个或多个转录控制元件。

85.根据权利要求82或83所述的方法，其中所述锚定序列介导的结合体包含所述结合体外部的一个或多个转录控制元件。

86.根据权利要求82-85中任一项所述的方法，其中所述第一和/或第二锚定序列位于所述转录控制元件的约500kb内。

87.根据权利要求86所述的方法，其中所述第一和/或第二锚定序列位于所述转录控制元件的300kb内。

88.根据权利要求67-87中任一项所述的方法，其中所述位点特异性HNF4α破坏剂包含核苷酸修饰。

89.根据权利要求71所述的方法，其中所述聚合物分子包括肽核酸(PNA)。

90.根据权利要求67所述的方法，其中所述效应分子包括多肽。

91.根据权利要求90所述的方法，其中所述多肽包含编码融合蛋白的核酸分子，所述融合蛋白包含靶向HNF4α表达调控区的位点特异性HNF4α靶向部分和效应分子。

92.根据权利要求91所述的方法，其中所述融合蛋白包含肽-核酸融合分子。

93.根据权利要求67所述的方法，其中所述效应物选自由核酸酶、物理阻断剂、表观遗传募集剂和表观遗传CpG修饰剂及前述的任何组合组成的组。

94.根据权利要求93所述的方法，其中所述效应物包含CRISPR相关蛋白(Cas)多肽或编码Cas多肽的核酸分子。

95.根据权利要求94所述的方法，其中所述Cas多肽是无酶活性的Cas多肽。

96.根据权利要求95所述的方法，其进一步包含人核酸外切酶1(hEXO1)的催化活性结构域。

97.根据权利要求93所述的方法，其中所述表观遗传募集剂包含转录增强子或转录阻遏物。

98.根据权利要求97所述的方法，其中所述转录增强子是VPR。

99.根据权利要求98所述的方法，其中所述VPR包含与

DALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRK

VGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQP
YPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPV
LAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEF
QQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIA
DMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLP
ASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVI
PQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHA
MHISTGLSIFDTSLF.

的完整氨基酸序列具有至少约85％氨基酸同一性的氨基酸序列。

100.根据权利要求98或99所述的方法，其中所述转录增强子包含2个、3个、4个或5个VPR。

101.根据权利要求97所述的方法，其中所述转录增强子是p300。

102.根据权利要求101所述的方法，其中p300具有与

IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQY
QEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSP
QTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRK
NDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRL
GTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKA
LFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLE
YVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYK
DIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKN
AKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANS
LPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQD.

的完整氨基酸序列具有至少约85％氨基酸同一性的氨基酸序列。

103.根据权利要求93所述的方法，其中所述表观遗传CpG修饰剂包括DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶。

104.根据权利要求90-93中任一项所述的方法，其中所述效应分子包含锌指多肽。

105.根据权利要求90-93中任一项所述的方法，其中所述效应分子包含转录激活物样效应物核酸酶(TALEN)多肽。

106.根据权利要求91所述的方法，其中所述融合蛋白包含无酶活性的Cas多肽和表观遗传募集剂多肽。

107.根据权利要求91所述的方法，其中所述融合蛋白包含酶性Cas多肽和表观遗传CpG修饰剂多肽。

108.根据权利要求67-107中任一项所述的方法，其中所述位点特异性HNF4α破坏剂包含编码第二融合蛋白的第二核酸分子，其中所述第二融合蛋白包含靶向第二HNF4α表达控制区的第二位点特异性HNF4α靶向部分和第二效应分子，其中所述第二HNF4α表达控制区不同于所述HNF4α表达控制区。

109.根据权利要求108所述的方法，其中所述HNF4α表达控制区包含ZF5靶序列

GGCGGGGGACCGATTAACCAT，并且所述第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

110.根据权利要求108所述的方法，其中所述第二效应物不同于所述效应物。

111.根据权利要求110所述的方法，其中所述第二效应物与所述效应物相同。

112.根据权利要求108-111中任一项所述的方法，其中所述融合蛋白与第二融合蛋白可操作地连接。

113.根据权利要求112所述的方法，其中所述融合蛋白和所述第二融合蛋白包含与选自ZF5.3-VPR-tPT2a-ZF7-VPR蛋白(SEQ ID NO:176)、ZF7-VPR-tPT2a-ZF5.3-VPR蛋白(SEQ ID NO:178)、ZF5.3-VPR-tPT2a-ZF7-p300蛋白(SEQ ID NO:180)和ZF7-p300-tPT2a-ZF5.3-VPR蛋白(SEQ ID NO:182)的多肽的完整氨基酸序列具有至少约85％序列同一性的氨基酸序列。

114.根据权利要求67-113中任一项所述的方法，其中所述融合蛋白包含与ZF5.3-VPR蛋白(SEQ ID NO:116)的完整氨基酸序列具有至少85％序列同一性的氨基酸序列。

115.根据权利要求114所述的方法，其中所述融合蛋白是由具有与选自由ZF5-VPR mRNA(SEQ ID NO:117)、ZF5.1-VPR mRNA(SEQ ID NO:160)、ZF5.2-VPR mRNA(SEQ ID NO:161)、ZF5.3-VPRmRNA(SEQ ID NO:162)、ZF5.4-VPR mRNA(SEQ ID NO:163)、ZF5.5-VPR mRNA(SEQ ID NO:164)和ZF5.6-VPR mRNA(SEQ ID NO:165)组成的组的多核苷酸的完整核苷酸序列具有至少约85％序列同一性的序列的多核苷酸编码的。

116.根据权利要求108-115中任一项所述的方法，其中所述位点特异性HNF4α破坏剂和所述第二位点特异性HNF4α破坏剂的施用在调节HNF4α的表达中具有协同作用。

117.根据权利要求108-116中任一项所述的方法，其中所述HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT，并且所述第二HNF4α表达控制区包含选自ZF7靶序列ACTGAACATCGGTGAGTTAGG、ZF10靶序列CCTGCAGCCCCGCCCAGCCTA、ZF14靶序列GGAGGGGTGGGGGTTAATGGT和ZF15靶序列GAAGGGGTGGAGGCTCTGCCG的序列。

118.根据权利要求117所述的方法，其中所述HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT，并且所述第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

119.根据权利要求117所述的方法，其中所述融合蛋白包含与ZF5.3-VPR的完整氨基酸序列具有至少85％序列同一性的序列，并且所述第二融合蛋白包含与选自ZF7-VPR(SEQ ID NO:124)、ZF14-VPR(SEQ ID NO:152)和ZF15-VPR(SEQ ID NO:156)的多肽的完整氨基酸序列具有至少85％序列同一性的序列。

120.根据权利要求91所述的方法，其中所述融合蛋白包含与选自由ZF1-VPR(SEQ ID NO:100)、ZF2-VPR(SEQ ID NO:104)、ZF3-VPR(SEQ ID NO:108)、ZF4-VPR(SEQ ID NO:112)、ZF5-VPR(SEQ ID NO:116)、ZF5.3-VPR(SEQ ID NO:116)、ZF6-VPR(SEQ ID NO:120)、ZF7-VPR(SEQ ID NO:124)、ZF8-VPR(SEQ ID NO:128)、ZF9-VPR(SEQ ID NO:132)、ZF10-VPR(SEQ ID NO:136)、ZF11-VPR(SEQ ID NO:140)、ZF12-VPR(SEQ ID NO:144)、ZF13-VPR(SEQ ID NO:148)、ZF14-VPR(SEQ ID NO:152)和ZF15-VPR(SEQ ID NO:156)组成的组的多肽的完整氨基酸序列具有至少约85％同一性的氨基酸序列。

121.根据权利要求120所述的方法，其中所述多肽选自由ZF5-VPR(SEQ ID NO:116)、

ZF5.3-VPR(SEQ ID NO:116)、ZF7-VPR(SEQ ID NO:124)、ZF14-VPR(SEQ ID NO:152)和ZF15-VPR(SEQ ID NO:156)组成的组。

122.根据权利要求121所述的方法,其中所述多肽是ZF5.3-VPR(SEQ ID NO:116)。

123.根据权利要求67-122中任一项所述的方法,其中所述位点特异性破坏剂、所述效应物或所述位点特异性破坏剂和所述效应物二者存在于载体中。

124.根据权利要求123所述的方法,其中所述位点特异性破坏剂和所述效应物存在于同一载体中。

125.根据权利要求123所述的方法,其中所述位点特异性破坏剂和所述效应物存在于不同的载体中。

126.根据权利要求123-125中任一项所述的方法,其中所述载体是病毒表达载体。

127.根据权利要求67-122中任一项所述的方法,其中所述位点特异性破坏剂、所述效应物或所述位点特异性破坏剂和所述效应物二者存在于组合物中。

128.根据权利要求127所述的方法,其中所述位点特异性破坏剂和所述效应物存在于同一组合物中。

129.根据权利要求127所述的方法,其中所述位点特异性破坏剂和所述效应物存在于不同的组合物中。

130.根据权利要求127-129中任一项所述的方法,其中所述组合物包括药物组合物。

131.根据权利要求130所述的方法,其中所述药物组合物包含脂质制剂。

132.根据权利要求131所述的方法,其中所述脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质,或前述的任何组合。

133.根据权利要求130所述的位点特异性HNF4α破坏剂,其中所述药物组合物包含脂质纳米颗粒。

134.根据权利要求67所述的方法,其中所述细胞是哺乳动物细胞。

135.根据权利要求134所述的方法,其中所述哺乳动物细胞是体细胞。

136.根据权利要求134所述的方法,其中所述哺乳动物细胞是原代细胞。

137.根据权利要求67所述的方法,其中所述接触在体外进行。

138.根据权利要求67所述的方法,其中所述接触在体内进行。

139.根据权利要求67所述的方法,其中所述接触离体进行。

140.根据权利要求139所述的方法,其进一步包含向受试者施用所述细胞。

141.根据权利要求67所述的方法,其中所述细胞在受试者体内。

142.根据权利要求140或141所述的方法,其中所述受试者患有HNF4α相关疾病。

143.根据权利要求142所述的方法,其中所述HNF4α相关疾病选自由脂肪肝(脂肪变性)、非酒精性脂肪性肝炎(NASH)、肝硬化、肝脏内脂肪堆积、肝脏炎症、肝细胞坏死、肝纤维化和非酒精性脂肪肝病(NAFLD)、多囊性肾病、炎症性肠病(IBD)和MODYI组成的组。

144.一种治疗患有HNF4α相关疾病的受试者的方法,其包括向所述受试者施用治疗有效量的位点特异性HNF4α破坏剂,所述破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子,从而治疗所述受试者。

145.根据权利要求144所述的方法,其中所述HNF4α相关疾病是肝细胞癌,并且所述位

点特异性HNF4α破坏剂降低所述受试者体内HNF4α的表达。

146.根据权利要求145所述的方法，其中所述HNF4α相关疾病选自由脂肪肝(脂肪变性)、非酒精性脂肪性肝炎(NASH)、肝硬化、肝脏内脂肪堆积、肝脏炎症、肝细胞坏死、肝纤维化和非酒精性脂肪肝病(NAFLD)组成的组，并且所述位点特异性HNF4α破坏剂增加受试者体内HNF4α的表达。

147.根据权利要求144-146中任一项所述的方法，其中所述位点特异性HNF4α破坏剂和所述效应分子同时施用于所述受试者。

148.根据权利要求144-146中任一项所述的方法，其中所述位点特异性HNF4α破坏剂和所述效应分子依次施用于所述受试者。

149.根据权利要求148所述所述的方法，其中所述效应分子在位点特异性HNF4α破坏剂的施用之前被施用于所述受试者。

150.根据权利要求149所述的方法，其中所述位点特异性HNF4α破坏剂在所述效应分子的施用之前被施用于所述受试者。

151.一种位点特异性HNF4α破坏剂，其包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分，其中所述HNF4α表达控制区包含表1的第3栏或表10的第1栏中列出的任何一个核苷酸序列的核苷酸序列。

152.根据权利要求151所述的位点特异性HNF4α破坏剂，其中所述位点特异性HNF4α靶向部分包含与表2、3、4和9的任一个中的任何核苷酸序列的完整核苷酸序列具有至少85％核苷酸同一性的核苷酸序列。

153.根据权利要求151所述的位点特异性HNF4α破坏剂，其中所述位点特异性HNF4α靶向部分包含聚合物分子，所述聚合物分子包含编码特异性结合所述HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

154.根据权利要求153所述的位点特异性HNF4α破坏剂，其中所述TALE或ZNF多肽的DNA结合域包含与表6A的第5栏或表10的第4栏中列出的任何一个氨基酸序列的完整氨基酸序列具有至少约85％氨基酸同一性的氨基酸序列。

155.根据权利要求151所述的位点特异性HNF4α破坏剂，其中所述HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT的核苷酸序列。

156.根据权利要求151所述的位点特异性HNF4α破坏剂，其中所述HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG的核苷酸序列。

157.一种位点特异性HNF4α破坏剂，其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPE
CGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFS
RNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLV
RHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLP
DTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSL
STINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPP
QAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQ
GIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFS
ALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAP
TPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEE
AAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTG
LSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF5-VPR氨基酸序列的多核苷酸。

158.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPE
CGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFS
RNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLV
RHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLP
DTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSL
STINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPP
QAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQ
GIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFS
ALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAP
TPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEE
AAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTG
LSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF5.3-VPR的氨基酸序列的多核苷酸。

159.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPE

CGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFS
RSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVR
HQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDL
DMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDT
DDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTI
NYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQA
VAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIP
VAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALL
GSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPT
GPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAI
CGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSI
FDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF7-VPR的氨基酸序列的多核苷酸。

160.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQNSTLTEHQRTHTGEKPYKCPE
CGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSR
NDTLTEHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSQSGDLRR
HQRTHTGEKPYKCPECGKSFSTKNSLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDL
DMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDT
DDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTI
NYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQA
VAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIP
VAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALL
GSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPT
GPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAI
CGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSI
FDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF10-VPR的氨基酸序列的多核苷酸。

161.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGHLVRHQRTHTGEKPYKCPE
CGKSFSTTGNLTVHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSR
SDKLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVR
HQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFD
LDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPD
TDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLST
INYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQA
VAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIP
VAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALL
GSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPT
GPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAI
CGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSI
FDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF14-VPR的氨基酸序列的多核苷酸。

162.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPE
CGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFS
RSDNLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLV
RHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLP
DTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSL
STINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPP
QAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQ
GIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFS
ALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAP
TPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEE
AAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTG
LSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的ZF15-VPR的氨基酸序列的多核苷酸。

163.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYK
CPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECG
KSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRS
DKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDA
LDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGS
QYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPF
TSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAP
GPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQL
LNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADM
DFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPAS
LAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQ
KEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHI
STGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPT

SAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQR
THTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEK
PYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPEC
GKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGG
SGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKK
RKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPA
PQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAP
VPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDN
SEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDF
SSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWAN
RPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMA
DTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECL
LHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的双顺反子ZF5.3-VPR-tPT2a-ZF7-VPR的氨基酸序列的多核苷酸。

164.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPE
CGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFS
RSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVR
HQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDL
DMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDT
DDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTI
NYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQA
VAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIP
VAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALL
GSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPT
GPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAI
CGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSI
FDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKL
GSGEGRGSLLTCGDVEENPGPLEGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKP
YKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPE
CGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFS
RSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGG
DALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRK
VGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQP
YPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPV
LAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEF

QQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIA
DMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLP
ASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVI
PQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHA
MHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的双顺反子ZF7-VPR-tPT2a-ZF5.3-VPR的氨基酸序列的多核苷酸。

165.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYK
CPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECG
KSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRS
DKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDA
LDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGS
QYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPF
TSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAP
GPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQL
LNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADM
DFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPAS
LAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQ
KEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHI
STGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPT
SAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQR
THTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEK
PYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPEC
GKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGG
SGGIFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDT
GQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKL
EFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFS
KRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLP
STRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPY
RTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILI
GYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVH
DYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGD
SKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPA
ANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSGG
KRPAATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的双顺反子ZF5.3-VPR-tPT2a-ZF7-p300的氨基酸序列的多核苷酸。

166.一种位点特异性HNF4α破坏剂,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPE
CGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFS
RSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVR
HQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGIFKPEELRQ
ALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVD
DIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGK
QLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELF
VECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRV
NDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEID
GVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLG
YTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQAT
EDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNN
KKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDP
DPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSGGKRPAATKKA
GQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEEN
PGPLEGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRV
HQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHT
GEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYK
CPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRK
RTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFP
SGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQA
GEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPML
MEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSR
EGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLT
PAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPP
RGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRP
AATKKAGQAKKKKGSYPYDVPDYA.

的氨基酸序列的双顺反子ZF7-p300-tPT2a-ZF5.3-VPR的氨基酸序列的多核苷酸。

167.一种载体,其包含编码根据权利要求151-166中任一项所述的位点特异性HNF4α破坏剂的核酸分子。

168.根据权利要求167所述的载体,其中所述载体是病毒表达载体。

169.一种药物组合物,其包含根据权利要求151-166中任一项所述的位点特异性HNF4α破坏剂或权利要求167或168所述的载体。

170.根据权利要求169所述的药物组合物,其中药物组合物包含脂质制剂。

171.根据权利要求170所述的药物组合物,其中所述脂质制剂包含一或多种阳离子脂质、一或多种非阳离子脂质、一或多种基于胆固醇的脂质、或一或多种PEG修饰的脂质,或前述的任何组合。

172.根据权利要求170所述的药物组合物,其中所述药物组合物包含脂质纳米颗粒。

173.一种包含位点特异性HNF4α破坏剂的药物组合物,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPE
CGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFS
RNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLV
RHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLP
DTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSL
STINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPP
QAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQ
GIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFS
ALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAP
TPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEE
AAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTG
LSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA

的氨基酸序列的ZF5.3-VPR的氨基酸序列的多核苷酸;和脂质纳米颗粒。

174.一种包含位点特异性HNF4α破坏剂的药物组合物,其包含编码包含

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPE
CGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFS
RSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVR
HQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDL
DMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDT
DDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTI
NYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQA
VAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIP
VAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALL

GSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPT
GPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAI
CGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSI
FDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA;

的氨基酸序列的ZF7-VPR的氨基酸序列的多核苷酸;和脂质纳米颗粒。

175.药物组合物,其包含位点特异性HNF4α破坏剂和脂质纳米颗粒,所述位点特异性HNF4α破坏剂包含编码双顺反子ZF5.3-VPR-tPT2a-ZF7-VPR的氨基酸序列的多核苷酸,所述双顺反子ZF5.3-VPR-tPT2a-ZF7-VPR的氨基酸序列包含

MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYK
CPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECG
KSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRS
DKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDA
LDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGS
QYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPF
TSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAP
GPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQL
LNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADM
DFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPAS
LAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQ
KEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHI
STGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPT
SAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQR
THTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEK
PYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPEC
GKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGG
SGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKK
RKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPA
PQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAP
VPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDN
SEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDF
SSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWAN
RPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMA
DTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECL
LHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA;

的氨基酸序列。

176.一种细胞,其包含根据权利要求151-166中任一项所述的位点特异性HNF4α破坏剂或根据权利要求167或168所述的载体。

177.一种调节细胞中肝细胞核因子4α(HNF4α)的表达的方法,所述方法包括使所述细胞与根据权利要求151-166中任一项所述的位点特异性HNF4α破坏剂,或根据权利要求167或168所述的载体,或根据权利要求169-175中任一项所述的药物组合物接触。

178.根据权利要求177所述的方法,其中表达的所述调节是细胞中HNF4α表达的增加。

179.根据权利要求177所述的方法,其中表达的所述调节是细胞中HNF4α表达的降低。

用于调节肝细胞核因子4α(HNF4α)基因表达的组合物和方法

[0001] 相关申请的交叉引用

[0002] 本申请要求于2019年9月23日提交的美国临时申请No.62/904,178的权益,其全部内容通过引用并入本文。

背景技术

[0003] 主调节因子是具有影响与细胞类型、器官系统或对刺激的反应相关的基因网络的表达的蛋白质,例如转录因子。

[0004] 主调节因子的一个示例是转录因子肝细胞核因子4-α(HNF4α)。HNF4α在胚胎发育晚期的终末分化肝细胞中首次表达。HNF4α控制肝脏中肝细胞和其它细胞类型的正常功能所必需的蛋白质的表达(Li等,(2000)Genes and Devel14:464-474)。此外,许多这些蛋白质是由肝脏细胞分泌的,并有助于全身健康。例如,在循环中需要蛋白质(例如白蛋白)转运营养物、激素、脂质和小分子药物。在肝纤维化病中,HNF4α失调,并由此导致其网络中的基因表达显著下降或停止(Guzman-Lepe等,(2018)Hepatol Comm 2(5):582)。这种网络的失调与器官自身中肝衰竭的病理学相关,并促进整个患者的共病。

[0005] 最近,NishikawA等人(2015)证实了肝硬化大鼠模型中HNF4α的转基因表达导致整个HNF4α网络中基因表达的恢复、肝细胞功能的恢复和动物健康的改善。用腺伴随病毒(AAV)递送转基因。然而,来自AAV递送的转基因表达不允许基因组中已存在的基因的表达的精细控制或临时修饰。一旦用AAV修饰,受影响的细胞即丧失以灵巧的生理学有意义的方式应答器官和身体中条件变化的能力。

[0006] 因此,本领域需要临时且不稳定的效应物,其提供更大的控制和将细胞和组织恢复至新生“正常”状态的能力,从而治疗HNF4α相关疾病,例如纤维化肝病,例如肝硬化。

发明内容

[0007] 本发明提供用于通过靶向HNF4α表达控制区来调节肝细胞核因子4α(HNF4α)基因的表达(例如增加或降低表达)的试剂和组合物。HNF4α基因可以在细胞中,例如哺乳动物细胞,如哺乳动物体细胞(如人类体细胞)。本发明还提供使用本发明的试剂和组合物调节HNF4α基因表达或治疗将受益于调节HNF4α基因表达的受试者(例如患有或易患HNF4α相关疾病的受试者)的方法。

[0008] 因此,在一个方面,本发明提供位点特异性破坏剂,其包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分。

[0009] 在一些实施方案中,位点特异性HNF4α靶向部分包含聚合物分子。

[0010] 聚合物分子可包括聚酰胺、多核苷酸、编码特异性结合HNF4α表达控制区的DNA结合域或其片段的多核苷酸,或肽核酸(PNA)。

[0011] 在一些实施方案中,表达控制区包含HNF4α特异性转录控制元件。

[0012] 在一些实施方案中,转录控制元件包含HNF4α启动子,例如HNF4α启动子1的核苷酸序列或其片段,或HNF4α启动子2的核苷酸序列或其片段。

[0013] 在一些实施方案中,转录控制元件包含转录增强子。

[0014] 在一些实施方案中,转录控制元件包含转录阻遏物。

[0015] 在一些实施方案中,位点特异性HNF4α破坏剂包含与表2、3、4和9的任一个的任何核苷酸序列的完整核苷酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%核酸同一性的核苷酸序列。

[0016] 在一些实施方案中,位点特异性HNF4α破坏剂包含编码特异性结合HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

[0017] 在一个实施方案中,TALE或ZNF多肽的DNA结合域包含与表6A的第5栏或表10的第4栏中列出的任何一个氨基酸序列的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。在一个实施方案中,TALE或ZNF多肽的DNA结合域包含与ZF5.3的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。在一个实施方案中,TALE或ZNF多肽的DNA结合域包含与ZF7的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。在一个实施方案中,TALE或ZNF多肽的DNA结合域包含与ZF14的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。在一个实施方案中,TALE或ZNF多肽的DNA结合域包含与ZF15的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0018] 在一些实施方案中,表达控制区在包含在含有第一和第二HNF4α相关锚定序列的锚定序列介导的结合体(conjunction)内的一个或多个HNF4α相关锚定序列。

[0019] 在一些实施方案中,锚定序列包含CCCTC结合因子(CTCF)结合基序。

[0020] 在一些实施方案中,锚定序列介导的结合体包含所述结合体内部的一个或多个转录控制元件。

[0021] 在一些实施方案中,锚定序列介导的结合体包含所述结合体外部的一个或多个转录控制元件。

[0022] 在一些实施方案中,第一和/或第二锚定序列位于转录控制元件的约500kb内。

[0023] 在一些实施方案中,第一和/或第二锚定序列位于转录控制元件的300kb内。

[0024] 在一些实施方案中,位点特异性HNF4α破坏剂包含核苷酸修饰。

[0025] 本发明还提供载体(例如病毒表达载体)和包含本发明的位点特异性HNF4α破坏剂以及本发明的载体的细胞。

[0026] 在一些实施方案中,本发明的位点特异性HNF4α破坏剂存在于组合物(例如药物组合物)中。

[0027] 在一些实施方案中,药物组合物包含脂质制剂。

[0028] 在一些实施方案中,脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质或前述的任何组合。

[0029] 在一些实施方案中,药物组合物包含脂质纳米颗粒。

[0030] 在另一个方面,本发明提供位点特异性HNF4α破坏剂,其包含编码融合蛋白的核酸

分子,所述融合蛋白包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子。

[0031] 在一些实施方案中,位点特异性HNF4α靶向部分包含编码特异性结合HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

[0032] 在一个实施方案中,TALE的DNA结合域包含与选自表6A的第5栏或表10的第4栏中列出的氨基酸序列的氨基酸序列的完整氨基酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0033] 在一些实施方案中,效应分子包含多肽或编码多肽的核酸分子。

[0034] 在一些实施方案中,融合蛋白包含肽-核酸融合物。

[0035] 在一些实施方案中,效应物选自由核酸酶、物理阻断剂、表观遗传募集剂和表观遗传CpG修饰剂及前述的任何组合组成的组。

[0036] 在一些实施方案中,效应物包含CRISPR相关蛋白(Cas)多肽或编码Cas多肽的核酸分子。

[0037] 在一些实施方案中,Cas多肽是无酶活性的Cas多肽。

[0038] 在一些实施方案中,Cas多肽包含人核酸外切酶1(hEXO1)的催化活性结构域。

[0039] 在一些实施方案中,表观遗传募集剂包含转录增强子或转录阻遏物。

[0040] 在一个实施方案中,转录增强子是VPR(VP64-p65-Rta)。

[0041] 在一个实施方案中,VPR包含与DALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLF的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0042] 在一个实施方案中,转录增强子包含2、3、4或5个VPR。

[0043] 在一个实施方案中,转录增强子是p300。

[0044] 在一个实施方案中,p300包含与IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQD的完整氨基酸序列具有至少约85%、85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或

100％同一性的氨基酸序列。

[0045] 在一些实施方案中，表观遗传CpG修饰剂包含DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶。

[0046] 在一些实施方案中，效应分子包含锌指多肽。

[0047] 在一些实施方案中，效应分子包含转录激活物样效应物核酸酶(TALEN)多肽。

[0048] 在一些实施方案中，位点特异性HNF4α破坏剂进一步包含编码第二融合蛋白的第二核酸分子，其中所述第二融合蛋白包含靶向第二HNF4α表达控制区的第二位点特异性HNF4α靶向部分和第二效应分子，其中所述第二HNF4α表达控制区不同于HNF4α表达控制区。

[0049] 在一个实施方案中，HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT，并且第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

[0050] 在一个实施方案中，第二效应物不同于第一效应物。

[0051] 在一个实施方案中，第二效应物与第一效应物相同。

[0052] 在一个实施方案中，融合蛋白和第二融合蛋白可操作地连接。

[0053] 在一个实施方案中，融合蛋白和第二融合蛋白包含与选自由ZF5.3-VPR-tPT2a-ZF7-VPR;ZF7-VPR-tPT2a-ZF5.3-VPR;ZF5.3-VPR-tPT2a-ZF7-p300和ZF7-p300-tPT2a-ZF5.3-VPR组成的组的多肽的完整氨基酸序列具有至少约85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％氨基酸序列同一性的氨基酸序列。

[0054] 在一个实施方案中，融合蛋白包含与ZF5.3-VPR的完整氨基酸序列具有至少约85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％氨基酸序列同一性的氨基酸序列。

[0055] 在一个实施方案中，融合蛋白是由包含与选自由ZF5-VPR mRNA、ZF5.1-VPR mRNA、ZF5.2-VPR mRNA、ZF5.3-VPR mRNA、ZF5.4-VPR mRNA、ZF5.5-VPR mRNA和ZF5.6-VPR mRNA组成的组的多核苷酸的完整核苷酸序列具有至少约85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％核苷酸序列同一性的核苷酸序列的多核苷酸编码的。

[0056] 在一个方面，本发明提供了位点特异性HNF4α破坏剂。所述破坏剂包括编码融合蛋白的核酸分子，其中所述融合蛋白包含与选自由ZF1-VPR、ZF2-VPR、ZF3-VPR、ZF4-VPR、ZF5-VPR、ZF5.3-VPR、ZF6-VPR、ZF7-VPR、ZF8-VPR、ZF9-VPR、ZF10-VPR、ZF11-VPR、ZF12-VPR、ZF13-VPR、ZF14-VPR和ZF15-VPR组成的组的多肽的完整氨基酸序列具有至少约85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％氨基酸同一性的氨基酸序列。

[0057] 在一个实施方案中，多肽选自由ZF5-VPR、ZF5.3-VPR、ZF7-VPR、ZF10-VPR、ZF14-VPR和ZF15-VPR组成的组。

[0058] 在一个实施方案中，多肽是ZF5.3-VPR。

[0059] 本发明还提供载体(例如病毒表达载体)和包含本发明的位点特异性HNF4α破坏剂以及本发明的载体的细胞。

[0060] 在一些实施方案中，本发明的位点特异性HNF4α破坏剂存在于组合物(例如药物组合物)中。

[0061] 在一些实施方案中,药物组合物包含脂质制剂。

[0062] 在一些实施方案中,脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质、或前述的任何组合。

[0063] 在一些实施方案中,药物组合物包含脂质纳米颗粒。

[0064] 在一个方面,本发明提供了调节细胞中肝细胞核因子4α(HNF4α)的表达的方法。该方法包括使所述细胞与位点特异性HNF4α破坏剂接触,该破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子,从而调节细胞中HNF4α的表达。

[0065] 表达的调节可增加细胞中HNF4α的表达或降低细胞中HNF4α的表达。

[0066] 在一些实施方案中,位点特异性HNF4α靶向部分包含聚合物分子。

[0067] 聚合物分子可以包括聚酰胺、多核苷酸、肽核酸(PNA)。

[0068] 在一些实施方案中,表达控制区包含HNF4α特异性转录控制元件。

[0069] 在一些实施方案中,转录控制元件包含HNF4α启动子,例如HNF4α启动子1的核苷酸序列或其片段,或HNF4α启动子2的核苷酸序列或其片段。

[0070] 在一些实施方案中,转录控制元件包含转录增强子。

[0071] 在一些实施方案中,转录控制元件包含转录阻遏物。

[0072] 在一些实施方案中,位点特异性HNF4α破坏剂包含与表2、3、4和9的任一个中的任何核苷酸序列的完整核苷酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%核苷酸同一性的核苷酸序列。

[0073] 在一些实施方案中,位点特异性HNF4α破坏剂包含编码特异性结合HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

[0074] 在一些实施方案中,TALE或ZNF的DNA结合域包含与选自表6A的第5栏或表10的第4栏中列出的氨基酸序列的氨基酸序列的完整氨基酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0075] 在一些实施方案中,表达控制区包含在含有第一和第二HNF4α相关锚定序列的锚定序列介导的结合体内的一个或多个HNF4α相关锚定序列。

[0076] 在一些实施方案中,锚定序列包含CCCTC结合因子(CTCF)结合基序。

[0077] 在一些实施方案中,锚定序列介导的结合体包含所述结合体内部的一个或多个转录控制元件。

[0078] 在一些实施方案中,锚定序列介导的结合体包含所述结合体外部的一个或多个转录控制元件。

[0079] 在一些实施方案中,第一和/或第二锚定序列位于转录控制元件的约500kb内。

[0080] 在一些实施方案中,第一和/或第二锚定序列位于转录控制元件的300kb内。

[0081] 在一些实施方案中,位点特异性HNF4α破坏剂包含核苷酸修饰。

[0082] 在一些实施方案中,效应分子包含多肽。

[0083] 在一些实施方案中,多肽包含编码含有靶向HNF4α表达调控区的位点特异性HNF4α靶向部分和效应分子的融合蛋白的核酸分子。

[0084] 在一些实施方案中,融合蛋白包含肽-核酸融合分子。

[0085] 在一些实施方案中,效应物选自核酸酶、物理阻断剂、表观遗传募集剂和表观遗传

CpG修饰剂,以及前述的任何组合。

[0086] 在一些实施方案中,效应物包含CRISPR相关蛋白(Cas)多肽或编码Cas多肽的核酸分子。

[0087] 在一些实施方案中,Cas多肽是无酶活性的Cas多肽。

[0088] 在一些实施方案中,Cas多肽进一步包含人核酸外切酶1(hEXO1)的催化活性结构域。

[0089] 在一些实施方案中,表观遗传募集剂包含转录增强子或转录阻遏物。

[0090] 在一些实施方案中,转录增强子是VPR。

[0091] 在一些实施方案中,VPR包含与DALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLF的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0092] 在一些实施方案中,转录增强子包含2个、3个、4个或5个VPR。

[0093] 在一些实施方案中,转录增强子是p300。

[0094] 在一些实施方案中,p300具有与IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQD的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%氨基酸同一性的氨基酸序列。

[0095] 在一些实施方案中,表观遗传CpG修饰剂包含DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶。

[0096] 在一些实施方案中,效应分子包含锌指多肽。

[0097] 在一些实施方案中,效应分子包含转录激活物样效应物核酸酶(TALEN)多肽。

[0098] 在一些实施方案中,融合蛋白包含无酶活性的Cas多肽和表观遗传募集剂多肽。

[0099] 在一些实施方案中,融合蛋白包含酶性Cas多肽和表观遗传CpG修饰剂多肽。

[0100] 在一些实施方案中,位点特异性HNF4α破坏剂包含编码第二融合蛋白的第二核酸分子,其中所述第二融合蛋白包含靶向第二HNF4α表达控制区的第二位点特异性HNF4α靶向部分和第二效应分子,其中所述第二HNF4α表达控制区不同于HNF4α表达控制区。

[0101] 在一些实施方案中,HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT,且第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

[0102] 在一些实施方案中,第二效应物不同于效应物。

[0103] 在一些实施方案中,第二效应物与效应物相同。

[0104] 在一些实施方案中,融合蛋白和第二融合蛋白可操作地连接。

[0105] 在一些实施方案中,融合蛋白和第二融合蛋白包含与选自ZF5.3-VPR-tPT2a-ZF7-VPR蛋白、ZF7-VPR-tPT2a-ZF5.3-VPR蛋白、ZF5.3-VPR-tPT2a-ZF7-p300蛋白和ZF7-p300-tPT2a-ZF5.3-VPR蛋白的多肽的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%序列同一性的氨基酸序列。

[0106] 在一些实施方案中,融合蛋白包含与ZF5.3-VPR蛋白的完整氨基酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%序列同一性的氨基酸序列。

[0107] 在一些实施方案中,融合蛋白是由具有与选自由ZF5-VPR mRNA、ZF5.1-VPR mRNA、ZF5.2-VPR mRNA、ZF5.3-VPR mRNA、ZF5.4-VPR mRNA、ZF5.5-VPR mRNA和ZF5.6-VPR mRNA组成的组的多核苷酸的完整核苷酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%序列同一性的序列的多核苷酸编码的。

[0108] 在一些实施方案中,位点特异性HNF4α破坏剂和第二位点特异性HNF4α破坏剂的施用在调节HNF4α的表达中具有协同作用。

[0109] 在一些实施方案中,HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT,且第二HNF4α表达控制区包含选自ZF7靶序列ACTGAACATCGGTGAGTTAGG、ZF10靶序列CCTGCAGCCCCGCCCAGCCTA、ZF14靶序列GGAGGGGTGGGGGTTAATGGT和ZF15靶序列GAAGGGGTGGAGGCTCTGCCG的序列。

[0110] 在一些实施方案中,HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT,且第二HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG。

[0111] 在一些实施方案中,融合蛋白包含与ZF5-VPR的完整氨基酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%序列同一性的序列,并且第二融合蛋白包含与选自ZF7-VPR、ZF10-VPR、ZF14-VPR和ZF15-VPR的多肽的完整氨基酸序列具有至少85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%序列同一性的序列。

[0112] 在一些实施方案中,融合蛋白包含与选自由ZF1-VPR、ZF2-VPR、ZF3-VPR、ZF4-VPR、ZF5-VPR、ZF5.3-VPR、ZF6-VPR、ZF7-VPR、ZF8-VPR、ZF9-VPR、ZF10-VPR、ZF11-VPR、ZF12-VPR、ZF13-VPR、ZF14-VPR和ZF15-VPR组成的组的多肽的完整氨基酸序列具有至少约85%、86%、87%、88%、89%、90%、91%、92%、93%、94%、95%、96%、97%、98%、99%或100%同一性的氨基酸序列。

[0113] 在一些实施方案中,多肽选自由ZF5-VPR、ZF5.3-VPR、ZF7-VPR、ZF10-VPR、ZF14-VPR和ZF15-VPR组成的组。

[0114] 在一些实施方案中,多肽是ZF5.3-VPR。

[0115] 在一些实施方案中，位点特异性破坏剂、效应物、或位点特异性破坏剂和效应物二者存在于载体中，例如病毒表达载体。

[0116] 在一些实施方案中，位点特异性破坏剂和效应物存在于同一载体中。

[0117] 在一些实施方案中，位点特异性破坏剂和效应物存在于不同的载体中。

[0118] 在一些实施方案中，位点特异性破坏剂、效应物、或位点特异性破坏剂和效应物二者存在于组合物中。

[0119] 在一些实施方案中，位点特异性破坏剂和效应物存在于同一组合物中。

[0120] 在一些实施方案中，位点特异性破坏剂和效应物存在于不同的组合物中。

[0121] 在一些实施方案中，组合物包含药物组合物。

[0122] 在一些实施方案中，药物组合物包含脂质制剂。

[0123] 在一些实施方案中，脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质，或前述的任何组合。

[0124] 在一些实施方案中，药物组合物包含脂质纳米颗粒。

[0125] 在一些实施方案中，细胞是哺乳动物细胞，例如体细胞或原代细胞。

[0126] 在一些实施方案中，接触在体外进行。

[0127] 在一些实施方案中，接触在体内进行。

[0128] 在一些实施方案中，接触离体进行。

[0129] 在一些实施方案中，本发明的方法进一步包括向受试者施用细胞。

[0130] 在一些实施方案中，细胞在受试者体内。

[0131] 在一些实施方案中，受试者患有HNF4α相关疾病。

[0132] 在一些实施方案中，HNF4α相关疾病选自由脂肪肝(脂肪变性)、非酒精性脂肪性肝炎(NASH)、肝硬化、肝脏内脂肪堆积、肝脏炎症、肝细胞坏死、肝纤维化和非酒精性脂肪肝病(NAFLD)、多囊性肾病、炎症性肠病(IBD)和MODY I组成的组。

[0133] 在另一个方面，本发明提供一种治疗患有HNF4α相关疾病的受试者的方法。该方法包括向受试者施用治疗有效量的位点特异性HNF4α破坏剂，该破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子，从而治疗受试者。

[0134] 在一些实施方案中，HNF4α相关疾病是肝细胞癌，并且位点特异性HNF4α破坏剂降低受试者体内HNF4α的表达。

[0135] 在一些实施方案中，HNF4α相关疾病选自由脂肪肝(脂肪变性)、非酒精性脂肪性肝炎(NASH)、肝硬化、肝脏内脂肪堆积、肝脏炎症、肝细胞坏死、肝纤维化和非酒精性脂肪肝病(NAFLD)组成的组，并且位点特异性HNF4α破坏剂增加受试者体内HNF4α的表达。

[0136] 在一些实施方案中，位点特异性HNF4α破坏剂和效应分子同时施用于受试者。

[0137] 在一些实施方案中，位点特异性HNF4α破坏剂和效应分子依次施用于受试者。

[0138] 在一些实施方案中，效应分子在位点特异性HNF4α破坏剂的施用之前被施用于受试者。

[0139] 在一些实施方案中，位点特异性HNF4α破坏剂在效应分子的施用之前被施用于所述受试者。

[0140] 在一个方面，本发明提供位点特异性HNF4α破坏剂，其包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分，其中所述HNF4α表达控制区包含表1的第3栏或表10的第4栏

中列出的任何一个核苷酸序列的核苷酸序列。

[0141] 在一个实施方案中，位点特异性HNF4α靶向部分包含与表2、3、4和9的任一个中的任何核苷酸序列的完整核苷酸序列具有至少85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％核苷酸同一性的核苷酸序列。

[0142] 在一个实施方案中，位点特异性HNF4α靶向部分包含聚合物分子，所述聚合分子包含编码特异性结合HNF4α表达控制区的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸。

[0143] 在一个实施方案中，TALE或ZNF多肽的DNA结合域包含与表6A的第5栏或表10的第4栏中列出的任何一个氨基酸序列的完整氨基酸序列具有至少约85％、86％、87％、88％、89％、90％、91％、92％、93％、94％、95％、96％、97％、98％、99％或100％氨基酸同一性的氨基酸序列。

[0144] 在一个实施方案中，HNF4α表达控制区包含ZF5靶序列GGCGGGGGACCGATTAACCAT的核苷酸序列。

[0145] 在一个实施方案中，HNF4α表达控制区包含ZF7靶序列ACTGAACATCGGTGAGTTAGG的核苷酸序列。

[0146] 在一个方面，本发明提供位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的ZF5-VPR氨基酸序列的多核苷酸。

[0147] 在另一个方面，本发明提供位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的ZF5.3-VPR的氨基酸序列的多核苷酸。

[0148] 在又一个方面，本发明提供位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的ZF7-VPR的氨基酸序列的多核苷酸。

[0149] 在一个方面，本发明提供位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQNSTLTEHQRTHTGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTGEKPYKCPECGKSFSTKNSLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的ZF10-VPR的氨基酸序列的多核苷酸。

[0150] 在另一个方面，本发明提供了位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGHLVRHQRTHTGEKPYKCPECGKSFSTTGNLTVHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的ZF14-VPR的氨基酸序列的多核苷酸。

[0151] 在一个方面，本发明提供位点特异性HNF4α破坏剂，其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRT

HTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPTGKKTSASGSGGGS
GGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRI
EEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQIS
QASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDL
GALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNG
LLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPA
SLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDL
SHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKA
GQAKKKKGSYPYDVPDYA的氨基酸序列的ZF15-VPR的氨基酸序列的多核苷酸。

[0152] 在一个方面，本发明提供双顺反子位点特异性HNF4α破坏剂，其包含编码包含MAP
KKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVH
QRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFS
QRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGK
KTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQ
YLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEF
PTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEA
LLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAP
APLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPP
GSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQK
EEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFS
GGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPL
EGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPE
CGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTG
EKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGD
ALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEK
RKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQAS
ALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGAL
LGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLS
GDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLA
PTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHP
PPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA的氨基酸序列的双顺反子ZF5.3-VPR-tPT2a-ZF7-VPR的氨基酸序列的多
核苷酸。

[0153] 在一个方面，本发明提供双顺反子位点特异性HNF4α破坏剂，其包含编码包含MAP
KKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRT
HTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSG
NLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTS
ASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLP
DTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTM

VFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQ
LQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPL
GAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSP
WANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEA
AICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGK
RPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGS
SGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSF
SHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYK
CPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTY
ETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPA
PPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNST
DPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDF
SSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTG
PVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGH
LDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKG
SYPYDVPDYA的氨基酸序列的双顺反子ZF7-VPR-tPT2a-ZF5.3-VPR的氨基酸序列的多核苷酸。

[0154] 在一个方面,本发明提供双顺反子位点特异性HNF4α破坏剂,其包含编码包含MAP
KKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVH
QRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFS
QRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGK
KTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQ
YLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEF
PTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAfPPAPKPTQAGEGTLSE
ALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPA
PAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHP
PGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQ
KEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLF
SGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGP
LEGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCP
ECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHT
GEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGG
IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWL
MFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYH
FCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGC
LKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAE
SFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKK
LGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPY

FEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSND
LSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCML
VELHTQSQDSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的双顺反子ZF5.3-VPR-tPT2a-
ZF7-p300的氨基酸序列的多核苷酸。

[0155] 在一个方面，本发明提供双顺反子位点特异性HNF4α破坏剂，其包含编码包含MAP
KKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRT
HTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSG
NLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTS
ASGSGGGSGGIFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQE
PWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDA
TYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEII
WPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKA
RFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEI
LIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATED
RLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKK
KPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLR
RAθWSTMCMLVELHTQSQDSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGS
GEGRGSLLTCGDVEENPGPLEGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGN
LRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECG
KSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEK
PTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRK
VGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTIN
YDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGT
LSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPP
DPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRP
FHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTV
IPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDT
SLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的双顺反子ZF7-p300-tPT2a-ZF5.3-
VPR的氨基酸序列的多核苷酸。

[0156] 本发明还提供载体(例如病毒表达载体)和包含本发明的位点特异性HNF4α破坏剂以及本发明的载体的细胞。

[0157] 在一些实施方案中，本发明的位点特异性HNF4α破坏剂存在于组合物(例如药物组合物)中。

[0158] 在一些实施方案中，药物组合物包含脂质制剂。

[0159] 在一些实施方案中，脂质制剂包含一种或多种阳离子脂质、一种或多种非阳离子脂质、一种或多种基于胆固醇的脂质、或一种或多种PEG修饰的脂质，或前述的任何组合。

[0160] 在一些实施方案中，药物组合物包含脂质纳米颗粒。

[0161] 在一个方面，本发明提供了包含位点特异性HNF4α破坏剂和脂质纳米粒的药物组合物，其中所述位点特异性HNF4α破坏剂包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPY

KCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQR
THTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRS
DKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSP
FSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAP
APAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASV
DNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSAL
LGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTP
APVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESM
TEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的
氨基酸序列的ZF5.3-VPR的氨基酸序列的多核苷酸。

[0162] 在一个方面,本发明提供了包含位点特异性HNF4α破坏剂的药物组合物,其中所述位点特异性HNF4α破坏剂包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSG
NLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPEC
GKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGE
KPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRR
IAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQA
PAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGI
PVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREG
MFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAV
TPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPE
LNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的
ZF5.3-VPR的氨基酸序列的多核苷酸;以及

[0163] 位点特异性HNF4α破坏剂,其包含编码包含MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKC
PECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTH
TGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSN
LVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDF
DLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFS
GPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAP
APAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDN
SEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLG
SGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAP
VPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTE
DLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨
基酸序列的ZF7-VPR的氨基酸序列的多核苷酸;和脂质纳米颗粒。

[0164] 在一个方面,本发明提供包含位点特异性HNF4α破坏剂的药物组合物,所述位点特异性HNF4α破坏剂包含编码包含MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLT
EHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKS

FSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPY
KCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFD
LDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAV
PSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAP
VPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVA
PHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFL
PKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPE
ASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNE
ILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENP
GPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKC
PECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTH
TGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLD
LIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDL
DMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQ
PYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAP
PAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFE
GREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQ
AVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHA
MHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA的氨基酸序列的双顺反子ZF5.3-VPR-tPT2a-ZF7-VPR的氨基酸序列的多核苷酸;和脂质纳米颗粒。

[0165] 在一个方面,本发明提供了调节细胞中肝细胞核因子4α(HNF4α)的表达的方法。该方法包括使细胞与位点特异性HNF4α破坏剂接触,所述破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子,从而调节细胞中HNF4α的表达。

[0166] 表达的调节可增加细胞中HNF4α的表达或降低细胞中HNF4α的表达。

附图说明

[0167] 图1描绘了HNF4α的上游区和编码序列的一部分的染色体视图以及本文所述的指导RNA和指导RNA池的位置。

[0168] 图2是描绘在指定剂量下使细胞与位点特异性HNF4α靶向部分和包含dCas和KRAB的效应分子的指定池接触72小时后HepG2细胞中剩余的HNF4α mRNA的百分比的图表。

[0169] 图3是描绘在指定剂量下使细胞与指定的位点特异性HNF4α靶向部分和包含dCas和KRAB的效应分子、或HNF4α靶向部分和包含dCas和KRAB的效应分子的指定池接触72小时后HepG2细胞中剩余的HNF4α mRNA的百分比的图表。未处理的细胞和单独与dCas9接触的细胞用作对照。

[0170] 图4A是描绘在指定剂量下使细胞与HNF4α靶向部分和包含dCas和VPR的效应分子的指定池接触48小时后在A549细胞中测量的HNF4αmRNA的百分比的图表。SH是“安全港”的缩写,该“安全港”是非靶标指导对照。

[0171] 图4B是描绘在指定剂量下使细胞与HNF4α靶向部分和包含dCas和VPR的效应分子

的指定池接触48小时后在LX-2细胞中测量的HNF4αmRNA的百分比的图表。

[0172] 图5是描绘通过使用LNP制剂转染的LX-2细胞中的dCas9-VPR激活HNF4α的图。

[0173] 图6是描绘通过使用LNP制剂转染的HepG2细胞中的dCas9-VPR激活HNF4α的图。

[0174] 图7是描绘通过dCas9-VPR池1诱导的HNF4α蛋白定位于细胞核的免疫组织学图像。

[0175] 图8是描绘人类HNF4α启动子区和HNF4α亚型的结构的示意图。

[0176] 图9示意性描绘了各种位点特异性HNF4α靶向部分向HNF4α启动子区域的定位。

[0177] 图10示意性描述了本发明的示例性锌指-VPR融合蛋白的结构。

[0178] 图11是描绘使用ZF-VPR mRNA激活LX-2细胞中HNF4α的图。

[0179] 图12是描绘使用TAL-VPR和ZF-VPR激活LX-2细胞中HNF4α的图。

[0180] 图13是描绘使用ATUM密码子优化的ZF5-VPR变体的LX-2细胞中HNF4α的激活的图。

[0181] 图14是描绘使用ZF5-VPR、ZF5-p300、ZF5-VPR和ZF5-p300、以及ZF5-VPR和ZF7-VPR的K562细胞中HNF4α的VPR激活的持久性的图。

[0182] 图15是描绘使用ZF5-VPR和ZF7-VPR的K562细胞中HNF4α的VPR激活的持久性的图。

[0183] 图16是描绘使用ZF5-VPR和ZF7-VPR、以及ZF5.3-VPR和ZF7-VPR的K562细胞中HNF4α的VPR激活的持久性的图。

[0184] 图17是描绘LX-2细胞中通过dCas9-VPR激活HNF4α后,HNF4α下游生物标志物的表达水平变化的图。

[0185] 图18是描绘LX-2细胞中通过ZF5-VPR、ZF5.3-VPR、ZF5-VPR和ZF7-VPR以及ZF5.3-VPR和ZF7-VPR激活HNF4α后,HNF4α生物标志物的表达水平的变化的图。

[0186] 图19是描绘在LX-2细胞中筛选ZF11、ZF13和ZF14以及通过ZF5-VPR和ZF7-VPR以及ZF5.3-VPR和ZF7-VPR激活HNF4α的协同作用的图。

[0187] 图20是描述使用dCas9-VPR3-池1激活HNF4α和筛选ZF-VPR组合的图。

[0188] 图21是描述FRG-KO小鼠肝脏人源化肝细胞(Yecuris人肝细胞)中激活HNF4α的图。

[0189] 图22是描绘用双顺反子ZF5.3-VPR和ZF7-VPR激活LX-2细胞中的HNF4α的图。

[0190] 图23是描述重复给药具有各种ZF-VPR和ZF-p300的Yecuris肝细胞对HNF4α基因表达的影响的图。

[0191] 图24是描述具有双顺反子ZF效应物构建体的Yecuris肝细胞中HNF4α的激活的图。

[0192] 图25是描绘在具有双顺反子ZF效应物构建体的K562细胞中HNF4α的VPR激活的10天耐久性的图。

具体实施方式

[0193] 本发明提供用于通过靶向HNF4α表达控制区来调节肝细胞核因子4α(HNF4α)基因的表达(例如增加或降低表达)的试剂和组合物。HNF4α基因可以在细胞中,例如哺乳动物细胞,如哺乳动物体细胞(如人类体细胞)。本发明还提供使用本发明的试剂和组合物调节HNF4α基因表达或治疗将受益于调节HNF4α基因表达的受试者(例如患有或易患HNF4α相关疾病的受试者)的方法。

[0194] 本发明的试剂在本文中称为位点特异性HNF4α破坏剂,并在下面的部分II中描述。

[0195] I.定义

[0196] 为了更容易理解本发明,首先定义某些术语。此外,应当注意的是,无论何时记载

参数的值或值的范围,其是指所述值中间的值和范围也是本发明的一部分。

[0197] 本文所用冠词“一(a)”和“一个(an)”是指该冠词的语法宾语的一个或多于一个(即至少一个)。举例来说,“一个元件”意指一个元件或多于一个元件,例如多个元件。

[0198] 除非上下文另有明确说明,本文所用术语“包括”是指短语“包括但不限于”,并且可与短语“包括但不限于”互换使用。本文所用术语“或”是指术语“和/或”,并且可与术语“和/或”互换使用。

[0199] 本文所用术语“约”是指在本领域的典型公差范围内。例如,“约”可以理解为平均值的约2个标准偏差。在某些实施方案中,约意指±10%。在某些实施方案中,约意指±5%。当约存在于一系列数字或范围前时,应理解“约”可修饰该系列或范围中的每个数字。

[0200] 从上下文可清楚看出,数字或一系列数字前的术语“至少”应理解为包括与术语“至少”相邻的数字以及逻辑上可包括的所有随后的数字或整数。例如,核酸分子中核苷酸数目必须是整数。例如,“21个核苷酸的核酸分子中的至少18个核苷酸”意指18、19、20或21个核苷酸具有指定性质。当至少存在于一系列数字或范围前时,应理解“至少”可以修饰该系列或范围中的每个数字。

[0201] 从上下文可清楚看出,如本文所用,“不多于”或“小于”被理解为与该短语相邻的值以及逻辑上较低的值或整数至零。当“不多于”存在于一系列数字或范围前时,应理解“不多于”可以修饰该系列或范围中的每个数字。

[0202] 如本文所用,术语“基本上”是指表现出感兴趣的特征或性质的总体或接近总体范围或程度的定性条件。本领域内普通技术人员将理解,生物和化学现象很少(如果有的话)进行到完成和/或进行到结束或者实现或避免绝对结果。因此,术语“基本上”可用于本文的一些实施方案中以体现许多生物和化学现象中固有的完全性的潜在缺乏。

[0203] 如本文所用,术语“肝细胞核因子4α”、“HNF4α”和“HNF4A”如本文可互换使用,是指基因以及众所周知的编码蛋白,其为作为同源二聚体结合DNA的核转录因子。编码蛋白控制多种基因的表达,其中包括肝细胞核因子1α,其是一种调节多种肝基因表达的转录因子。HNF4α还在肝、肾和肠的发育中发挥作用。该基因表达的降低与单基因常染色体显性非胰岛素依赖性I型糖尿病(MODY I)和肝脏疾病(例如肝硬化)有关。该基因的表达失调(例如增加)与肝细胞癌有关。HNF4α的核苷酸和氨基酸序列是已知的,并且可以在例如Genbank登录号NM_000457;NM_175914;NM_178849;NM_178850;NM_001030003;NM_001030004;NM_001258355;NM_001287182;NM_001287183;NM_001287184;XM_005260407;NP_000448.3;NP_787110.2;NP_849180.1;NP_849181.1;NP_001025174.1;NP_001025175.1;NP_001245284.1;NP_001274111.1;NP_001274112.1;NP_001274113.1;XP_005260464.1中找到,其中每一个的全部内容通过引用并入本文。包括HNF4α的内源启动子和HNF4α编码序列的染色体20的基因组区域的核苷酸序列也是已知的,并且可以在Genbank登录号NC_000020.10(42984441...43061485)中找到。

[0204] HNF4α基因位于染色体20上,其转录通过两个启动子(P1和P2)和选择性剪接变体调节,从而产生9种不同的亚型(α1-α9)(图8)。HNF4α基因座通过使用物理上分开超过45kb的两种不同启动子进行转录调节。由较近启动子活性产生的亚型命名为P1,而由第二和较远启动子产生的亚型命名为P2。肝脏中最常见的亚型由启动子1(P1)表达,而来自P2的亚型最常见于胎儿组织和成人肾和小肠中。

[0205] HNF4α控制肝脏中肝细胞和其它细胞类型的正常功能所必需的蛋白质的表达。(Argemi J等,Defective HNF4alpha-dependent gene expression as a driver of hepatocellular failure in alcoholic hepatitis.Nat Commun.2019;10(1):3126.doi:10.1038/s41467-019-11004-3;Nishikawa T等,Resetting the transcription factor network reverses terminal chronic hepatic failure.J Clin Invest.2015;125(4):1533-1544.doi:10.1172/JCI73137)。此外,这些蛋白质中的许多是由肝脏细胞分泌的,并有助于全身健康。例如,在循环中需要蛋白质如白蛋白来转运营养物、激素、脂质和小分子药物。

[0206] 如本文所用,术语“位点特异性HNF4α破坏剂”是指特异性结合靶HNF4α表达控制区并例如调节HNF4α基因表达的任何试剂。表达的调节可以是永久的或瞬时的调节。本发明的位点特异性HNF4α破坏剂可包含“位点特异性HNF4α靶向部分”。

[0207] 如本文所用,术语“位点特异性HNF4α靶向部分”是指特异性结合至HNF4α表达控制区(例如HNF4α基因的转录控制区,如启动子、增强子或阻遏物)的部分;或例如在HNF4α相关锚定序列介导的结合体中的HNF4α相关锚定序列。示例性的“位点特异性HNF4α靶向部分”包括但不限于聚酰胺、核酸分子如RNA、DNA或经修饰的RNA或DNA、多肽、蛋白质核酸分子和融合蛋白。

[0208] 如本文所用,术语“特异性结合”或“特异性地结合”是指在发生结合的环境中区分可能的结合配偶体的能力。在一些实施方案中,当存在其他潜在的破坏剂时,与一种特定靶标相互作用(例如优先地相互作用)的破坏剂被称为“特异性结合”至与其相互作用的靶标(即表达控制区)。在一些实施方案中,通过检测或测定破坏剂与其靶标之间的结合程度来评估特异性结合;在一些实施方案中,通过检测或测定破坏剂-靶标复合物的解离程度来评估特异性结合。在一些实施方案中,通过检测或测定破坏剂与其靶标和另一实体之间的替代相互作用的竞争的能力来评估特异性结合。在一些实施方案中,通过在一定浓度范围内进行这种检测或测定来评估特异性结合。

[0209] 本文所用,术语“表达控制区”或“表达控制结构域”是指基因组DNA中存在的调节细胞中靶基因表达的区域或结构域。与表达控制区相关的功能可以例如通过募集或阻断刺激基因表达的转录因子的募集直接影响靶基因的表达。与表达控制区相关的功能可以例如通过引入表观遗传修饰或募集引入诱导调节靶基因表达的染色体拓扑结构改变的表观遗传修饰的其它因子间接地影响靶基因的表达。表达控制区可以在基因的蛋白质编码序列的上游和/或下游,并且包括例如转录控制元件,例如启动子、增强子或阻遏物;和锚定序列和锚定序列介导的结合体。

[0210] 如本文所用,术语“转录控制元件”是指控制基因转录的核酸序列。转录控制元件包括例如锚定序列、锚定序列介导的结合体、启动子、转录增强子和转录阻遏物。

[0211] 启动子是通过RNA聚合酶识别以启动特定基因转录的DNA区域,通常位于基因转录起始位点的5’末端的上游。

[0212] “转录增强子”增加基因转录。“转录沉默子”或“转录阻遏物”降低基因转录。增强和沉默序列的长度可以是约50-3500个碱基对,并且可影响长达约1兆碱基远的基因转录。

[0213] 如本文所用,术语“基因”是指编码具有功能的分子(例如蛋白质)的核苷酸序列。基因包含转录的序列(例如3’UTR)、非转录的序列(例如启动子)、翻译的序列(例如外显子)

和非翻译的序列(例如内含子)。

[0214] 如本文所用,术语“靶基因”是指被靶向用于表达的调节(例如增加或降低)的HNF4α基因。在一些实施方案中,HNF4α靶基因是靶向的基因组复合物的一部分(例如具有其基因组序列的至少一部分作为靶基因组复合物的一部分的HNF4α基因,例如在锚定序列介导的结合体内部),该基因组复合物通过本文所述的一种或多种位点特异性破坏剂靶向。在一些实施方案中,调节包括靶基因的表达的抑制。在一些实施方案中,HNF4α基因通过使HNF4α基因或可操作连接至HNF4α基因的转录控制元件与本文所述的一种或多种位点特异性破坏剂接触来调节。在一些实施方案中,HNF4α基因在细胞中(例如受试者(例如患有HNF4α相关疾病的受试者)体内的细胞)中异常表达(例如过表达)。在一些实施方案中,HNF4α基因在细胞(例如受试者(例如患有HNF4α相关疾病的受试者)体内的细胞)中异常表达(例如表达不足)。

[0215] 如本文所用,术语“锚定序列”是指由充分结合以形成锚定序列介导的结合体(例如复合体)的成核剂识别的核苷酸序列。在一些实施方案中,锚定序列包含一个或多个CTCF结合基序。在一些实施方案中,锚定序列不位于基因编码区内。在一些实施方案中,锚定序列位于基因间隔区内。在一些实施方案中,锚定序列不位于增强子或启动子内。在一些实施方案中,锚定序列位于距任何转录起始位点至少400bp、至少450bp、至少500bp、至少550bp、至少600bp、至少650bp、至少700bp、至少750bp、至少800bp、至少850bp、至少900bp、至少950bp或至少1kb处。在一些实施方案中,锚定序列位于与基因组印记、单等位基因表达和/或单等位基因表观遗传标记不相关的区域内。在一些实施方案中,锚定序列具有选自以下的一种或多种功能:结合内源性成核多肽(例如CTCF)、与第二锚定序列相互作用以形成锚定序列介导的结合体,或与锚定序列介导的结合体外的增强子隔离。在本发明的一些实施方案中,提供了可特异性靶向一个或多个特定锚定序列而不靶向其他锚定序列(例如,在不同背景下可包含成核剂(例如CTCF)结合基序的序列)的技术;这种靶向的锚定序列可称为“靶锚定序列”。在一些实施方案中,靶锚定序列的序列和/或活性被调节,而可能存在于相同系统中(例如在相同细胞中和/或在一些实施方案中在相同核酸分子上,例如相同染色体)作为其他靶向的锚定序列的一种或多种其它锚定序列的序列和/或活性则不被调节。在一些实施方案中,锚定序列包含或是成核多肽结合基序。在一些实施方案中,锚定序列与成核多肽结合基序相邻。

[0216] 如本文所用,术语“锚定序列介导的结合体”是指这样的DNA结构(在一些情况下是复合体),其由DNA的至少两个锚定序列被一种或多种多肽(例如成核多肽)或一种或多种蛋白质和/或核酸实体(例如RNA或DNA)(其结合锚定序列使得锚定序列之间空间接近和功能性连接)的物理相互作用或结合而实现和/或维持。

[0217] 如本文所用,术语“基因组复合体”是通过多种蛋白质和/或其它组分(可能包括基因组序列元件)之间或之中的相互作用将一条或多条染色体上彼此间隔开的两个基因组序列元件集合在一起的复合体。在一些实施方案中,基因组序列元件是与复合体的一种或多种蛋白质组分结合的锚定序列。在一些实施方案中,基因组复合体可包含锚定序列介导的结合体。在一些实施方案中,基因组序列元件可以是或可包含CTCF结合基序、启动子和/或增强子。在一些实施方案中,基因组序列元件包括启动子和/或调控区(例如增强子)中的至少一个或两者。在一些实施方案中,复合体的形成在基因组序列元件处和/或通过蛋白质组

分的一种或多种与基因组序列元件的结合而成核。如本领域技术人员将理解，在一些实施方案中，通过复合体形成的基因组位点的共定位(例如结合)改变了基因组序列元件处或附近的DNA拓扑结构，在一些实施方案中包括在它们之间。在一些实施方案中，基因组复合体包含含有一个或多个环的锚定序列介导的结合体。在一些实施方案中，本文所述的基因组复合体通过成核多肽(例如CTCF和/或黏连蛋白)成核。在一些实施方案中，本文所述的基因组复合体可包括例如CTCF、黏连蛋白、非编码RNA(例如eRNA)、转录机制蛋白(例如RNA聚合酶、一种或多种转录因子，例如选自由TFIIA、TFIIB、TFIID、TFIIE、TFIIF、TFIIH等组成的组)、转录调控因子(例如Mediator、P300、增强子结合蛋白、阻遏物结合蛋白、组蛋白修饰剂等)等中的一种或多种。在一些实施方案中，本文所述的基因组复合体包括一种或多种多肽组分和/或一种或多种核酸组分(例如一种或多种RNA组分)，其在一些实施方案中可彼此和/或与一种或多种基因组序列元件(例如锚定序列、启动子序列、调控序列(例如增强子序列))相互作用，以将基因组DNA的片段限制为拓扑构型(例如环)，当复合体未形成时基因组DNA的片段不采取该拓扑构型。

[0218] 如本文所用，“效应分子”是指能够调节生物活性(例如酶活性)、基因表达、锚定序列介导的结合体或细胞信号传导的分子。示例性效应物描述于下文第II部分中，并且在一些实施方案中包括例如核酸酶、物理阻断剂、表观遗传募集剂(例如转录增强子或转录阻遏物)和表观遗传CpG修饰剂(例如DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰基酶)以及前述的任何组合。

[0219] II.本发明的位点特异性HNF4α破坏剂

[0220] 本发明提供位点特异性HNF4α破坏剂，在本发明的一个方面，其包括靶向HNF4α表达控制区的位点特异性HNF4α靶向部分。在另一个方面，本发明的位点特异性破坏剂包括靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子。如本领域内普通技术人员将理解的，此类破坏剂是位点特异性的，并且因此特异性结合至例如细胞内的HNF4α表达控制区(例如一个或多个转录控制元件和/或一个或多个靶锚定序列)，而不结合非靶向的表达控制区(例如在同一细胞内)。

[0221] 本发明的位点特异性HNF4α破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分。由位点特异性靶向部分靶向的表达控制区可以是例如转录控制元件或锚定序列，如锚介导的结合体内的锚定序列。

[0222] 因此，本发明的位点特异性HNF4α破坏剂可例如通过调节来自内源启动子、增强子或阻遏物的基因的表达来调节基因(即HNF4α)的表达，可改变调控区的甲基化，可改变至少一个锚定序列；可以例如通过改变结合成核分子的结合亲和力改变至少一个结合成核分子结合位点；可以通过例如至少一个锚定序列(如CTCF结合基序)中的取代、添加或删除来改变至少一个共同核苷酸序列(如CTCF结合基序)的定向。

[0223] 在某些实施方案中，本文所述的位点特异性破坏剂和组合物靶向包含一个或多个HNF4α特异性转录控制元件的表达控制区以调节细胞中的表达。可被靶向的HNF4α特异性转录控制元件包括HNF4α特异性启动子、HNF4α特异性增强子和HNF4α特异性阻遏物。在一个实施方案中，HNF4α特异性启动子基本上驱动肝脏细胞中的表达，即启动子1。在一个实施方案中，HNF4α特异性启动子基本上驱动胰脏细胞中的表达，即启动子2。HNF4α启动子1和启动子2的核苷酸序列是已知的，并且可在例如GeneBank登录号NC_000020.10

(42984441...43061485)中找到。

[0224] 例如,位点特异性破坏剂可包括位点特异性靶向部分,例如编码特异性靶向并结合HNF4α表达控制区(例如HNF4α内源启动子区,如启动子1)的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的核酸分子和效应分子(例如包括调节(例如增强或阻遏)来自内源性启动子的靶基因表达以调节基因表达的转录增强子或转录阻遏物的效应分子)。在一个实施方案中,破坏剂是"双顺反子核酸分子",即能够由单一信使RNA分子、第一和第二位点特异性靶向部分(编码特异性靶向并结合HNF4α表达控制区(例如HNF4α内源启动子区,如启动子1)的转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的核酸分子)和效应物分子(例如包括调节(例如增强或阻遏)来自内源性启动子的靶基因表达以调节基因表达的转录增强子或转录阻遏物的效应分子)制备两种融合蛋白,。

[0225] 在本发明的一些实施方案中,位点特异性破坏剂可包括位点特异性靶向部分(例如核酸分子,如靶向HNF4α内源启动子区(例如启动子1)的指导RNA)和效应分子(例如包括调节(例如增强或阻遏)来自内源性启动子的靶基因表达以调节基因表达的转录增强子或转录阻遏物的效应分子)。

[0226] 在本发明的某些实施方案中,本文所述的位点特异性破坏剂和组合物靶向包含例如锚定序列介导的结合体内的一个或多个HNF4α相关锚定序列的表达控制区,该锚定序列介导的结合体包含第一和第二HNF4α相关锚定序列,以改变二维染色质结构(例如锚定序列介导的结合体),从而例如通过修饰DNA(例如基因组DNA)中的锚定序列介导的结合体来调节细胞(例如受试者内的细胞)中的表达。

[0227] 在一个方面,本发明包括含有靶向HNF4α表达控制区的位点特异性HNF4α靶向部分的位点特异性HNF4α破坏剂,所述HNF4α表达控制区其包含锚定序列介导的结合体内的一个或多个HNF4α相关锚定序列。破坏剂结合(例如特异性结合)特定锚定序列介导的结合体以改变锚定序列介导的结合体(例如具有通过结合成核分子结合的两个或更多个DNA位点的物理相互作用的锚定序列介导的结合体)的拓扑结构。

[0228] 锚定序列介导的结合体的形成可迫使转录控制元件与HNF4α基因相互作用或空间限制转录控制元件的活性。因此,改变锚定序列介导的结合体允许调节HNF4α表达而不改变被调节的HNF4α基因的编码序列。

[0229] 在一些实施方案中,本发明的位点特异性破坏剂和组合物通过一个或多个锚定序列和结合成核分子之间的物理干扰来调节与锚定序列介导的结合体相关的HNF4α基因的表达。例如,DNA结合小分子(例如小沟或大沟结合剂)、肽(例如锌指、TALE、新的或经修饰的肽)、蛋白质(例如CTCF、具有受损的CTCF结合和/或内聚结合亲和力的经修饰的CTCF)、或核酸(例如ssDNA、经修饰的DNA或RNA、肽寡核苷酸缀合物、锁核酸、桥接核酸、聚酰胺和/或形成三链体的寡核苷酸)可以物理地防止结合成核分子与一个或多个锚定序列相互作用以调节HNF4α基因表达。

[0230] 在一些实施方案中,本发明的位点特异性破坏剂和组合物通过锚定序列的修饰(例如表观遗传修饰,例如组蛋白修饰或基因组编辑修饰)调节与锚定序列介导的结合体相关的HNF4α基因的表达。例如,与包含HNF4α基因的锚定序列介导的结合体相关的一个或多个锚定序列可以靶向DNA甲基转移酶(例如dCas9-甲基转移酶融合体,例如反义寡聚核苷

酸-酶融合体)的甲基化修饰以调节基因的表达。

[0231] 在一些实施方案中,本发明的位点特异性破坏剂和组合物调节与锚定序列介导结合体相关的HNF4α基因的表达,例如激活或抑制转录,例如诱导染色质的表观遗传改变。

[0232] 在一些实施方案中,锚定序列介导的结合体包含一个或多个锚定序列、HNF4α基因和一个或多个转录控制元件(如增强或沉默元件)。在一些实施方案中,转录控制元件在锚定序列介导的结合体内、部分地在锚定序列介导的结合体内或在锚定序列介导的结合体外。

[0233] 在一个实施方案中,锚定序列介导的结合体包括环,如染色体内环。在某些实施方案中,锚定序列介导的结合体具有多个环。一个或多个环可包括第一锚定序列、核酸序列、转录控制元件和第二锚定序列。在另一个实施方案中,至少一个环依次包括第一锚定序列、转录控制元件和第二锚定序列;或第一锚定序列、核酸序列和第二锚定序列。在另一个实施方案中,核酸序列和转录控制元件中的一个或两者位于环内或环外。在另一个实施方案中,一个或多个环包含转录控制元件。

[0234] 在一些实施方案中,锚定序列介导的结合体包括TATA盒、CAAT盒、GC盒或CAP位点。

[0235] 在一些实施方案中,锚定序列介导的结合体包含多个环,并且其中锚定序列介导的结合体在一个或多个环中包含锚定序列、核酸序列和转录控制元件中的至少一种。

[0236] 在一个方面,本发明的位点特异性破坏剂和组合物可以向锚定序列介导的结合体引入靶向的改变,以用结合锚定序列的破坏剂调节核酸序列的表达。在一些实施方案中,通过靶向锚定序列介导的结合体内的一个或多个核苷酸进行取代、添加或删除来改变锚序列介导的结合体。

[0237] 在一些实施方案中,通过包含激活环或排除阻遏环来激活表达,例如转录。在一个这样的实施方案中,锚定序列介导的结合体包括增加核酸序列(例如这样的HNF4α编码核酸)转录的转录控制序列。在另一个这样的实施方案中,锚定序列介导的结合体排除降低核酸序列(例如这样的HNF4α编码核酸)的表达(例如转录)的转录控制元件。

[0238] 在一些实施方案中,通过包含阻遏环或排除激活环来阻遏表达,例如转录。在一个这样的实施方案中,锚定序列介导的结合体包括降低核酸序列(例如这样的HNF4α编码核酸序列)的表达(例如转录)的转录控制元件。在另一个这样的实施方案中,锚定序列介导的结合体排除增强核酸序列(例如这样的HNF4α编码核酸)转录的转录控制序列。

[0239] 每个锚定序列介导的结合体包含一个或多个锚定序列,例如多个。可以操纵或改变锚定序列以破坏天然存在的环或形成新环(例如,形成外源环或形成具有外源或改变的锚定序列的非天然存在的环)。此类改变通过改变含有HNF4α基因的全部或一部分的DNA的二维结构来调节HNF4α基因表达,例如通过由此调节HNF4α基因与转录控制元件(例如增强和沉默/阻遏序列)相互作用的能力。在一些实施方案中,通过取代、添加或删除锚定序列介导的结合体的锚定序列内一个或多个核苷酸来修饰染色质结构。

[0240] 锚定序列可以彼此不连续。在具有不连续锚定序列的实施方案中,第一锚定序列可以与第二锚定序列间隔约500bp至约500Mb、约750bp至约200Mb、约1kb至约100Mb、约25kb至约50Mb、约50kb至约1Mb、约100kb至约750kb、约150kb至约500kb、或约175kb至约500kb。在一些实施方案中,第一锚定序列与第二锚定序列间隔约500bp、600bp、700bp、800bp、900bp、1kb、5kb、10kb、15kb、20kb、25kb、30kb、35kb、40kb、50kb、55kb、60kb、65kb、70kb、

75kb、80kb、85kb、90kb、95kb、100kb、125kb、150kb、175kb、200kb、225kb、250kb、275kb、300kb、350kb、400kb、500kb、600kb、700kb、800kb、900kb、1Mb、2Mb、3Mb、4Mb、5Mb、6Mb、7Mb、8Mb、9Mb、10Mb、15Mb、20Mb、25Mb、50Mb、75Mb、100Mb、200Mb、300Mb、400Mb、500Mb或其间的任何大小。

[0241] 在一个实施方案中，锚定序列包含共同的核苷酸序列，例如CTCF结合基序：

[0242] N(T/C/G)N(G/A/T)CC(A/T/G)(C/G)(C/T/A)AG(G/A)(G/T)GG(C/A/T)(G/A)(C/G)(C/T/A)(G/A/C)(SEQ ID NO:64)，其中N是任何核苷酸。

[0243] CTCF-结合基序也可以是相反的定向，例如，(G/A/C)(C/T/A)(C/G)(G/A)(C/A/T)GG(G/T)(G/A)GA(C/T/A)(C/G)(A/T/G)CC(G/A/T)N(T/C/G)N(SEQ ID NO:65)。

[0244] 在一个实施方案中，锚定序列包含SEQ ID NO:64或SEQ ID NO:65或与SEQ ID NO:64或SEQ ID NO:65具有至少75％、至少80％、至少85％、至少86％、至少87％、至少88％、至少89％、至少90％、至少91％、至少92％、至少93％、至少94％、至少95％、至少96％、至少97％、至少98％、至少99％同一性的核苷酸序列。

[0245] 在一些实施方案中，锚定序列介导的结合体包含至少第一锚定序列和第二锚定序列。第一锚定序列和第二锚定序列可以各自包含共同核苷酸序列，例如各自包含CTCF结合基序。在一些实施方案中，第一锚定序列和第二锚定序列包含不同的序列，例如，第一锚定序列包含CTCF结合基序，且第二锚定序列包含CTCF结合基序以外的锚定序列。在一些实施方案中，每个锚定序列包含共同核苷酸序列和该共同核苷酸序列的一侧或两侧上的一个或多个侧翼核苷酸。

[0246] 可以形成结合的两个CTCF结合基序(例如连续的或非连续的CTCF结合基序)可以任何定向存在于基因组中，例如，以相同的定向(串联)，或者5’→3’(左串联，例如包含SEQ ID NO:64的两个CTCF结合基序)或者3’→5’(右串联，例如包含SEQ ID NO:65的两个CTCF结合基序)，或者会聚定向，其中一个CTCF结合基序包含SEQ ID NO:64且另一个包含SEQ ID NO:65。CTCFBSDB 2.0：CTCF结合基序和基因组组构的数据库(http://insulatordb.uthsc.edu/)可用于鉴定与靶基因(例如HNF4α)相关的CTCF结合基序。

[0247] 在一些实施方案中，通过改变至少一个共同核苷酸序列(例如结合成核分子结合位点)的定向来改变锚定序列介导的结合体。

[0248] 在一些实施方案中，锚定序列包含结合成核分子结合位点，例如CTCF结合基序，并且本发明的位点特异性破坏剂在至少一个结合成核分子结合位点中引入改变，例如改变对于结合成核分子的结合亲和力。

[0249] 在一些实施方案中，通过引入外源锚定序列来改变锚定序列介导的结合体。加入非天然存在的或外源性锚定序列以形成或破坏天然存在的锚定序列介导的结合体，例如通过诱导形成改变核酸序列的转录的非天然存在的环。

[0250] 在一些实施方案中，锚定序列介导的结合体包含HNF4α基因和一个或多个(例如2、3、4、5个或其它的)除HNF4α基因以外的基因。

[0251] 在一些实施方案中，锚定序列介导的结合体与一个或多个(例如2、3、4、5或更多个)转录控制元件相关。在一些实施方案中，HNF4α基因与一个或多个转录控制元件不连续。在HNF4α基因与转录控制元件不连续的一些实施方案中，基因可以与一个或多个转录控制元件间隔约100bp至约500Mb、约500bp至约200Mb、约1kb至约100Mb、约25kb至约50Mb、约

50kb至约1Mb、约100kb至约750kb、约150kb至约500kb、或约175kb至约500kb。在一些实施方案中，基因与转录控制元件间隔约100bp、300bp、500bp、600bp、700bp、800bp、900bp、1kb、5kb、10kb、15kb、20kb、25kb、30kb、35kb、40kb、45kb、50kb、55kb、60kb、65kb、70kb、75kb、80kb、85kb、90kb、95kb、100kb、125kb、150kb、175kb、200kb、225kb、250kb、275kb、300kb、350kb、400kb、500kb、600kb、700kb、800kb、900kb、1Mb、2Mb、3Mb、4Mb、5Mb、6Mb、7Mb、8Mb、9Mb、10Mb、15Mb、20Mb、25Mb、50Mb、75Mb、100Mb、200Mb、300Mb、400Mb、500Mb或其间的任何大小。

[0252] 在一些实施方案中，锚定序列介导的结合体的类型可有助于确定如何通过改变锚定序列介导的结合体来调节基因表达，例如位点特异性靶向部分的选择。例如，锚定序列介导的结合体的一些类型包括锚定序列介导的结合体内的一种或多种转录控制元件。通过破坏锚定序列介导的结合体的形成(例如改变一个或多个锚定序列)破坏这样的锚定序列介导的结合体可能降低锚定序列介导的结合体内HNF4α基因的转录。

[0253] 在一些实施方案中，HNF4α基因的表达受与锚定序列介导的结合体相关的一个或多个转录控制元件调控、调节或影响。在一些实施方案中，锚定序列介导的结合体包含HNF4α基因和一个或多个转录控制元件。例如，HNF4α基因和一个或多个转录控制序列至少部分位于锚定序列介导的结合体(例如1型锚定序列介导的结合体)内。锚定序列介导的结合体也可称为“1型，EP亚型”。在一些实施方案中，HNF4α基因具有确定的表达状态，例如处于其天然状态，例如处于患病状态。例如，HNF4α基因可具有高水平的表达。通过破坏锚定序列介导的结合体，由于先前对锚定序列介导的结合体内的转录开放的DNA发生构象变化，HNF4α基因的表达可以降低(例如降低转录)，例如，由在HNF4α基因和增强序列之间产生额外距离的DNA的构象变化引起的转录降低。在一个实施方案中，相关的HNF4α基因和一个或多个转录控制序列(例如增强序列)位于锚定序列介导的结合体内。锚定序列介导的结合体的破坏降低了HNF4α基因的表达。在一个实施方案中，与锚定序列介导的结合体相关的HNF4α基因是至少部分地位于锚定序列介导的结合体内的一个或多个转录控制元件可及的。

[0254] 在一些实施方案中，HNF4α基因的表达通过一个或多个转录控制元件调控、调节或影响，所述转录控制元件与锚定序列介导的结合体相关，但由于锚定序列介导的结合体而不可及。例如，与HNF4α基因相关的锚定序列介导的结合体破坏了一个或多个转录控制元件调控、调节或影响HNF4α基因表达的能力。转录控制序列可以与HNF4α基因分开，例如至少部分地位于锚定序列介导的结合体的相对侧，例如作为HNF4α基因的锚定序列介导的结合体的内部或外部，例如由于锚定序列介导的结合体的接近，HNF4α基因是转录控制元件不可及的。在一些实施方案中，一个或多个增强序列通过锚定序列介导的结合体(例如2型锚定序列介导的结合体)与HNF4α基因分离。

[0255] 在一些实施方案中，由于锚定序列介导的结合体，HNF4α基因是一个或多个转录控制元件不可及的，并且锚定序列介导的结合体的破坏允许转录控制元件调控、调节或影响HNF4α基因的表达。在一个实施方案中，HNF4α基因在锚定序列介导的结合体的内部和外部且是一个或多个转录控制元件不可及的。锚定序列介导的结合体的破坏增加了转录控制元件的进入以调控、调节或影响HNF4α基因表达，例如，转录控制元件增加HNF4α基因的表达。在一个实施方案中，HNF4α基因在锚定序列介导的结合体内部，且是至少部分地位于锚定序列介导的结合体外部的一个或多个转录控制元件不可及的。锚定序列介导的结合体的破坏

增加了HNF4α基因的表达。在一个实施方案中，HNF4α基因至少部分位于锚定序列介导的结合体外部且是位于锚定序列介导的结合体内部的一个或多个转录控制元件不可及的。锚定序列介导的结合体的破坏增加了HNF4α基因的表达。

[0256] A.HNF4α位点特异性靶向部分

[0257] 本发明的位点特异性HNF4α靶向部分靶向HNF4α表达控制区，并且可包含聚合物或聚合物分子，例如聚酰胺(即，通过酰胺结合连接的重复单元的分子，例如多肽)、核苷酸的聚合物(例如指导RNA、编码TALE多肽或锌指多肽的核酸)、肽核酸(PNA)或氨基酸的聚合物(例如肽或多肽，例如融合蛋白)等。合适的位点特异性HNF4α靶向部分、组合物及此类试剂和组合物的使用方法如下和在PCT公开WO2018/049073中所述，其全部内容通过引用方式明确并入本文。

[0258] 在一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分，其包含编码转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的多肽(例如DNA结合域)或其片段的核酸分子，所述核酸分子被工程化为特异性靶向HNF4α表达控制区以调节HNF4α基因的表达。

[0259] 在另一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分(所述位点特异性HNF4α靶向部分包含核酸分子例如指导RNA(或gRNA)或指导RNA)和效应物或其片段，或编码效应物或其片段的核酸分子。

[0260] 在另一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分，所述位点特异性HNF4α靶向部分包含多核苷酸，例如PNA(例如核酸gRNA)，其与效应物多肽或其片段连接。

[0261] 在另一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分和效应物，所述位点特异性HNF4α靶向部分包含融合分子，例如编码转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的核酸分子。

[0262] 在一个实施方案中，此类位点特异性破坏剂包含第二融合蛋白，其中所述第二融合蛋白包含靶向第二HNF4α表达控制区的第二位点特异性HNF4α靶向部分和第二效应分子，其中所述第二HNF4α表达控制区不同于所述HNF4α表达控制区。

[0263] 在另一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分，所述位点特异性HNF4α靶向部分包含融合分子，例如编码包含Cas多肽和例如表观遗传募集剂或表观遗传CpG修饰剂的蛋白质的核酸分子。

[0264] 在另一个实施方案中，本发明的位点特异性破坏剂包含位点特异性HNF4α靶向部分，所述位点特异性HNF4α靶向部分包含融合分子，例如包含Cas多肽和例如表观遗传募集剂或表观遗传CpG修饰剂的融合蛋白。

[0265] 如本文所用，在其最广泛的意义上，术语“核酸”是指并入或可并入寡核苷酸链中的任何化合物和/或物质。在一些实施方案中，核酸是通过磷酸二酯键并入或可并入多核苷酸链中的化合物和/或物质。从上下文将清楚看出，在一些实施方案中，“核酸”是指单个核酸残基(例如，核苷酸和/或核苷)；在一些实施方案中，“核酸”是指包含单个核酸残基的多核苷酸链。在一些实施方案中，“核酸”是或包含RNA；在一些实施方案中，“核酸”是或包含DNA。在一些实施方案中，“核酸”是包含锁核酸分子和脱氧核酸分子的“混合物”。在一些实施方案中，核酸是、包含或由一个或多个天然核酸残基组成。在一些实施方案中，核酸是、包

含或由一种或多种核酸类似物组成。在一些实施方案中，核酸类似物与核酸的不同之处在于其不采用磷酸二酯主链。例如，在一些实施方案中，核酸是、包含或由一个或多个“肽核酸”组成，其是本领域内已知的且在主链中具有肽键而不是磷酸二酯键，被认为在本发明的范围内。或者或另外，在一些实施方案中，核酸具有一个或多个硫代磷酸酯和/或5’-N-亚磷酰胺连接而不是磷酸二酯键。在一些实施方案中，核酸是、包含或由一种或多种天然核苷(例如腺苷、胸苷、鸟苷、胞苷、尿苷、脱氧腺苷、脱氧胸苷、脱氧鸟苷和脱氧胞苷)组成。在一些实施方案中，核酸是、包含或由一种或多种核苷类似物(例如，2-氨基腺苷、2-硫代胸苷、肌苷、吡咯-嘧啶、3-甲基腺苷、5-甲基胞苷、C-5丙炔基-胞苷、C-5丙炔基-尿苷、2-氨基腺苷、C5-溴尿苷、C5-氟尿嘧啶、C5-碘尿苷、C5-丙炔基-尿苷、C5-丙炔基-胞苷、C5-甲基胞苷、2-氨基腺苷、7-脱氮腺苷、7-脱氮鸟苷、8-氧代腺苷、8-氧代鸟苷、O(6)-甲基鸟嘌呤、2-硫代胞苷、甲基化碱基、插入碱基及其组合)组成。在一些实施方案中，与天然核酸中的那些相比，核酸包含一种或多种修饰的糖(例如，2’-氟代核糖、核糖、2’-脱氧核糖、阿拉伯糖和己糖)。在一些实施方案中，核酸具有编码功能性基因产物(例如RNA或蛋白质)的核苷酸序列。在一些实施方案中，核酸包括一个或多个内含子。在一些实施方案中，核酸是通过从天然来源分离、通过基于互补模板的聚合的酶促合成(体内或体外)、在重组细胞或系统中复制和化学合成中的一种或多种制备的。在一些实施方案中，核酸的长度为至少3、4、5、6、7、8、9、10、15、20、25、30、35、40、45、50、55、60、65、70、75、80、85、90、95、100、110、120、130、140、150、160、170、180、190、200、225、250、275、300、325、350、375、400、425、450、475、500、600、700、800、900、1000、1500、2000、2500、3000、3500、4000、4500、5000或更多个残基。在一些实施方案中，核酸是部分或全部单链的；在一些实施方案中，核酸是部分或全部双链的。在一些实施方案中，核酸具有包含至少一个编码多肽或是编码多肽的序列的互补物的元件的核苷酸序列。在一些实施方案中，核酸具有酶活性。

[0266] 如本文所用，术语“肽”、“多肽”和“蛋白质”是指由通过肽键或通过除肽键以外的方式共价连接的氨基酸残基组成的化合物。蛋白质或肽必须包含至少两个氨基酸且对可构成蛋白质的或肽的序列的氨基酸的最大数目没有限制。多肽包括包含通过肽键或通过除肽键以外的方式彼此连接的两个或更多个氨基酸的任何肽或蛋白质。如本文所用，该术语是指许多类型的短链(其在本领域内通常也被称为例如肽、寡肽和寡聚体)以及长链(其在本领域内通常被称为蛋白质)。

[0267] 在某些实施方案中，多肽是或可包含嵌合蛋白或“融合蛋白”。如本文所用，“嵌合蛋白”或“融合蛋白”包含可操作地连接至异源第二多肽(即不同于第一蛋白的多肽)的第一蛋白的全部或部分(优选生物活性部分)。在融合蛋白中，术语“可操作地连接”意指第一蛋白或其片段和异源多肽相互框内融合。异源多肽可以与第一蛋白或片段的氨基末端或羧基末端融合。

[0268] “聚酰胺”是具有通过酰胺结合连接的重复单元的聚合物分子。蛋白质是天然聚酰胺的示例。在一些实施方案中，聚酰胺包含肽核酸(PNA)。

[0269] “肽核酸”(“PNA”)是其中PNA中的一个或多个氨基酸单元具有含酰胺的主链的分子，例如氨乙基-甘氨酸，类似于肽主链，其中用核酸侧链代替氨基酸侧链。已知肽核酸(PNA)与以比它们的寡核苷酸对应物更高的亲和力杂交互补的DNA和RNA。PNA的这一特征不仅使它们成为与核酸侧链的稳定杂合体，而且同时中性主链和疏水侧链产生多肽内的疏水

单元。核酸侧链包括但不限于嘌呤或嘧啶侧链，例如腺嘌呤、胞嘧啶、鸟嘌呤、胸腺嘧啶和尿嘧啶。在一个实施方案中，核酸侧链包括本文所述的核苷类似物。

[0270] 在一个实施方案中，本发明的位点特异性HNF4α靶向部分包含聚酰胺。用于本发明的试剂和组合物的合适的聚酰胺是本领域内已知的。

[0271] 在一个实施方案中，本发明的位点特异性HNF4α靶向部分包含多核苷酸。在一些实施方案中，多核苷酸的核苷酸序列编码HNF4α基因或HNF4α表达产物。在一些实施方案中，多核苷酸的核苷酸序列不包括HNF4α编码序列或HNF4α表达产物。例如，在一些实施方案中，本发明的位点特异性HNF4α靶向部分包含与靶表达控制区(例如启动子或锚定序列)杂交的多核苷酸。在一些实施方案中，多核苷酸的核苷酸序列是靶锚定序列的互补序列，或具有与靶序列的互补序列至少80％、至少85％、至少85％、至少86％、至少87％、至少88％、至少89％、至少90％、至少91％、至少92％、至少93％、至少94％、至少95％、至少96％、至少97％、至少98％、至少99％同一性的序列。

[0272] 本发明的多核苷酸可以包括脱氧核苷酸、核糖核苷酸、经修饰的脱氧核苷酸、经修饰的核糖核苷酸(例如化学修饰，例如改变主链连接、糖分子和/或核酸碱基的修饰)和人工核酸。在一些实施方案中，多核苷酸包括但不限于基因组DNA、cDNA、肽核酸(PNA)、或肽寡核苷酸缀合物、锁核酸(LNA)、桥接核酸(BNA)、聚酰胺、三链体形成寡核苷酸、经修饰的DNA、反义DNA寡核苷酸、tRNA、mPvNA、rPvNA、经修饰的RNA、miRNA、gRNA和siRNA或其它RNA或DNA分子。

[0273] 在一些实施方案中，本发明的多核苷酸的长度为约2至约5000nt、约10至约100nt、约50至约150nt、约100至约200nt、约150至约250nt、约200至约300nt、约250至约350nt、约300至约500nt、约10至约1000nt、约50至约1000nt、约100至约1000nt、约1000至约2000nt、约2000至约3000nt、约3000至约4000nt、约4000至约5000nt或其间的任何范围。

[0274] 本发明的多核苷酸可以包括核苷，例如嘌呤或嘧啶，例如腺嘌呤、胞嘧啶、鸟嘌呤、胸腺嘧啶和尿嘧啶。在一些实施方案中，多核苷酸包含一种或多种核苷类似物。核苷类似物包括但不限于如5-氟尿嘧啶;5-溴尿嘧啶、5-氯尿嘧啶、5-碘尿嘧啶、次黄嘌呤、黄嘌呤、4-乙酰胞嘧啶、4-甲基苯并咪唑，5-(羧基羟甲基)尿嘧啶、5-羧甲基氨基甲基-2-硫代尿苷、5-羧甲基氨基甲基尿嘧啶、二氢尿嘧啶、二氢尿苷、β-D-半乳糖基queosine、肌苷、N6-异戊烯基腺嘌呤、1-甲基鸟嘌呤、1-甲基肌苷、2,2-二甲基鸟嘌呤、2-甲基腺嘌呤、2-甲基鸟嘌呤、3-甲基胞嘧啶、5-甲基胞嘧啶、N6-腺嘌呤、7-甲基鸟嘌呤、5-甲氨基甲基尿嘧啶、5-甲氧基氨基甲基-2-硫尿嘧啶、β-D-甘露糖基queosine、5’-甲氧基羧甲基尿嘧啶、5-甲氧基尿嘧啶、2-甲硫基-N6-异戊烯基腺嘌呤、尿嘧啶-5-羟乙酸(v)、wybutoxosine、假尿嘧啶、queosine、2-巯基胞嘧啶、5-甲基-2-硫脲嘧啶、2-硫尿嘧啶、4-硫尿嘧啶、5-甲基尿嘧啶、尿嘧啶-5-羟乙酸甲酯、尿嘧啶-5-羟乙酸(v)、5-甲基-2-硫尿嘧啶、3-(3-氨基-3-N-2-羧丙基)尿嘧啶、(acp3)w、2,6-二氨基嘌呤、3-硝基吡咯、肌苷、硫尿苷、辫苷、怀俄苷、二氨基嘌呤、异鸟嘌呤、异胞嘧啶、二氨基嘧啶、2,4-二氟甲苯、异喹啉、吡咯并[2,3-]吡啶和任何其他能够与嘌呤或嘧啶侧链配对的核苷类似物。

[0275] 在一些实施方案中，本发明的位点特异性HNF4α靶向部分包含编码多肽的多核苷酸，所述多肽包含锌指或TALE的DNA结合域(DBD)或其片段，其被工程化为特异性靶向HNF4α表达控制区以调节HNF4α基因的表达。

[0276] 特异性结合目标DNA靶区域(例如HNF4α表达控制区)的这种锌指多肽的设计和制备是本领域内众所周知的。例如,锌指(ZNF)蛋白包含特异性结合核苷酸三联体的DNA结合域。因此,为了设计和制备本发明的位点特异性HNF4α靶向部分,可以使用模块化组装方法,该方法包括结合能够各自识别特定的3-碱基对DNA序列的单独的锌指DNA结合域以产生识别长度在9个碱基对至24个碱基对范围内的靶位点的3-指、4-指、5-指、6-指、7-指或8-指的锌指多肽。另一种合适的方法可包括2-指模块以产生具有多达6个单独锌指的ZNF多核苷酸。参见例如Shukla VK等,Nature.459(7245)2009:437-41;Dreier B等,JBC.280(42)2005:35588-97;Dreier B等,JBC276(31)2001:29466-78;Bae KH等,Nature Biotechnology.21(3)2003:275-80。

[0277] 在一些实施方案中,本发明的位点特异性HNF4α靶向部分包含编码多肽的多核苷酸,所述多肽包含锌指的DNA结合域(DBD)或其片段,其被工程化为特异性靶向HNF4α表达控制区以调节HNF4α基因的表达。编码结合适用于本发明的核苷酸三联体的锌指的示例性氨基酸序列提供于下表1A中。(参见,例如Gersbach等,SyntheticZinc Finger Proteins:The Advent of Targeted Gene Regulation and Genome Modification Technologies)。

[0278] 表1A.

[0279]

锌指 DNA 结合域(指)的氨基酸序列	核苷酸三连体	SEQ ID NO.
RKDALRG	TTG	1
TTGALTE	CTT	2
QRHHLVE	CTC	3
QNSTLTE	CTA	4
RNDALTE	CTG	5
HKNALQN	ATT	6
RRSACRR	ATC	7

[0280]

锌指 DNA 结合域（指）的氨基酸序列	核苷酸三连体	SEQ ID NO.
QKSSLIA	ATA	8
RRDELNV	ATG	9
TSGSLVR	GTT	10
DPGALVR	GTC	11
QSSSLVR	GTA	12
RSDELVR	GTG	13
RLRDIQF	TCT	14
RSDERKR	TCC	15
RSDHLTT	TCA	16
RLRALDR	TCG	17
TKNSLTE	CCT	18
SKKHLAE	CCC	19
TSHSLTE	CCA	20
RNDTLTE	CCG	21
THLDLIR	ACT	22
DKKDLTR	ACC	23
SPADLTR	ACA	24
RTDTLRD	ACG	25
TSGELVR	GCT	26
DCRDLAR	GCC	27
QSGDLRR	GCA	28
RSDDLVR	GCG	29
ARGNLRT	TAT	30
SRGNLKS	TAC	31
QASNLIS	TAA	32
REDNLHT	TAG	33
TSGNLTE	CAT	34
SKKALTE	CAC	35
QSGNLTE	CAA	36
RADNLTE	CAG	37
TTGNLTV	AAT	38
DSGNLRV	AAC	39
QRANLRA	AAA	40
RKDNLKN	AAG	41
TSGNLVR	GAT	42
DPGNLVR	GAC	43
QSSNLVR	GAA	44

[0281]

锌指DNA结合域（指）的氨基酸序列	核苷酸三连体	SEQ ID NO.
RSDNLVR	GAG	45
APKALGW	TGC	46
QAGHLAS	TGA	47
RSDHLTT	TGG	48
SRRTCRA	CGT	49
HTGHLLE	CGC	50
QSGHLTE	CGA	51
RSDKLTE	CGG	52
HRTTLTN	AGT	53
ERSHLRE	AGC	54
QLAHLRA	AGA	55
RSDHLTN	AGG	56
TSGHLVR	GGT	57
DPGHLVR	GGC	58
QRAHLER	GGA	59
RSDKLVR	GGG	60

[0282] 锌指DNA结合域包含N-端区域和C-端区域，其之间具有结合靶DNA序列的“指”。N-端区域的长度通常为7个氨基酸。C-端区域长度通常为6个氨基酸。因此，N-端区域通常包含氨基酸序列$X_1X_2X_3X_4X_5X_6X_7$(SEQ ID NO:)。“X”可以是任何氨基酸。在一些实施方案中，N端区域包含示例性氨基酸序列LEPGEKP(SEQ ID NO:)。“X”可以是任何氨基酸。C端区域通常包含氨基酸序列$X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$(SEQ ID NO:)。在某些实施方案中，C-端区域包含示例性氨基酸序列TGKKTS(SEQ ID NO:)。

[0283] DNA结合域中的每个指的侧邻位于该指N-端的N-端主链和位于该指C-端的C-端主链。指的N-端主链的长度通常为11个氨基酸，在第3和第6位具有两个保守半胱氨酸(C)。因此，指的N-端主链通常包含氨基酸序列$X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$(SEQ ID NO:)。“X”可以是任何氨基酸。指的C-端主链的长度通常为5个氨基酸，在第1和第5位具有两个保守的组氨酸(H)。因此，该指的C-端主链通常包含氨基酸序列$HX_{17}X_{18}X_{19}H$(SEQ ID NO:)。“X”可以是任何氨基酸。在一些实施方案中，N-端主链包含示例性氨基酸序列YKCPECGKSFS(SEQ ID No.61)且C-端主链包含示例性氨基酸序列HQRTH(SEQ ID No.62)。两个“指”通过接头连接。接头的长度通常为5个氨基酸并且包含$X_{20}X_{21}X_{22}X_{23}X_{24}$(SEQ ID NO:)的氨基酸序列。“X”可以是任何氨基酸。在某些实施方案中，接头包含示例性氨基酸序列TGEKP(SEQ ID No.63)。因此，位点特异性的HNF4α位点特异性破坏剂的锌指具有如下结构：(N-端主链-指-C-端主链-接头)n，并且位点特异性的HNF4α位点特异性破坏剂的锌指具有如下结构：[N-端区域(N-端主链-指-C-端主链-接头)n-C-端区域]。“N”表示与锌指DNA结合域结合并因此与HNF4α位点特异性破坏剂结合的核苷酸三联体的数目。

[0284] 四个核苷酸三联体的“指”氨基酸序列是未知的，但是，如果这样的三联体在感兴趣的靶区域中被鉴定，则两个“接头跨度序列”(接头跨度1和接头跨度2)可用于规避该问题。如果三联体的“指”氨基酸序列不可用，则接头跨度1用于跳过一个碱基对。如果三联体的“指”氨基酸序列不可用，则接头跨度2用于跳过2个碱基对。接头跨度1的长度通常为12个

氨基酸。接头跨度2的长度通常为16个氨基酸。因此，接头跨度1通常包含氨基酸序列$X_{31}X_{32}X_{33}X_{34}X_{35}X_{36}X_{37}X_{38}X_{39}X_{40}X_{41}X_{42}$(SEQ ID NO:)。接头跨度2通常包含氨基酸序列$X_{43}X_{44}X_{45}X_{46}X_{47}X_{48}X_{49}X_{50}X_{51}X_{52}X_{53}X_{54}X_{55}X_{56}X_{57}X_{58}$(SEQ IDNO:)。在一些实施方案中，接头跨度1包含氨基酸序列THPRAPI PKPFQ(SEQ ID NO:)。在某些实施方案中，接头跨度2包含氨基酸序列TPNPHRRTDPSHKPFQ(SEQ ID NO:)。当使用接头跨度1和/或接头跨度2时，指-接头跨度1/跨度2-指包含如下结构:N端主链-指-C端主链-接头跨度1/跨度2-N端主链-指-C端主链-接头。

[0285] 表1B提供了包含以下工作实施例中描述包含锌指DNA结合域的破坏剂的示例性锌指DNA结合域(参见表6A)的氨基酸序列结构。表10还提供了表达控制区中合适的靶序列的核苷酸序列，适用于包含本发明的锌指DNA结合域的破坏剂的示例性锌指DNA结合域的氨基酸序列，以及适用于包含本发明的锌指DNA结合域的破坏剂的示例性锌指DNA结合域的氨基酸序列结构。表1B中使用的“X”代表任何氨基酸。

[0286] 在一些实施方案中，适用于本发明的破坏剂的锌指DNA结合域包含与表6A和10中任一个提供的任何一个锌指DNA结合域的完整氨基酸序列具有至少75％、至少80％、至少85％、至少86％、至少87％、至少88％、至少89％、至少90％、至少91％、至少92％、至少93％、至少94％、至少95％、至少96％、至少97％、至少98％、至少99％氨基酸同一性的氨基酸序列。

[0287] 表1B.

[0288]

示例性锌指DNA结合域的名称	氨基酸序列结构	SEQ ID NO:
ZF1	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF2	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF3	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDN	

[0289]

示例性锌指DNA结合域的名称	氨基酸序列结构	SEQ ID NO:
	LVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QLAHLRAHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$DPGHLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QSSNLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$RKDNLKNHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QAGHLASHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TSGSLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_{25}$X$_{26}$X$_{27}$X$_{28}$X$_{29}$X$_{30}$	
ZF4	X$_1$X$_2$X$_3$X$_4$X$_5$X$_6$X$_7$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QLAHLRAHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$SKKHLAEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TTGALTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TSGNLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QSGDLRRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TSHSLTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_{25}$X$_{26}$X$_{27}$X$_{28}$X$_{29}$X$_{30}$	
ZF5	X$_1$X$_2$X$_3$X$_4$X$_5$X$_6$X$_7$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TSGNLTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$DSGNLRVHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$HKNALQNHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$RNDTLTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$RSDKLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$DPGHLVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_{25}$X$_{26}$X$_{27}$X$_{28}$X$_{29}$X$_{30}$	
ZF6	X$_1$X$_2$X$_3$X$_4$X$_5$X$_6$X$_7$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$TSHSLTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$QRANLRAHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$RADNLTEHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$ERSHLREHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$CX$_{10}$X$_{11}$CX$_{12}$X$_{13}$X$_{14}$X$_{15}$X$_{16}$DPGALVRHX$_{17}$X$_{18}$X$_{19}$HX$_{20}$X$_{21}$X$_{22}$X$_{23}$X$_{24}$X$_8$X$_9$C	

[0290]

示例性锌指DNA结合域的名称	氨基酸序列结构	SEQ ID NO:
	$X_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF7	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF8	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF9	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEH$X_{17}X_{18}X_{19}HX_{43}X_{44}X_{45}X_{46}X_{47}X_{48}X_{49}X_{50}X_{51}X_{52}X_{53}X_{54}X_{55}X_{56}X_{57}X_{58}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF10	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1$	

[0291]

示例性锌指DNA结合域的名称	氨基酸序列结构	SEQ ID NO:
	$_3X_{14}X_{15}X_{16}$ERSHLREH$X_{17}X_{18}X_{19}$H$X_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRH$X_{17}X_{18}X_{19}HX_{20}X_2{}_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF11	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSH LREH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1{}_3X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_{18}X_{19}HX_2{}_0X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLA EH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_1{}_4X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{18}X_{19}HX_{20}X_2{}_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF12	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKH LAEH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1{}_3X_{14}X_{15}X_{16}$THLDLIRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLA RH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_1{}_4X_{15}X_{16}$REDNLHTH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_{18}X_{19}HX_{20}X_2{}_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF13	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDK LVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1{}_3X_{14}X_{15}X_{16}$QSGDLRRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRH$X_{17}X_{18}X_{19}HX_2{}_0X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLV RH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_1{}_4X_{15}X_{16}$DPGHLVRH$X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEH$X_{17}X_{18}X_{19}HX_{20}X_2$	

[0292]

示例性锌指DNA结合域的名称	氨基酸序列结构	SEQ ID NO:
	$_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH $X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF14	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGH LVRHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1$ $_3X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8$ $X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{18}X_{19}HX_2$ $_0X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLV RHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_1$ $_4X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9C$ $X_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}HX_{20}X_2$ $_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERH $X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ZF15	$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDT LTEHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_1$ $_3X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8$ $X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_{19}HX_2$ $_0X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLV RHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_1$ $_4X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9C$ $X_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}HX_{20}X_2$ $_1X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH $X_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	

[0293] 类似地,特异性结合目标DNA靶区域(例如HNF4α表达控制区)的这类TALE多肽的设计和制备是本领域众所周知的。例如,TALE的DNA结合域包含重复的高度保守的33-34氨基酸的序列,其具有不同的第12和第13氨基酸。这两个位置(称为重复可变双残基(RVD))是高度可变的,并显示与特定核苷酸识别的强相关性。氨基酸序列和DNA识别之间的这种直接关系允许通过选择含有适当RVD的重复片段的组合来工程化特异性DNA结合域。参见,例如Boch J Nature Biotechnology.29(2)2011:135-6;Boch J等,Science.326(5959)2009:1509-12;Moscou MJ&Bogdanove AJ Science.326(5959)2009:1501。

[0294] 在一些实施方案中,包含多核苷酸的本发明的位点特异性HNF4α靶向部分包含指导RNA(或gRNA)或编码指导RNA的核酸。gRNA是包含例如引导效应物至HNF4α表达控制元件所必需的“支架”序列的短合成RNA分子,其可以例如包含靶向含HNF4α表达控制元件的基因组靶序列的约20个核苷酸位点特异性序列。

[0295] 通常,指导RNA序列被设计为具有约17至约24个核苷酸(例如19、20或21个核苷酸)的长度并且与靶序列互补。定制gRNA发生器和算法在商业上可得以用于有效的指导RNA的设计。基因编辑也已使用嵌合“单指导RNA”(“sgRNA”)实现,其为模拟天然存在的crRNA-tracrRNA复合体并包含tracrRNA(用于结合核酸酶)和至少一种crRNA(以引导核酸酶至用于编辑的靶序列)的工程化(合成)单RNA分子。化学修饰的sgNA也已被证实在基因组编辑中

是有效的;参见,例如Hendel等(2015)Nature Biotechnol.,985-991。

[0296] 示例性位点特异性HNF4α启动子1靶向部分提供于下表2中。在一些实施方案中,多核苷酸包含与表2中任何核苷酸序列的完整核苷酸序列具有至少75%、至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%同一性的核苷酸序列。

[0297] 示例性位点特异性HNF4α启动子2靶向部分提供于下表3中。在一些实施方案中,多核苷酸包含与表3中任何核苷酸序列的完整核苷酸序列具有至少75%、至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%同一性的核苷酸序列。

[0298] 示例性位点特异性HNF4α启动子靶向部分还提供于下表9中。在一些实施方案中,多核苷酸包含与表9中任何核苷酸序列的完整核苷酸序列具有至少75%、至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%同一性的核苷酸序列。

[0299] 应当理解,尽管表2、3、4和9中的序列被描述为经修饰的(或未修饰的),但本发明所涵盖的核酸分子(例如位点特异性破坏剂)可包含表2、3、4或9的任一个中所列的未修饰或与本文所述修饰不同的任何一个序列。还应当理解,尽管表9中的一些序列在用作本发明的位点特异性靶向部分中的RNA分子(例如指导RNA)时具有“Ts”,但“Ts”可被“Us”替代。

[0300] 在一些实施方案中,包含多核苷酸(例如gRNA)的位点特异性HNF4α靶向部分包含与锚定序列互补的核苷酸序列。在一个实施方案中,锚定序列包含CTCF结合基序或共有序列:N(T/C/G)N(G/A/T)CC(A/T/G) (C/G) (C/T/A)AG(G/A) (G/T)GG(C/A/T) (G/A) (C/G) (C/T/A) (G/A/C) (SEQ ID NO:64)、其中N是任何核苷酸。CTCF结合基序或共有序列也可以是相反的定向,例如(G/A/C) (C/T/A) (C/G) (G/A) (C/A/T)GG(G/T) (G/A)GA(C/T/A) (C/G) (A/T/G)CC(G/A/T)N(T/C/G)N(SEQ ID NO:65)。在一些实施方案中,核酸序列包含与CTCF结合基序或共有序列互补的序列。

[0301] 在一些实施方案中,多核苷酸包含与锚定序列至少75%、至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%互补的核苷酸序列。

[0302] 在一些实施方案中,多核苷酸包含与CTCF结合基序或共有序列至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%互补的核苷酸序列。在一些实施方案中,多核苷酸选自由gRNA和与锚定序列互补的序列或包含与锚定序列至少80%、至少85%、至少86%、至少87%、至少88%、至少89%、至少90%、至少91%、至少92%、至少93%、至少94%、至少95%、至少96%、至少97%、至少98%、至少99%互补序列的序列组成的组。

[0303] 在一些实施方案中,包含本发明的多核苷酸的位点特异性HNF4α靶向部分是RNAi分子。RNAi分子包括RNA或RNA样结构,其通常包含15-50个碱基对(例如约8-25个碱基对)并且具有与细胞内表达的靶基因中的编码序列相同(互补)或几乎相同(基本上互补)的核碱基序列。RNAi分子包括但不限于:短干扰RNA(siRNA)、双链RNA(dsRNA)、微RNA(miRNA)、短发夹RNA(shRNA)、部分双链体(meroduplexe)和dicer底物(美国专利号8,084,599、8,349,809

和8,513,207)。在一个实施方案中,本发明包括抑制编码本文所述多肽(例如结合成核分子)的基因的表达的组合物。

[0304] RNAi分子包含与靶基因的全部或片段基本上互补或完全互补的序列。RNAi分子可以在内含子和外显子之间的边界处补充序列,以防止新产生的特定基因的核RNA转录物成熟为用于转录的mRNA。与特定基因互补的RNAi分子可与该基因的mRNA杂交并阻止其翻译。反义分子可以是DNA、RNA或其衍生物或杂合物。这种衍生分子的示例包括但不限于肽核酸(PNA)和基于硫代磷酸酯的分子,例如脱氧核糖核酸胍(DNG)或核糖核酸胍(R G)。

[0305] RNAi分子可以作为体外合成的"即用型"RNA或作为转染至细胞内的反义基因(其在转录后将产生RNAi分子)提供给细胞。与mRNA的杂交导致通过RNAse H降解杂交分子和/或抑制翻译复合体的形成。两者都导致不能产生原始基因的产物。

[0306] 与目标转录物杂交的RNAi分子的长度应为约10个核苷酸,约15或30个核苷酸之间,或约15、16、17、18、19、20、21、22、23、24、25、26、27、28、29、30或更多个核苷酸。反义序列与靶向的转录物的同一性程度应为至少75%、至少80%、至少85%、至少90%或至少95%。

[0307] RNAi分子还可以包含突出端,即通常不成对的突出核苷酸,其不直接参与由本文定义的有义链和反义链对的核心序列正常形成的双螺旋结构。RNAi分子可在每个有义链和反义链上独立包含约1-5个碱基的3'和/或5'突出端。在一个实施方案中,有义链和反义链均包含3'和5'突出端。在一个实施方案中,一条链的一个或多个3'突出端核苷酸与另一条链的一个或多个5'突出端核苷酸配对。在另一个实施方案中,一条链碱基的一个或多个3'突出端核苷酸不与另一条链的一个或多个5'突出端核苷酸碱基配对。RNAi分子的有义链和反义链可包含或不包含相同数目的核苷酸碱基。反义链和有义链可形成双链体,其中仅5'端具有平端,仅3'端具有平端,5'端和3'端均为平端,或5'端和3'端均不是平端。在另一个实施方案中,突出端中一个或多个核苷酸包含硫代磷酸、硫代磷酸酯、脱氧核苷酸反向(3'-3'连接)核苷酸或是经修饰的核糖核苷酸或脱氧核苷酸。

[0308] 小干扰RNA(siRNA)分子包含与靶mRNA的约15至约25个连续核苷酸相同的核苷酸序列。在一些实施方案中,siRNA序列从二核苷酸AA开始,包含约30-70%(约50-60%、约40-60%、或约45%-55%)的GC含量,并且与其引入其中的哺乳动物基因组中除靶标以外的任何核苷酸序列不具有高百分比同一性,例如通过标准BLAST检索确定。

[0309] siRNA和shRNA类似于内源性微RNA(miRNA)基因的加工途径中的中间体(Bartel,Cell116:281-297,2004)。在一些实施方案中,siRNA可作为miRNA发挥作用且反之亦然(Zeng等,Mol Cell 9:1327-1333,2002;Doench等,Genes Dev 17:438-442,2003)。与siRNA类似,微RNA使用RISC以下调靶基因,但与siRNA不同,大多数动物miRNA不切割mRNA。相反,miRNA通过翻译抑制或polyA去除和mRNA降解减少蛋白质输出(Wu等,Proc Natl Acad Sci USA 103:4034-4039,2006)。已知的miRNA结合位点在mRNA 3'UTR内;miRNA似乎靶向与miRNA 5'末端的核苷酸2-8几乎完全互补的位点(Rajewsky,Nat Genet 38Suppl:S8-13,2006;Lim等,Nature 433:769-773,2005)。该区域被称为种子区域。因为siRNA和miRNA是可互换的,外源性siRNA下调具有与siRNA的种子互补性的mRNA(Birmingham等,Nat Methods 3:199-204,2006)。3'UTR内的多个靶位点给出更强的下调(Doench等,Genes Dev 17:438-442,2003)。

[0310] 已知的miRNA序列的列表可以在由研究组织维护的数据库中找到,例如Wellcome

Trust Sanger Institute、Perm Center for Bioinformatics、Memorial Sloan Kettering Cancer Center和European Molecule Biology Laboratory等。已知的有效siRNA序列和同源结合位点也在相关文献中充分描述。通过本领域内已知的技术容易地设计和产生RNAi分子。此外，存在增加发现有效且特异性的序列基序的机会的计算工具(Pei等，2006;Reynolds等，2004;Khvorova等，2003;Schwarz等，2003;Ui-Tei等，2004;Heale等，2005;Chalk等，2004;Amarzguioui等，2004)。

[0311] RNAi分子调节由基因编码的RNA的表达。因为多个基因可以相互共享一定程度的序列同源性，在一些实施方案中，RNAi分子可以被设计为靶向具有足够序列同源性的一类基因。在一些实施方案中，RNAi分子可包含与在不同基因靶标之间共有的或对特定基因靶标独特的序列互补的序列。在一些实施方案中，RNAi分子可被设计为靶向在若干基因之间具有同源性的RNA序列的保守区，从而靶向基因家族中的若干基因(例如不同的基因异构体、剪接变体、突变基因等)。在一些实施方案中，RNAi分子可被设计为靶向单一基因的特定RNA序列所特有的序列。

[0312] 在一些实施方案中，RNAi分子靶向结合成核分子(例如CTCF、黏连蛋白、USF1、YY1、TATA-盒结合蛋白相关因子3(TAF3)、ZNF143)中的序列，或促进锚定序列介导的结合体的形成的另一多肽，或表观遗传修饰剂，例如参与翻译后修饰的酶，其包括但不限于DNA甲基化酶(例如DNMT3a、DNMT3b、DNMTL)，DNA去甲基化酶(例如催化5-甲基胞嘧啶氧化成5-羟甲基胞嘧啶和更高级氧化衍生物的TET家族酶)，组蛋白甲基转移酶，组蛋白脱乙酰酶(例如HDAC1、HDAC2、HDAC3)，去乙酰化酶1、2、3、4、5、6或7，赖氨酸特异性组蛋白去甲基化酶1(LSD1)，组蛋白-赖氨酸-N-甲基转移酶(Setdb1)，常染色质组蛋白-赖氨酸N-甲基转移酶2(G9a)，组蛋白-赖氨酸N-甲基转移酶(SUV39H1)，zeste同源物2(EZH2)增强子，病毒赖氨酸甲基转移酶(vSET)，组蛋白甲基转移酶(SET2)，蛋白质-赖氨酸N-甲基转移酶(SMYD2)等。在一个实施方案中，RNAi分子靶向蛋白质脱乙酰酶，例如去乙酰化酶1、2、3、4、5、6或7。在一个实施方案中，本发明包括包含靶向结合成核分子(例如CTCF)的RNAi的组合物。

[0313] 在一些实施方案中，位点特异性HNF4α靶向部分包含肽或蛋白质部分。在一些实施方案中，位点特异性破坏剂包含融合蛋白。在一些实施方案中，效应物是ca肽或蛋白质部分。肽或蛋白质部分可包括但不限于肽配体、抗体片段、或结合受体(如细胞外受体)的靶向适体、神经肽、激素肽、肽药物、毒性肽、病毒或微生物肽、合成肽和激动剂或拮抗剂肽。

[0314] 示例性肽或蛋白质包括DNA结合蛋白、CRISPR组分蛋白、结合成核分子、显性负性结合成核分子、表观遗传修饰剂或其任何组合。在一些实施方案中，肽包括核酸酶、物理阻断剂、表观遗传募集剂和表观遗传CpG修饰剂及前述的任何片段和组合。在一些实施方案中，肽包括蛋白质的DNA结合域，例如螺旋-转角-螺旋基序、亮氨酸拉链、Zn-指、TATA盒结合蛋白、转录因子。

[0315] 肽或蛋白质可以是直链或支链的。肽或蛋白质部分可具有约5至约200个氨基酸、约15至约150个氨基酸、约20至约125个氨基酸、约25至约100个氨基酸、20-70个氨基酸、20-80个氨基酸、20-90个氨基酸、30-100个氨基酸、30-60个氨基酸、30-80个氨基酸、35-85个氨基酸、40-100个氨基酸或50-125个氨基酸或或其间的任何范围的长度。

[0316] 如上所述，在一些实施方案中，本发明的位点特异性HNF4α靶向部分包含融合蛋白。

[0317] 在一些实施方案中，本发明的融合蛋白包括靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子。在其它实施方案中，本发明的融合蛋白包含效应分子。示例性效应分子包括如下所述且在一些实施方案中包括例如核酸酶、物理阻断剂、表观遗传募集剂(例如转录增强子或转录阻遏物)和表观遗传CpG修饰剂(例如DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶)及前述的任何组合。

[0318] 例如，位点特异性靶向部分可包含gRNA和效应物，例如核酸酶，例如Cas9，例如野生型Cas9、切口酶Cas9(例如Cas9D10A)、死亡Cas9(dCas9)、eSpCas9、Cpf1、C2C1或C2C3、或编码此类核酸酶的核酸。核酸酶和gRNA的选择取决于靶向的突变是否为核苷酸的删除、取代或添加，例如对靶向的序列的核苷酸的删除、取代或添加。无催化活性的核酸内切酶(例如死亡Cas9(dCas9，例如D10A;H840A))与(一个或多个)效应物结构域的全部或一部分(例如生物活性部分)拴系的融合产生嵌合蛋白，所述嵌合蛋白可通过一个或多个RNA序列(例如DNA识别元件，其包括但不限于锌指阵列、sgRNA、TAL阵列、本文所述肽核酸)连接至多肽以将组合物引导至特定DNA位点，从而调节一个或多个靶核酸序列的活性和/或表达(例如使DNA序列甲基化或去甲基化)。

[0319] 在一个实施方案中，本发明的融合蛋白可包含效应分子，其包含例如CRISPR相关蛋白(Cas)多肽或其片段(例如Cas9多肽或其片段)和表观遗传募集剂或表观遗传CpG修饰剂。

[0320] 在一个实施方案中，合适的Cas多肽是无酶活性的Cas多肽，例如“死Cas多肽”或“dCas”多肽。

[0321] 适用于本文所述方法和组合物的示例性Cas多肽如下所述。使用本领域已知的方法，Cas多肽可与本文所述多种试剂和/或分子中的任何一种融合;这样得到的融合分子可用于各种公开的方法。

[0322] 在一个方面，本发明包括包含蛋白质与将蛋白质靶向位点特异性靶序列的至少一种指导RNA(gRNA)或反义DNA寡核苷酸组合的组合物，所述蛋白质包含作用于DNA的结构域(例如效应物)(例如核酸酶结构域，例如Cas9结构域，例如dCas9结构域;DNA甲基转移酶、去甲基化酶、脱氨酶)，其中所述组合物在人细胞中有效改变靶基因的表达。在一些实施方案中，酶结构域是Cas9或dCas9。在一些实施方案中，蛋白质包含两个酶结构域，例如dCas9和甲基化酶或去甲基化酶结构域。

[0323] 在一个方面，本发明包括包含蛋白质与将蛋白质靶向位点特异性靶序列的至少一种指导RNA(gRNA)或反义DNA寡核苷酸组合的组合物，所述蛋白质包含含有转录控制元件的结构域(例如效应物)(例如核酸酶结构域，例如Cas9结构域，例如dCas9结构域;转录增强子;转录阻遏物)，其中所述组合物在人细胞中有效改变靶基因的表达。在一些实施方案中，酶结构域是Cas9或dCas9。在一些实施方案中，蛋白质包含两个酶结构域，例如dCas9和转录增强子或转录阻遏物结构域。

[0324] 如本文所用，“效应物结构域的生物活性部分”是维持效应物结构域的功能(例如完全地、部分地、最低限度地)的部分(例如“最小”或“核心”结构域)。

[0325] 本文所述的嵌合蛋白还可以包含接头，例如氨基酸接头。在一些方面，接头包含2个或更多个氨基酸，例如一个或多个GS序列。在一些方面，Cas9(例如dCas9)与两个或更多个效应物结构域(例如，DNA甲基化酶或在DNA去甲基化中起作用的酶或蛋白乙酰转移酶或

脱乙酰酶的)的融合包括在结构域之间的一个或多个散布的接头(例如GS接头)。在一些方面,dCas9与具有散布的接头的2-5效应物结构域融合。

[0326] 在一些实施方案中,位点特异性HNF4α靶向部分包含结合成核分子、编码结合成核分子的核酸或其组合。在一些实施方案中,锚定序列介导的结合体通过结合至第一锚定序列的第一结合成核分子、结合至非邻接的第二锚定序列的第二结合成核分子以及第一和第二结合成核分子之间的缔合介导。在一些实施方案中,结合成核分子可以例如通过竞争性结合(内源性结合成核分子与其结合位点的结合)破坏。

[0327] 结合成核分子可以是例如CTCF、黏连蛋白、USF1、YY1、TATA-盒结合蛋白相关因子3(TAF3)、ZNF143结合基序或促进锚定序列介导的结合体形成的另一种多肽。结合成核分子可以是内源多肽或其它蛋白质,例如转录因子,例如自身免疫调节剂(AIRE),另一种因子,例如X-失活特异性转录物(XIST),或被工程化以识别特定目标DNA序列的工程化多肽,例如具有锌指、亮氨酸拉链或用于序列识别的bHLH结构域。结合成核分子可以调节锚定序列介导的结合体内或周围的DNA相互作用。例如,结合成核分子可以将其他因子募集至锚定序列,其改变锚定序列介导的结合体的形成或破坏。

[0328] 结合成核分子还可以具有用于同源或异源二聚化的二聚化结构域。一种或多种结合成核分子(例如内源的和工程化的)可以相互作用以形成锚定序列介导的结合体。在一些实施方案中,结合成核分子被工程化以进一步包括稳定结构域(例如粘聚相互作用结构域)以稳定锚定序列介导的结合体。在一些实施方案中,结合成核分子被工程化以结合靶序列,例如调节靶序列结合亲和力。在一些实施方案中,选择或工程化结合成核分子,使其对锚定序列介导的结合体内的锚定序列具有选择的结合亲和力。可以通过使用CTCF中携带失活突变的细胞和染色体构象捕获试验或基于3C的方法(例如Hi-C或高通量测序)来鉴定结合成核分子及它们相应的锚定序列,以在不存在CTCF的情况下检测拓扑相关的结构域,例如远端DNA区域或基因座之间的拓扑相互作用。也可鉴定长程DNA相互作用。其他分析可包括使用诱饵(例如黏连蛋白、YY1或USF1、ZNF143结合基序和MS)的ChIA-PET分析以识别与诱饵相关的复合体。

[0329] II.效应分子

[0330] 用于本发明组合物和方法的效应分子包括调节生物活性的那些,例如增强或减弱酶活性、基因表达、细胞信号传导和细胞或器官功能。本发明优选的效应分子是核酸酶、物理阻断剂、表观遗传募集剂(例如转录增强子或转录阻遏物)和表观遗传CpG修饰剂(例如DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶)及前述的任何组合。

[0331] 本发明的效应分子的其它效应物活性也可包括结合调节蛋白以调节调节物的活性,例如转录或翻译。效应分子还可包含本文所述的激活剂或抑制剂(或“负效应物”)功能。例如,效应分子可抑制底物与受体的结合并抑制其活化,例如纳曲酮和纳洛酮结合阿片样物质受体而不激活它们并阻断受体结合阿片样物质的能力。效应分子还可以调节蛋白质稳定性/降解和/或转录物稳定性/降解。例如,蛋白质可以被多肽辅因子、泛素靶向降解到蛋白质上以标记它们用于降解。在另一个实施例中,效应分子通过阻断酶的活性位点来抑制酶活性,例如甲氨蝶呤是四氢叶酸的结构类似物,其是二氢叶酸还原酶的辅酶,其比与二氢叶酸还原酶的结合天然底物更紧密1000倍并抑制核苷酸碱基合成。

[0332] 在一些实施方案中,效应分子是化学品,例如调节胞嘧啶(C)或腺嘌呤(A)的化学

品(例如亚硫酸氢钠、亚硫酸氢铵)。在一些实施方案中,效应分子具有酶活性(甲基转移酶、去甲基化酶、核酸酶(例如Cas9)、脱氨酶)。在一些实施方案中,效应分子在空间上阻碍锚定序列介导的结合体的形成或RNA聚合酶与启动子的结合。

[0333] 具有效应物活性的效应分子可以是本文所述的具有差PK/PD的小分子、肽、融合蛋白、核酸、纳米颗粒、适体或药物试剂(pharmacoagent)中的任何一种。

[0334] 在一些实施方案中,效应分子是抑制剂或"负效应分子"。在调节锚定序列介导的结合体的形成的负效应分子的情况下,在一些实施方案中,负效应分子的特征在于负效应分子存在时与不存在时相比,内源成核多肽的二聚化减少。例如,在一些实施方案中,负效应分子是或包含内源成核多肽的二聚化结构域的变体或其二聚化部分。

[0335] 例如,在某些实施方案中,通过使用显性负性效应物(例如识别并结合锚定序列(例如CTCF结合基序)但具有失活的(例如突变的)二聚化结构域(例如不能形成功能性锚定序列介导的结合体的二聚化结构域)的蛋白质)来改变(例如破坏)锚定序列介导的结合体。例如,可以改变CTCF的锌指结构域,使其结合特定的锚定序列(通过加入识别侧翼核酸的锌指),同时改变同源二聚化结构域以防止工程化CTCF和CTCF的内源形式之间的相互作用。

[0336] 在一些实施方案中,效应分子包含对靶锚定序列介导的结合体内的锚定序列具有选择的结合亲和力的合成结合成核分子(该结合亲和力与靶锚定序列相关的内源性结合成核分子的亲和力相比可以是至少10%、15%、20%、25%、30%、35%、40%、45%、50%、55%、60%、65%、70%、75%、80%、85%、90%、95%、或者更高或更低。合成结合成核分子可以与内源结合成核分子具有30-90%、30-85%、30-80%、30-70%、50-80%、50-90%的氨基酸序列同一性)。结合成核分子可以例如通过竞争性结合(内源性结合成核分子与其锚定序列的结合)破坏。在更多的一些实施方案中,结合成核分子被工程化以结合锚定序列介导的结合体中的新锚定序列。

[0337] 在一些实施方案中,显性负性效应分子具有识别特定DNA序列(例如锚定序列、CTCF锚定序列、侧翼为赋予序列特异性的序列)的结构域和在锚定序列附近提供空间存在的第二结构域。第二结构域可包含显性负性的结合成核分子或其片段、干扰结合成核分子序列识别的多肽(例如,肽/核酸的氨基酸主链或PNA),赋予空间干扰的与小分子连接的核苷酸序列、或DNA识别元件和空间阻断剂的任何其它组合。

[0338] 在一些实施方案中,效应分子是表观遗传修饰剂。可用于本文所述方法和组合物的表观遗传修饰剂包括影响例如DNA甲基化、组蛋白乙酰化和RNA相关沉默的试剂。在一些实施方案中,效应物序列特异性靶向表观遗传酶(例如产生或去除表观遗传标记(例如乙酰化和/或甲基化)的酶)。示例性的表观遗传效应物可通过包含位点特异性靶向部分的位点特异性破坏剂靶向包含例如转录控制元件或锚定序列的表达控制区。

[0339] 在一些实施方案中,效应分子包含基因编辑系统的一个或多个组分。基因编辑系统的组件可用于多种情况,其包括但不限于基因编辑。例如,这些组分可用于靶向物理修饰、遗传修饰和/或表观遗传修饰HNF4α序列的试剂。

[0340] 示例性基因编辑系统包括规律成簇的间隔短回文重复(CRISPR)系统、锌指核酸酶(ZFN)和基于转录激活物样效应物的核酸酶(TALEN)。ZFN、TALEN和基于CRISPR的方法描述于例如Gaj等,Trends Biotechnol.31.7(2013):397-405;基因编辑的CRISPR方法描述于例如Guan等,Application of CRISPR-Cas system in gene therapy:Pre-clinical

progress in animal model.DNA Repair 2016July 30[Epub ahead of print];Zheng等,Precise gene deletion and replacement using the CRISPR/Cas9 system in human cells.BioTechniques,Vol.57,No.3,September2014,pp.115-124。

[0341] CRISPR系统是最初在细菌和古细菌中发现的适应性防御系统。CRISPR系统使用称为CRISPR相关或“Cas”核酸内切酶(例如Cas9或Cpf1)的RNA指导的核酸酶以切割外源DNA。在典型的CRISPR/Cas系统中,核酸内切酶通过靶向单链或双链DNA序列的序列特异性、非编码“指导RNA”针对靶核苷酸序列(例如基因组中待序列编辑的位点)。已经确定了三类(I-III)CRISPR系统。II类CRISPR系统使用单个Cas核酸内切酶(而不是多个Cas蛋白)。一种II类CRISPR系统包括II型Cas核酸内切酶,例如CaS9、CRISPR RNA(“crRNA”)和反式激活crRNA(“tracrRNA”)。crRNA包含“指导RNA”,通常是对应于靶DNA序列的约20个核苷酸的RNA序列。crRNA还包含与tracrRNA结合以形成通过RNase III切割的部分双链结构的区域,从而产生crRNA/tracrRNA杂合体。然后crRNA/tracrRNA杂合体指导Cas9核酸内切酶识别和切割靶DNA序列。靶DNA序列通常必须与对给定Cas核酸内切酶特异性的“前间区序列邻近基序”(“PAM”)相邻;然而,PAM序列出现在整个给定的基因组中。从各种原核物种中鉴定的CRISPR核酸内切酶具有独特的PAM序列要求;PAM序列的示例包括5’-NGG(酿脓链球菌)、5’-NNAGAA(嗜热链球菌CRISPR1)、5’-NGGNG(嗜热链球菌CRISPR3)和5’-NNNGATT(脑膜炎奈瑟菌)。一些核酸内切酶(例如Cas9核酸内切酶)与富含G的PAM位点(例如5’-NGG)相关,和在PAM位点上游(从5’)3个核苷酸的位置进行靶DNA的平端切割。另一种II类CRISPR系统包含V型核酸内切酶Cpf1,其小于Cas9;示例包括AsCpf1(来自氨基酸球菌属)和LbCpf1(来自毛螺菌科)。Cpf1相关CRISPR阵列被加工为成熟crRNA而不需要tracrRNA;换句话说,Cpf1系统仅需要Cpf1核酸酶和crRNA来切割靶DNA序列。Cpf1核酸内切酶与富含T的PAM位点(例如5’-TTN)相关。Cpf1也可以识别5’-CTA PAM基序。Cpf1通过引入具有4-或5-核苷酸5’突出端的偏移的或错列的双链断裂切割靶DNA,例如,用位于编码链上PAM位点下游(从3’)的18个核苷酸和互补链上PAM位点下游的23个核苷酸的5-核苷酸偏移或错列切口切割靶DNA;由这种偏移切割产生的5-核苷酸突出端允许通过同源重组的DNA插入比通过平端切割的DNA处的插入更精确的基因组编辑。参见,例如Zetsche等(2015)Cell,163:759-771。

[0342] 多种CRISPR相关(Cas)基因或蛋白可用于本发明,并且Cas蛋白的选择将取决于所述方法的特定条件。

[0343] Cas蛋白的具体示例包括II类系统,其包括Cas1、Cas2、Cas3、Cas4、Cas5、Cas6、Cas7、Cas8、Cas9、Cas10、Cpf1、C2C1或C2C3。在一些实施方案中,Cas蛋白(例如Cas9蛋白)可来自多种原核物种中的任何一种。在一些实施方案中,选择特定的Cas蛋白(例如特定的Cas9蛋白)以识别特定的前间区序列邻近基序(PAM)序列。在一些实施方案中,位点特异性靶向部分包括序列靶向多肽,例如酶,例如Cas9。在某些实施方案中,Cas蛋白(例如Cas9蛋白)可从细菌或古细菌获得或使用已知方法合成。在某些实施方案中,Cas蛋白可来自革兰氏阳性细菌或革兰氏阴性细菌。在某些实施方案中,Cas蛋白可以来自链球菌(例如,化脓性链球菌、嗜热链球菌)、隐球菌、棒状杆菌、嗜血杆菌、真杆菌、巴氏杆菌、普雷沃菌、韦永氏球菌或海杆菌。在一些实施方案中,编码两种或更多种不同Cas蛋白的核酸或者两种或更多种Cas蛋白可被引入细胞、受精卵、胚胎或动物中,例如以允许包含相同、相似或不同PAM基序的位点的识别和修饰。在一些实施方案中,Cas蛋白被修饰以使核酸酶失活(例如核酸酶缺

陷型Cas9)并募集转录激活子或阻遏物,例如E.coli Pol的共同亚单位,VP64、p65的活化结构域,KRAB或SID4X,以诱导表观遗传修饰,例如组蛋白乙酰转移酶、组蛋白甲基转移酶和去甲基化酶、DNA甲基转移酶和在DNA去甲基化中发挥作用的酶(例如催化5-甲基胞嘧啶氧化成5-羟甲基胞嘧啶和更高级氧化衍生物的TET家族酶)。

[0344] 出于基因编辑的目的,CRISPR阵列可以被设计为包含对应于所希望的靶DNA序列的一个或多个指导RNA序列;参见,例如Cong等,(2013)Science,339:819-823;Ran等,(2013)Nature Protocols,8:2281-2308。Cas9需要gRNA序列的至少约16或17个核苷酸用于发生DNA切割;对于Cpf1,需要gRNA序列的至少约16个核苷酸以实现可检测的DNA切割。

[0345] 虽然野生型Cas9在gRNA靶向的特定DNA序列处产生双链断裂(DSB),但是许多具有修饰的功能性的CRISPR核酸内切酶是可用的,例如Cas9的“切口酶”形式仅产生单链断裂;无催化活性的Cas9(“dCas9”)不切割靶DNA,但通过空间位阻干扰转录。dCas9还可以与异源效应物融合以抑制(CRISPRi)或激活(CRISPRa)靶基因的表达。例如,Cas9可以与转录沉默子(例如KRAB结构域)或转录激活因子(例如dCas9-VP64融合体)融合。与FokI核酸酶融合的无催化活性的Cas9(dCas9)(“dCas9-FokI”)可被用于在与两个gRNA同源的靶序列处产生DSB。参见,例如公开并可获自Addgene存储库的众多CRISPR/Cas9质粒(Addgene,75Sidney St.,Suite 550A,Cambridge,MA 02139;addgene.org/crispr)。引入两个单独的双链断裂(每个双链断裂由单独的指导RNA引导)的“双切口酶”Cas9被RaN等,(2013)Cell,154:1380-1389描述为实现更准确的基因组编辑。

[0346] 用于编辑真核生物的基因的CRISPR技术公开于美国专利申请公布2016/0138008A1和US2015/0344912A1中,和美国专利8,697,359、8,771,945、8,945,839、8,999,641、8,993,233、8,895,308、8,865,406、8,889,418、8,871,445、8,889,356、8,932,814、8,795,965和8,906,616中。Cpf1核酸内切酶和相应的指导RNA和PAM位点公开于美国专利申请公开2016/0208243A1。

[0347] 在一些实施方案中,效应物包含上文所述的CRISPR系统的一种或多种组分。

[0348] 在一些实施方案中,用于本发明的试剂、组合物和方法中的合适的效应物包括例如核酸酶、物理阻断剂,表观遗传募集剂(例如转录增强子或转录阻遏物)和表观遗传CpG修饰剂(例如DNA甲基化酶、DNA去甲基化酶、组蛋白修饰剂或组蛋白脱乙酰酶)及前述的任何组合。

[0349] 合适的效应物包括多肽或其变体。如本文所用,术语“变体”是指通过在前体多肽(例如“亲本”多肽)中掺入一个或多个氨基酸插入、取代或删除而衍生的多肽。在某些实施方案中,变体多肽与亲本多肽的完整氨基酸序列具有至少约85%的氨基酸序列同一性,例如约90%、约91%、约92%、约93%、约94%、约95%、约96%、约97%、约98%、约99%或约100%的氨基酸序列同一性。

[0350] 本文所用的术语“序列同一性”是指核酸或氨基酸分子对之间的比较,即两个氨基酸序列之间或两个核苷酸序列之间的相关性。通常,对序列进行比对以便获得最高阶匹配。用于测定序列同一性的方法是已知的,并且可以通过商业上可获得的计算机程序来测定,所述计算机程序可以计算两个或多个序列之间的同一性百分比。这种计算机程序的典型示例是CLUSTAL。

[0351] 示例性效应物包括泛素、作为泛素连接酶抑制剂的双环肽、转录因子、DNA和蛋白

质修饰酶(例如拓扑异构酶)、拓扑异构酶抑制剂(如拓扑替康)、DNA甲基转移酶(例如DNMT家族(例如DNMT3a、DNMT3b、DNMTL))、蛋白质甲基转移酶(例如病毒赖氨酸甲基转移酶(vSET)、蛋白质-赖氨酸N-甲基转移酶(SMYD2)、脱氨酶(例如APOBEC、UG1)、组蛋白甲基转移酶(例如zeste同源物2(EZH2)的增强子)、PRMT1、组蛋白-赖氨酸-N-甲基转移酶(Setdb1)、组蛋白甲基转移酶(SET2)、常染色质组蛋白-赖氨酸N-甲基转移酶2(G9a)、组蛋白-赖氨酸N-甲基转移酶(SUV39H1)和G9a)、组蛋白脱乙酰酶(例如HDAC1、HDAC2、HDAC3)、在DNA去甲基化中发挥作用的酶(例如催化5-甲基胞嘧啶氧化成5-羟甲基胞嘧啶和更高级氧化衍生物的TET家族酶)、蛋白质去甲基化酶(例如KDMIA和赖氨酸特异性组蛋白去甲基化酶1(LSD1))、解旋酶(例如DHX9)、乙酰基转移酶、脱乙酰酶(例如去乙酰化酶1、2、3、4、5、6或7)、激酶、磷酸酶、DNA嵌入剂(例如溴化乙锭、sybr绿和普罗黄素)、外排泵抑制剂(例如类肽如苯丙氨酸精氨酰-萘酰胺,或喹啉衍生物)、核受体激活剂和抑制剂、蛋白酶体抑制剂、酶的竞争性抑制剂(例如涉及溶酶体贮积病的那些)、锌指蛋白、TALEN、来自蛋白的特定结构域(例如KRAB结构域、VP64结构域、p300结构域(例如p300核心结构域)、MeCP2结构域、MQ1结构域、DNMT3a-3L结构域、TET1结构域和/或TET2结构域)、蛋白质合成抑制剂、核酸酶(例如Cpf1、Cas9、锌指核酸酶)、其一种或多种的融合体(例如dCas9-DNMT、dCas9-APOBEC、dCas9-UG1、dCas9-VP64、dCas9-p300核心、dCas9-KRAB、dCas9-KRAB-MeCP2、dCas9-MQ1、dCas9-DNMT3a-3L、dCas9-TET1、dCas9-TET2和dCas9-MC/MN)。

[0352] 在一些实施方案中,用于本发明的试剂、组合物和方法中的合适的核酸酶包含Cas9多肽或其酶活性部分。在一个实施方案中,Cas9多肽或其酶活性部分进一步包含人核酸外切酶1(hEXO1)的催化活性结构域,例如5'至3'核酸外切酶活性和/或RNase H活性。在其它实施方案中,合适的核酸酶包括转录激活物样效应物核酸酶(TALEN)。在其它实施方案中,合适的核酸酶包括锌指蛋白。

[0353] 如本文所用,术语TALEN是广义的,并且包括能够切割双链DNA而无需另一个TALEN帮助的单体TALEN。术语TALEN也用于指一对TALEN的一个或两个成员,所述一对TALEN被工程化为在相同位点共同工作以切割DNA。共同工作的TALEN可称为左TALEN和右TALEN,其涉及DNA的手性。参见USSN 12/965,590;USSN 13/426,991(US 8,450,471);USSN 13/427,040(US 8,440,431);USSN 13/427,137(US 8,440,432);和USSN 13/738,381,其全部内容通过引用并入本文。

[0354] TAL效应物是黄单胞菌分泌的蛋白质。DNA结合域包含高度保守的33-34个氨基酸的序列,第12和13个氨基酸除外。这两个位置是高度可变的(重复可变双残基(RVD))并显示与特定核苷酸识别的强相关性。氨基酸序列和DNA识别之间的这种简单关系允许通过选择含有适当RVD的重复片段的组合来进行特定DNA结合结构域的工程化。

[0355] 来自FokI核酸内切酶末端的非特异性DNA切割结构域可用于构建在酵母测定中具有活性的杂合核酸酶。这些试剂在植物细胞和动物细胞中也具有活性。最初的TALEN研究使用野生型FokI切割结构域,但是一些随后的TALEN研究也使用具有设计为提高切割特异性和切割活性的突变的FokI切割结构域变体。FokI结构域作为二聚体发挥作用,其需要两个具有针对有正确定向和间隔的靶基因组中位点的独特DNA结合域的构建体。TALEN DNA结合域和FokI切割结构域之间的氨基酸残基数目和两个单独的TALEN结合位点之间的碱基数目都是用于获得高水平活性的参数。TALEN DNA结合域和FokI切割结构域之间的氨基酸残基

数目可以通过多个TAL效应物重复序列和FokI核酸内切酶结构域之间间隔区(不同于间隔区序列)的引入来修饰。间隔区序列可以是12-30个核苷酸。

[0356] TALEN结合域的氨基酸序列和DNA识别之间的关系允许可设计的蛋白质。在这种情况下,人工基因合成是有问题的,因为在TALE结合域中发现的重复序列的不适当退火。对此的一个解决方案是使用公众可获得的软件程序(DNAWorks)来计算适合于在两步PCR中组装的寡核苷酸;寡核苷酸组装后进行全基因扩增。还报道了许多用于产生工程化TALE构建体的模块组装方案。两种方法都提供了工程化DNA结合域的系统方法,其在概念上类似于用于产生锌指DNA识别域的模块组装方法。

[0357] 一旦TALEN基因被组装,就将它们插入质粒;然后质粒被用于转染表达基因产物的靶细胞并进入细胞核以进入基因组。TALEN可用于通过诱导双链断裂(DSB)来编辑基因组,所述双链断裂细胞以修复机制应答。用这种方式,它们可用于校正基因组中的突变,例如引起疾病的突变。

[0358] 如本文所用,“锌指多肽”或“锌指蛋白”是通过被称为锌指的金属稳定结构域以序列特异性方式结合DNA、RNA和/或蛋白质的蛋白质。锌指蛋白是具有DNA切割结构域和DNA结合锌指结构域的核酸酶。锌指多肽可以通过融合核酸内切酶的非特异性DNA切割结构域和位点特异性DNA结合锌指结构域来制备。这样的核酸酶是用于基因编辑的强大工具,并且可被组装以诱导双链断裂(DSB)位点特异性地进入基因组DNA中。ZFN允许特定基因破坏,如在DNA修复期间,靶向的基因可以通过诱变的非同源末端接头(NHEJ)破坏或通过同源重组(HR)修饰(如果提供密切相关的DNA模板)。

[0359] 锌指核酸酶是通过融合核酸内切酶FokI的非特异性DNA切割结构域和位点特异性DNA结合锌指结构域制备的嵌合酶。由于锌指蛋白(ZFP)的柔性性质,ZFN可以被组装,其诱导双链断裂(DSB)位点特异性地进入基因组DNA中。ZFN允许特定基因破坏,如在DNA修复期间,靶基因可以通过诱变的非同源末端接头(NHEJ)破坏或通过同源重组(HR)修饰(如果提供密切相关的DNA模板)。

[0360] 在一些实施方案中,用于本发明的试剂、组合物和方法的合适的物理阻断剂包括gRNA、反义DNA或三链体形成寡核苷酸(其可靶向表达控制单元)空间阻断转录控制元件或锚定序列。gRNA识别特定DNA序列,并且还包括干扰例如结合成核分子序列以用作空间阻断剂的序列。在一些实施方案中,gRNA与一种或多种用作立体存在的肽组合,例如S-腺苷甲硫氨酸(SAM)。在其它实施方案中,物理阻断剂包括无酶活性的Cas9多肽或其片段(例如dCas9)。

[0361] 在一个实施方案中,表观遗传募集剂激活或增强靶基因的转录。在一些实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含VP64结构域或p300核心结构域。

[0362] 在一个实施方案中,表观遗传募集剂沉默或阻遏靶基因的转录。在一些实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含KRAB结构域或MeCP2结构域。

[0363] 在一个实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含dCas9-VP64融合体、dCas9-p300核心融合体、dCas9-KRAB融合体或dCas9-KRAB-MeCP2融合体。

[0364] 如本文所用，“VP64”是由用甘氨酸-丝氨酸(GS)接头连接的VP16(单纯疱疹病毒蛋白16，氨基酸437-447*:DALDDFDLDML)的四个串联拷贝构成的转录激活因子。在一个实施方案中，VP64在C末端还包含转录因子p65(RelA)和Rta。包含VP64、p65和Rta的效应物被称为“VPR”。VP64的GenBank登录号是ADD60007.1，p65的GenBank登录号是NP_001138610.1，Rta的GenBank登录号是AAA66528.1。

[0365] VPR的示例性氨基酸序列如下：

[0366] DALDDFDLDMLGSDALDDFDLDMLGSD
ALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETF
KSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTI
NYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSAL
AQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDE
DLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPML
MEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIAD

[0367] MDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAP
AVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMD
LSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECL
LHAMHISTGLSIFDTSLF（SEQ ID NO: 66)

[0368] 如本文所用，“p300核心结构域”是指人乙酰转移酶p300的催化核心。包含p300的蛋白质的GenBank登记号是NP_001420.2。

[0369] p300的示例性氨基酸序列如下：

[0370] IFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFD IVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKT SRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGK QLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTI NKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFV CDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHP ESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKAL FAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRP KCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHP PDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTS AKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKG DSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYAT MEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLA RDKHLEFSSLRRAQWSTMCMLVELHTQSQD（SEQ ID NO: 67)。

[0371] 如本文所用,“KRAB”是指存在于基于人锌指蛋白的转录因子(KRAB锌指蛋白)中的KrüppeL相关盒(KRAB)转录阻遏域。

[0372] 如本文所用,“MeCp2”是指甲基CpG结合蛋白2,其例如通过结合至包含甲基化DNA的启动子来阻遏转录。

[0373] 在一个实施方案中,表观遗传CpG修饰剂甲基化DNA并使转录失活或阻遏转录。在一些实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传CpG修饰剂包含MQ1结构域或DNMT3a-3L结构域。

[0374] 在一个实施方案中,表观遗传CpG修饰剂去甲基化DNA并激活或刺激转录。在一些实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含TET1或TET2结构域。

[0375] 如本文所用,“TET1”是指由TET1基因编码的TET酶家族的成员“10-11易位甲基胞嘧啶双加氧酶1”。TET1是以铁和α-酮戊二酸依赖性方式通过5-mC的氧化催化经修饰的DNA碱基5-甲基胞嘧啶(5-mC)转化为5-羟甲基胞嘧啶(5-hmC)(哺乳动物中活性DNA去甲基化的初始步骤)的双加氧酶。胞嘧啶碱基C5位的甲基化是哺乳动物基因组的表观遗传修饰,其在转录调节中起重要作用。除了它在DNA去甲基化中的作用之外,它在染色质调节中还起着更普遍的作用。在转录活性和多梳阻遏基因的启动子处优先结合富含CpG的序列。参与O-GlcNAc转移酶OGT向活性基因的富含CpG的转录起始位点处的募集,从而促进通过OGT的组蛋白H2B的GlcNAc化。

[0376] 如本文所用,“TET2”是指由TET1基因编码的TET酶家族的成员“10-11易位2(TET2)”。与TET1类似,TET2是催化经修饰的基因组碱基5-甲基胞嘧啶(5mC)转化为5-羟甲基胞嘧啶(5hmC)的双加氧酶,并在活性DNA去甲基化中起关键作用。TET2偏好CpG基序中的5-羟甲基胞嘧啶。TET2还介导5hmC随后转化为5-甲酰基胞嘧啶(5fC)和5fC转化为5-羧基胞

嘧啶(5caC)。5mC向5hmC、5fC和5caC的转化可能构成胞嘧啶去甲基化的第一步。胞嘧啶碱基C5位的甲基化是哺乳动物基因组的表观遗传修饰,其在转录调节中起重要作用。除了它在DNA去甲基化中的作用之外,它还参与O-GlcNAc转移酶OGT向活性基因的富含CpG的转录起始位点的募集,从而促进通过OGT的组蛋白H2B GlcNAc化。

[0377] 如本文所用,"DNMT3a-3L"是指DNA甲基转移酶、Dnmt3a和Dnmt3L的融合体,其是无催化活性的,但直接与Dnmt3a的催化结构域相互作用。

[0378] 在一些实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含MQ1结构域、DNMT3a-3L结构域、TET1结构域或TET2结构域。在一个实施方案中,用于本发明的试剂、组合物和方法的合适的表观遗传募集剂包含dCas9-MQ1融合体、dCas9-DNMT3a-3L融合体、dCas9-TET1融合体或dCAS9-TET2融合体。

[0379] III.本发明的位点特异性HNF4α破坏剂和包含本发明的位点特异性HNF4α破坏剂的组合物的递送

[0380] 本发明的破坏剂向细胞(例如受试者如人类受试者(例如有需要的受试者,如患有与HNF4α相关的病症如肝硬化的受试者)内的细胞)的递送可以许多不同的方式实现。例如,递送可以通过使细胞与本发明的破坏剂在体外、离体或体内接触来进行。体内递送可通过向受试者施用包含破坏剂的组合物(例如脂质组合物)直接进行。或者,体内递送可通过施用一种或多种编码并指导破坏剂的表达的载体间接进行。下面进一步讨论这些可选方案。

[0381] 在一些实施方案中,破坏剂包含编码融合蛋白的核酸分子,所述融合蛋白包含特异性靶向并结合HNF4α表达控制区的位点特异性HNF4α靶向部分,例如编码转录激活物样效应物(TALE)多肽或锌指(ZNF)多肽的DNA结合域或其片段的多核苷酸,和效应物分子,例如VPR。

[0382] 在其它实施方案中,破坏剂包含指导RNA和编码效应分子的mRNA。指导RNA与mRNA的比率可以是约100:1至约1:100(wt:wt)。

[0383] 通常,本发明的位点特异性HNF4α破坏剂的任何递送方法(体外、离体或体内)可适用于本发明的破坏剂(参见例如Akhtar S.和Julian RL.,(1992)Trends Cell.Biol.2(5):139-144和WO94/02595,其全部内容通过引用并入本文)。对于体内递送,用于递送本发明的位点特异性HNF4α破坏剂考虑的因素包括,例如破坏剂的生物稳定性、非特异性作用的预防和靶组织中破坏剂的累积。破坏剂的非特异性作用可通过局部施用(例如通过直接注射或植入到组织中或局部施用包含破坏剂的组合物)最小化。对治疗部位的局部施用最大化破坏剂的局部浓度,限制破坏剂对全身组织的暴露(否则全身组织可被破坏剂损害或其可降解破坏剂),并允许施用总剂量较低的破坏剂。

[0384] 为了全身施用位点特异性HNF4α破坏剂以治疗疾病(例如HNF4α相关疾病),破坏剂(例如包含含有核酸分子的位点特异性靶向部分的破坏剂)可被修饰或者可选地使用药物递送体系递送;这两种方法用于防止包含核酸分子的位点特异性靶向部分通过内切核酸酶和外切核酸酶在体内的快速降解。包含含有核酸分子的位点特异性靶向部分的破坏剂的修饰或药物载体也允许破坏剂对靶组织的靶向和避免不期望的脱靶效应。例如,本发明的破坏剂可以通过与亲脂性基团(例如胆固醇)的化学缀合进行修饰以增强细胞摄取并防止降解。

[0385] 或者,本发明的破坏剂可以使用药物递送系统(例如纳米颗粒、树枝状大分子、聚

合物、脂质体或阳离子递送系统)递送。带正电荷的阳离子递送系统促进破坏剂(例如带负电荷的分子)的结合,并且还增强在带负电荷的细胞膜处的相互作用以允许细胞对破坏剂的有效摄取。阳离子脂质、树枝状大分子或聚合物可以与破坏剂结合,或被诱导以形成包封破坏剂的囊泡或胶束(参见例如Kim SH.等,(2008)Journal of Controlled Release 129(2):107-116)。当全身施用时,囊泡或胶束的形成进一步防止破坏剂的降解。制备和施用阳离子复合物的方法完全在本领域技术人员的能力范围内(参见,例如Sorensen,DR.等,(2003)J.Mol.Biol 327:761-766;Verma,UN.等,(2003)Clin.Cancer Res.9:1291-1300;Arnold,AS等,(2007)J.Hypertens.25:197-205,其通过全文引用并入本文)。可用于本发明的破坏剂的全身递送的药物递送系统的一些非限制性示例包括DOTAP(Sorensen,DR.等,(2003),同上;Verma,UN.等,(2003),同上)、Oligofectamine,“固体核酸脂质颗粒”(Zimmermann,TS.等,(2006)Nature 441:111-114)、心磷脂(Chien,PY.等,(2005)Cancer Gene Ther.12:321-328;Pal,A.等,(2005)Int J.Oncol.26:1087-1091)、聚乙烯亚胺(Bonnet ME.等,(2008)Pharm.Res.Aug16Epub ahead of print;Aigner,A.(2006)J..Biomed.Biotechnol.71659)、Arg-Gly-Asp(RGD)肽(Liu,S.(2006)Mol.Pharm.3:472-487)和聚酰胺胺(Tomalia,DA.等,(2007)Biochem.Soc.Trans.35:61-67;Yoo,H.等,(1999)Pharm.Res.16:1799-1804)。在一些实施方案中,破坏剂(例如gRNA或mRNA)与环糊精形成复合物用于全身施用。用于施用的方法和包含环糊精的药物组合物可以在美国专利号7,427,605中找到,其全部内容通过引用并入本文。

[0386] 本发明的破坏剂可以掺入到适合施用的药物组合物中。这样的组合物通常包括一个或多个种类的破坏剂和药学上可接受的载体。如本文所用,术语“药学上可接受的载体”旨在包括与药物施用相容的任何和所有溶剂、分散介质、包衣、抗细菌剂和抗真菌剂、等渗剂和吸收延迟剂等。此类介质和试剂用于药物活性物质的用途是本领域众所周知的。除非任何常规介质或试剂与活性化合物不相容,否则其在组合物中的用途是预期的。补充活性化合物也可掺入组合物中。

[0387] 本发明的药物组合物可以多种方式施用,其取决于是否需要局部或全身治疗以及待治疗的区域。施用可以是局部(包括眼、阴道、直肠、鼻内、经皮肤)、口服或肠胃外。肠胃外施用包括静脉滴注、皮下、腹腔内或肌内注射、或鞘内或心室内施用。

[0388] 施用途径和位点可被选择以增强包含位点特异性靶向部分的破坏剂向特定位置的递送或靶向。例如,为了靶向肝细胞,可以使用静脉内注射。可以通过施用气溶胶形式的破坏剂靶向肺细胞。可通过肛门施用靶向空肠细胞。

[0389] 用于局部施用的制剂可包括透皮贴剂、软膏剂、洗剂、乳膏、凝胶、滴剂、栓剂、喷雾剂、液体和粉末。常规的药物载体、水性、粉末或油性基质、增稠剂等可能是必需的或期望的。有涂层的避孕套、手套等也可能是有用的。

[0390] 用于口服施用的组合物包括粉末或颗粒、水中的悬浮液或溶液、糖浆、酏剂或非水性介质、片剂、胶囊、锭剂或糖锭。在片剂的情况下,可以使用的载体包括乳糖、柠檬酸钠和磷酸的盐。各种崩解剂(例如淀粉)和润滑剂(例如硬脂酸镁、十二烷基硫酸钠和滑石)常用于片剂中。对于胶囊形式的口服施用,有用的稀释剂是乳糖和高分子量聚乙二醇。当口服使用需要水性悬浮液时,核酸组合物可以与乳化剂和悬浮剂组合。如果需要,可以加入某些甜味剂或调味剂。

[0391] 用于静脉内施用的组合物可包括无菌水溶液，其还可含有缓冲剂、稀释剂和其它合适的添加剂。

[0392] 用于肠胃外施用的制剂可以包括无菌水溶液，其还可含有缓冲剂、稀释剂和其它合适的添加剂。对于静脉内使用，可以控制溶质的总浓度以使制备物等渗。

[0393] 在一个实施方案中，本发明的破坏剂组合物的施用是肠胃外的，例如静脉内(例如作为大丸剂或作为可扩散的输液)、皮内、腹腔内、肌内、鞘内、心室内、颅内、皮下、经粘膜、口腔、舌下、内窥镜、直肠、口服、阴道、局部、肺部、鼻内、尿道或眼部。施用可由受试者或另一个人(例如健康护理提供者)提供。组合物可以测量的剂量或在递送计量剂量的分配器中提供。下面更详细地讨论选定的递送模式。

[0394] 在某些实施方案中，本发明的破坏剂是多核苷酸，例如mRNA，并且在脂质纳米颗粒(LNP)中配制。

[0395] A.包含本发明的位点特异性HNF4α破坏剂的组合物

[0396] 本发明的位点特异性HNF4α破坏剂可以使用一种或多种赋形剂配制成组合物(例如药物组合物)以：(1)增加稳定性；(2)增加细胞转染；(3)允许持续或延迟释放(例如从贮库制剂)；(4)改变生物分布(例如，将破坏剂靶向特定组织或细胞类型)；(5)增强编码蛋白的体内翻译；和/或(6)改变编码蛋白的体内释放曲线。除了常规赋形剂之外，例如任何和所有溶剂、分散介质、稀释剂或其它液体载体、分散或悬浮助剂、表面活性剂、等渗剂、增稠剂或乳化剂、防腐剂，本发明的组合物中所用的赋形剂可包括但不限于类脂质、脂质体、脂质纳米颗粒、聚合物、脂质复合物、核-壳纳米颗粒、肽、蛋白质、用核酸分子转染的细胞、经修饰的核酸分子或RNA(例如用于移植到受试者中)、透明质酸酶、纳米颗粒模拟物及其组合。因此，本发明的药物组合物可以包含一种或多种赋形剂，每种的量使得其一起增加破坏剂的稳定性，增加破坏剂的细胞转染，增加经修饰的核酸或mRNA编码的蛋白质的表达，和/或改变破坏剂的释放曲线。此外，本发明的破坏剂可以使用自组装核酸纳米颗粒配制(参见，例如美国专利公开号2016/0038612A1，其通过全文引用并入本文)。

[0397] i.类脂质

[0398] 类脂质的合成已被广泛描述并且含有这些化合物的制剂尤其适用于本发明的破坏剂(例如包含含有核酸分子(例如含有经修饰的核酸分子或mRNA)的位点特异性HNF4α靶向部分的破坏剂)的递送(参见Mahon等，Bioconjug Chem.201021:1448-1454;Schroeder等，J Intern Med.2010 267:9-21;Akinc等，Nat Biotechnol.2008 26:561-569;Love等，Proc Natl Acad Sci USA.2010 107:1864-1869;Siegwart等，Proc Natl Acad Sci USA.2011108:12996-3001;所有这些文献的内容在此全文引入)。

[0399] 例如，类脂质已用于有效递送双链小干扰RNA分子、单链核酸分子、经修饰的核酸分子或经修饰的mRNA。(参见，例如美国专利公布2016/0038612A1)。可制备含有这些类脂质的复合物、胶束、脂质体或颗粒，并且因此提供包含核酸分子的位点特异性HNF4α靶向部分的有效递送，如通过在类脂质制剂的施用(例如通过局部和/或全身施用)后编码的蛋白质的产生所判断的。类脂质复合物可通过各种方式施用，其包括但不限于静脉内、肌内、皮内、腹腔内或皮下途径。

[0400] 包含例如核酸分子的位点特异性HNF4α靶向部分的体内递送可受到许多参数的影响，所述参数包括但不限于制剂组成、颗粒PEG化的性质、装载程度、多核苷酸与脂质的比率

和生物物理参数,例如但不限于粒度(Akinc等,Mol Ther.2009 17:872-879;其全部内容通过引用并入本文)。举个例子,聚(乙二醇)(PEG)脂质的锚定链长度的小变化可导致对体内功效的显著影响。可使用具有不同类脂质的制剂(包括但不限于五[3-(1-月桂基氨基丙酰基)]-三亚乙基四胺盐酸盐(TETA-5LAP;也称为98NI2-5,参见Murugaiah等,Analytical Biochemistry,401:61(2010);其内容通过引用整体并入本文))、C12-200(包括衍生物和变体)和MDI。

[0401] 在一个实施方案中,将包含位点特异性HNF4α靶向部分(包含例如核酸分子)的破坏剂与类脂质配制用于全身静脉内施用以靶向肝脏的细胞。例如,包含含有位点特异性HNF4α靶向部分(其包含核酸分子)的破坏剂和42%98NI2-5、48%胆固醇和10%PEG-脂质的脂质摩尔组合物的最终优化的静脉内制剂(具有总脂质与核酸分子的约7.5比1的最终重量比,和PEG脂质上的C14烷基链长度,具有约50-60nm的平均粒度)可导致制剂在肝脏中大于90%的分布(参见,Akinc等,Mol Ther.2009 17:872-879;其全部内容通过引用并入本文)。在另一个实例中,使用C12-200类脂质(参见,例如PCT公开号WO2010/129709,其通过全文引用方式并入本文)的静脉内制剂可用于将包含含有核酸分子的位点特异性HNF4α靶向部分的破坏剂递送至肝细胞,所述制剂具有50/10/38.5/1.5摩尔比的C12-200/双硬脂酰磷脂酰胆碱/胆固醇/PEG-DMG,具有总脂质与核酸分子的7:1的重量比,并且平均粒度为80nm(参见,Love等,Proc Natl Acad Sci USA.2010 107:1864-1869;其全部内容通过引用并入本文)。在另一个实施方案中,含MDI类脂质的制剂可用于在体内将包含含有核酸分子的位点特异性HNF4α靶向部分的破坏剂有效递送至肝细胞。用于肌内或皮下途径的优化类脂质制剂的特性可根据靶细胞类型和制剂通过细胞外基质扩散到血流中的能力而显著变化。尽管由于内皮窗孔的尺寸,小于150nm的粒度可能是有效的肝细胞递送所期望的(参见,Akinc等,Mol Ther.2009 17:872-879;其全部内容通过引用并入本文),使用类脂质配制的核酸分子将制剂递送到其它细胞类型(包括但不限于内皮细胞、骨髓细胞和肌细胞)可能不受类似的尺寸限制。已经报道了使用类脂质制剂在体内将siRNA递送至其它非肝细胞例如骨髓细胞和内皮(参见Akinc等,Nat Biotechnol.2008 26:561-569;Leuschner等,Nat Biotechnol.2011 29:1005-1010;Cho等,Adv.Funct.Mater.2009 19:3112-3118;8th International Judah Folkman Conference,Cambridge,Mass.Oct.8-9,2010;其中每一个的全部内容均通过引用并入本文)。对于递送至骨髓细胞(例如单核细胞),类脂质制剂可具有类似的组分摩尔比。类脂质和其它组分(其包括但不限于双硬脂酰磷脂酰胆碱、胆固醇和PEG-DMG)的不同比率可用于优化用于递送至不同细胞类型(其包括但不限于肝细胞、骨髓细胞、肌肉细胞等)的制剂。例如,组分摩尔比可包括但不限于50%CI2-200、10%双硬脂酰磷脂酰胆碱、38.5%胆固醇和1.5%PEG-DMG(参见Leuschner等,Nat Biotechnol2011 29:1005-1010;其全部内容通过引用并入本文)。用于通过皮下、皮内或肌内递送局部递送至细胞(例如但不限于脂肪细胞和肌肉细胞)的类脂质制剂的使用可以不需要全身递送所需的所有制剂组分,并且因此,可仅包含类脂质和本文所述的包含含有例如核酸分子的位点特异性HNF4α靶向部分的破坏剂。

[0402] 不同类脂质的组合可用于通过增加细胞转染和/或增加其中所含的编码蛋白质的翻译来提升制剂的功效(参见Whitehead等,Mol.Ther.2011,19:1688-1694,其整体内容通过引用并入本文)。

[0403] 在一个实施方案中，类脂质可由烷基胺与丙烯酸酯的共轭加成制备。作为非限制性示例，类脂质可通过PCT专利公开号WO2014/028487中所述的方法制备，其全文内容通过引用方式并入本文。在一个实施方案中，类脂质可包含如PCT专利公开号WO2014/028487所述的具有式(I)、式(II)、式(III)、式(IV)或式(V)的化合物，其全文内容通过引用方式并入本文。在一个实施方案中，类脂质可以是可生物降解的。

[0404] ii.脂质体、脂质复合物和脂质纳米颗粒

[0405] 本发明的破坏剂可以使用一种或多种脂质体、脂质复合物或脂质纳米颗粒配制制。在一个实施方案中，本发明的药物组合物包括脂质体。脂质体是是主要由脂质双层组成的人工制备的囊泡，并且可以用作营养物和药物制剂的施用的递送载体。脂质体可以具有不同的大小，例如但不限于直径可以是数百纳米且可包含一系列由狭窄的水性隔室分开的同心双层的多层囊泡(MLV)，直径可以小于50nm的小单细胞囊泡(SUV)，以及直径可以在50和500nm之间的大单层囊泡(LUV)。脂质体设计可包括但不限于调理素或配体，以改善脂质体对不健康组织的附着或激活事件(例如但不限于内吞作用)。脂质体可包含低或高pH以改善药物制剂的递送。脂质体的形成可取决于物理化学特性，例如但不限于包埋的药物制剂和脂质体成分，脂质囊泡分散于其中的介质的性质，包埋的物质的有效浓度及其潜在毒性，囊泡的应用和/或递送过程中涉及的任何其他过程，用于预期应用的囊泡的最优化尺寸、多分散性和保质期，以及安全有效的脂质体产品的批次间再现性和大规模生产的可能性。

[0406] 作为非限制性示例，脂质体(例如合成膜囊泡)可以通过美国专利公开号2013/0177638、2013/0177637、2013/0177636、201/30177635、2013/0177634、2013/0177633、2013/0183375、2013/0183373、2013/0183372和2016/0038612和PCT专利公开号WO2008/042973中所述的方法、设备和装置来制备，其中每一个通过全文引用方式并入本文。

[0407] 在一个实施方案中，本文所述的药物组合物可以包括但不限于脂质体，例如由1，2-二油酰基氧基-N,N-二甲基氨基丙烷(DODMA)脂质体、来自Marina Biotech(Bothell，Wash.)的DiLa2脂质体、1,2-二亚油基氧基-3-二甲基氨基丙烷(DLin-DMA)、2,2-二亚油基-4-(2-二甲基氨基乙基)-[1,3]-二氧戊环(DLin-KC2-DMA)和MC3(US20100324120;其通过全文引用并入本文)形成的那些，和可递送小分子药物的脂质体，例如但不限于来自Janssen Biotech,Inc.(Horsham,Pa.)的DOXIL®。在一个实施方案中，本文所述的药物组合物可以包括但不限于脂质体，例如由稳定的质粒-脂质颗粒(SPLP)或稳定的核酸脂质颗粒(SNALP)的合成形成的那些，所述稳定的质粒-脂质颗粒(SPLP)或稳定的核酸脂质颗粒(SNALP)先前已被描述并显示出适合于体外和体内的寡核苷酸递送(参见Wheeler等，Gene Therapy.19996:271-281;Zhang等，Gene Therapy.19996:1438-1447;Jeffs等，Pharm Res.2005 22:362-372;Morrissey等，Nat Biotechnol.2005 2:1002-1007;Zimmermann等，Nature.2006 441:111-114;Heyes等，J Contr Rel.2005 107:276-287;Semple等，Nature Biotech.2010 28:172-176;Judge等，J Clin Invest.2009 119:661-673;deFougerolles Hum Gene Ther.2008 19:125-132;美国专利公布号2013/0122104、2013/0303587和2016/0038612;其中每一个通过全文引用方式并入本文)。Wheeler等人的原始制备方法是去污剂透析法，其后来由Jeffs等人改进并被称为自发囊泡形成方法。本发明的脂质体制剂可由3至4种脂质组分以及包含位点特异性HNF4α靶向部分的破坏剂组成。作为示例，本发明的脂质体可以含有但不限于55％胆固醇、20％双硬脂酰磷脂酰胆碱(DSPC)、10％PEG-SDSG和

15％1,2-二油酰基氧基-N,N-二甲基氨基丙烷(DODMA),如Jeffs等人所述。作为另一个示例,本发明的脂质体制剂可以包含但不限于48％胆固醇、20％DSPC、2％PEG-c-DMA和30％阳离子脂质,其中所述阳离子脂质可以是1,2-二硬脂酰氧基-N,N-二甲氨基丙烷(DSDMA)、DODMA、DLin-DMA或1,2-二亚油烯氧基-3-二甲氨基丙烷(DLenDMA),如Heyes等人所述。在一些实施方案中,脂质体制剂可包含约25.0％胆固醇至约40.0％胆固醇、约30.0％胆固醇至约45.0％胆固醇、约35.0％胆固醇至约50.0％胆固醇和/或约48.5％胆固醇至约60％胆固醇。在另一个实施方案中,本发明的制剂可包含选自由28.5％、31.5％、33.5％、36.5％、37.0％、38.5％、39.0％和43.5％组成的组的胆固醇百分比。在一些实施方案中,本发明的脂质体制剂可包含约5.0％至约10.0％DSPC和/或约7.0％至约15.0％DSPC。

[0408] 在一个实施方案中,药物组合物可以包含可形成以递送本发明的破坏剂的脂质体。包含位点特异性HNF4α靶向部分的破坏剂可以被脂质体包封和/或其可以包含在水性核中,然后该水性核可以被脂质体包封(参见,例如PCT专利公开号WO2012/031046、WO2012/031043、WO2012/030901和WO2012/006378以及美国专利公开号2013/0189351、2013/0195969和201/30202684,其中每一个通过全文引用方式并入本文)。

[0409] 在另一个实施方案中,用于本发明的脂质体可被配制用于靶向递送。作为非限制性示例,脂质体可被配制用于靶向递送至肝脏。这样的脂质体可以包括但不限于美国专利公开号2013/0195967中描述的脂质体,其全部内容通过引用并入本文。

[0410] 在一个实施方案中,包含脂质体和破坏剂的制剂可以肌内、皮内或静脉内施用。

[0411] 在另一个实施方案中,本发明的脂质制剂可以包括至少一种阳离子脂质、增强转染的脂质和至少一种包含连接至脂质部分的亲水头部基团的脂质(国际公布号WO2011076807和美国公布号20110200582;其中每一个通过全文引用方式并入本文)。在另一个实施方案中,本发明的脂质制剂是脂质囊泡,其可具有官能化的脂质双层之间的交联(参见美国专利公开号2012/0177724,其全部内容通过引用并入本文)。

[0412] 在一个实施方案中,包含破坏剂的制剂是可包含至少一种脂质的脂质纳米颗粒(LNP)。所述脂质可选自但不限于DLin-DMA、DLin-K-DMA、98NI2-5、CI2-200、DLin-MC3-DMA、DLin-KC2-DMA、DODMA、PLGA、PEG、PEG-DMG、PEG化脂质和氨基醇脂质。在另一个方面,脂质可以是阳离子脂质,例如但不限于DLin-DMA、DLin-D-DMA、DLin-MC3-DMA、DLin-KC2-DMA、DODMA和氨基醇脂质。氨基醇阳离子脂质可以是美国专利公开号2013/0150625中描述的和/或通过该专利描述的方法制备的脂质。

[0413] 在一个实施方案中,阳离子脂质可选自但不限于PCT公布号WO2012/040184、WO2011/153120、WO2011/149733、WO2011/090965、WO201I/043913、WO2011/022460、WO2012/061259、WO2012/054365、WO2012/044638、WO2010/080724、WO2010/21865、WO2008/103276、WO2013/086373和WO2013/086354、美国专利号7,893,302、7,404,969、8,283,333、8,466,122和8,569,256以及美国专利公布号2010/0036115、2012/0202871、2013/0064894、2013/0129785、2013/0150625、2013/0178541、2013/0225836和2014/0039032中所描述的阳离子,其中每一个通过全文引用方式并入本文。在另一个实施方案中,阳离子脂质可以选自但不限于PCT公开号WO2012/040184、WO0111/53120、WO2011/149733、WO2011/090965、WO2011/043913、WO2011/022460、WO2012/061259、WO2012/054365、WO2012/044638和WO2013/116126或美国专利公开号2013/0178541和2013/0225836中所描述的式A;其中每一个通过全文引

用方式并入本文。在又一个实施方案中,阳离子脂质可选自但不限于PCT公开号WO2008/103276的式CLI-CLXXIX、美国专利7,893,302的式CLICLXXIX、美国专利7,404,969的式CLICLXXXXII和美国专利公开号2010/0036115的式I-VI、美国专利公开号2013/0123338的式I;其中每一个通过全文引用方式并入本文。

[0414] 在一个实施方案中,阳离子脂质可通过本领域已知的方法和/或PCT公开号WO2012/040184、WO2011/153120、WO2011/149733、WO2011/090965、WO2011/043913、WO2011/022460、WO2012/061259、WO2012/054365、WO2012/044638、WO2010/080724、WO2010/21865、WO2013/126803、WO2013/086373和WO2013/086354中所述的方法合成;其中每一个通过全文引用方式并入本文。

[0415] 在一个实施方案中,可用于本文所述的破坏剂的制剂和/或用于递送的脂质可以是可裂解的脂质。作为非限制性示例,可裂解脂质和/或包含可裂解脂质的药物组合物包括PCT专利公布号WO2012/170889中所描述的那些,其通过全文引用方式并入本文。作为另一个非限制性示例,可裂解脂质可以是PCT专利公开号WO2012/170889中所描述的HGT4001、HGT4002、HGT4003、HGT4004和/或HGT4005,其通过全文引用方式并入本文。

[0416] 在一个实施方案中,可用于本文所述的破坏剂的制剂和/或递送的聚合物可包括但不限于聚(乙二醇)(PEG)、聚乙烯亚胺(PEI)、二硫代双(琥珀酰亚胺丙酸酯)(DSP)、二甲基-3,3'-二硫代双丙酰亚胺(DTBP)、聚(乙烯亚胺)双氨基甲酸酯(PEIC)、聚(L-赖氨酸)(PLL)、组氨酸修饰的PLL、聚(N-乙烯基吡咯烷酮)(PVP)、聚(丙烯亚胺)(PPI)、聚(酰胺基胺)(PAMAM)、聚(酰胺基乙烯亚胺)(SS-PAEI)、三亚乙基四胺(TETA)、聚(β-氨基酯)、聚(4-羟基-L-脯氨酸酯)(PHP)、聚(烯丙胺)、聚(α-[4-氨基丁基])-L-乙醇酸(PAGA)、聚(D,L-乳酸-共乙醇酸)(PLGA)、聚(N-乙基-4-乙烯基溴化吡啶)、聚(磷腈)(PPZ)、聚(磷酸酯)(PPE)、聚(氨基磷酸酯)(PPA)、聚(N-2-羟丙基甲基丙烯酰胺)(pHPMA)、聚(2-(二甲氨基)乙基甲基丙烯酸酯)(pDMAEMA)、聚(2-氨基乙基丙烯磷酸酯)(PPE_EA)、壳聚糖、半乳糖基化壳聚糖、N-十二烷基化壳聚糖、组蛋白、胶原和葡聚糖精胺。在一个实施方案中,聚合物可以是惰性聚合物,例如但不限于PEG。在一个实施方案中,聚合物可以是阳离子聚合物,例如但不限于PE1、PLL、TETA、聚(烯丙胺)、聚(N-乙基-4-乙烯基溴化吡啶)、pHPMA和pDMAEMA。在一个实施方案中,聚合物可以是可生物降解的PE1,例如但不限于DSP、DTBP和PEIC。在一个实施方案中,聚合物可以是可生物降解的,例如但不限于组氨酸修饰的PLL SSPAEI、聚(β-氨基酯)、PHP、PAGA、PLGA、PPZ、PPE、PPA和PPE-EA。

[0417] 在一个实施方案中,本发明的LNP制剂可以根据PCT公开号WO2011/127255或WO2008/103276中描述的方法制备,其中每一个通过全文引用方式并入本文。作为非限制性示例,包含位点特异性HNF4α靶向部分的破坏剂可以包封在如PCT公开号WO2011/127255和/或WO2008/103276中所描述的LNP制剂中;其中每一个通过全文引用并入本文。作为另一个非限制性示例,如本文所述的包含位点特异性HNF4α靶向部分的破坏剂可以配制在纳米颗粒中以通过如美国专利公开号2012/0207845和PCT公开号WO2014/008334中所述的肠胃外途径递送;其中每一个通过全文引用方式并入本文。

[0418] 在一个实施方案中,本文所述的LNP制剂可以肌内施用。LNP制剂可包含本文所述的阳离子脂质,例如但不限于DLin-DMA、DLin-KC2-DMA、DLin-MC3-DMA、DODMA和C12-200。

[0419] 在一个实施方案中,本文所述的包含如本文所述破坏剂的LNP制剂可以皮内施用。

LNP制剂可包含本文所述的阳离子脂质，例如但不限于DLin-DMA、DLin-KC2-DMA、DLin-MC3-DMA、DODMA和C12-200。

[0420] 纳米颗粒制剂可以包含偶联物，例如磷酸酯偶联物、聚合物偶联物、增强纳米颗粒递送的偶联物，如美国专利公开号US20160038612A1中所描述。

[0421] 在一个实施方案中，脂质纳米颗粒制剂包含如美国专利公开号US 20100324120中所描述的DLin-MC3-DMA。

[0422] 在一个实施方案中，脂质纳米颗粒包含脂质化合物或其药学上可接受的盐、互变异构体或其立体异构体、或脂质纳米颗粒制剂，如美国专利No.US10723692B2、美国专利公开号US20200172472A1、US20200163878A1、US20200046838A1、US20190359556A1、US20190314524A1、US20190274968A1、US20190022247A1、US20180303925A1、US20180185516A1、US20160317676A1、国际专利公开号：WO2020014680 5A1、WO2020081938A1、WO2019089828A1、WO2019036030A1、WO2019036028A1、WO2019036008A1、WO2018200943A1、WO2018191719A1、WO2018107026A1、WO2018081480A1，其中每一个通过全文引用方式并入本文(Acuitas Therapeutics，Inc.)。

[0423] 在一个实施方案中，脂质纳米颗粒包含氨基脂质或其药学上可接受的盐、互变异构体或其立体异构体、或脂质纳米颗粒制剂，其由Tekmira Pharmaceuticals Corp.描述于US9139554B2、US9051567B2、US8883203B2、美国专利公开US20110117125A1中，其中每一个通过全文引用方式并入本文。在一个具体示例中，US9139554B2中描述的化合物是DLin-kC2-DMA。

[0424] 在一个实施方案中，脂质纳米颗粒包含氨基脂质或其药学上可接受的盐、互变异构体或其立体异构体、或脂质纳米颗粒制剂，其由Arbutus Biopharma Corp.描述于US10561732B2、US9938236B2、US9687550B2、美国专利公开US20190240354A1、US20170027658A1、WO2020097493A1、WO2020097520A1、WO2020097540A1、WO2020097548A1中，其中每一个通过全文引用方式并入本文。

[0425] 脂质纳米颗粒可被工程化以改变颗粒的表面性质，从而使脂质纳米颗粒可穿透粘膜屏障。粘液位于粘膜组织上，例如但不限于口腔(例如口腔和食道膜和扁桃体组织)、眼、胃肠道(例如胃、小肠、大肠、结肠、直肠)、鼻、呼吸道(例如鼻、咽、气管和支气管膜)、生殖器(例如阴道、宫颈和尿道膜)。对于更高的药物封装效率和提供多种药物的缓释递送的能力而言优选的大于10-200nm的纳米颗粒已被认为太大而不能通过粘膜屏障快速扩散。粘液连续地分泌、脱落、丢弃或消化并再循环，因此大多数捕获颗粒可在数秒内或数小时内被从粘膜组织中去除。已经被低分子量聚乙二醇(PEG)致密地涂覆的大聚合物纳米颗粒(直径为200nm-500nm)通过粘液扩散仅比相同颗粒在水中扩散低4-6倍(Lai等，PNAS 2007 104(5)：1482-487;Lai等，Adv Drug Deliv Rev.2009 61(2):158-171;其中每一个通过全文引用方式并入本文)。纳米颗粒的转运可以使用渗透率和/或荧光显微镜技术(其包括但不限于荧光漂白后荧光恢复(FRAP)和高分辨率多颗粒跟踪(MPT))来测定。作为非限制性示例，可穿透粘膜屏障的组合物可以根据美国专利号8,241,670或国际专利公开号WO 2013110028中所描述制备，其中每一个通过全文引用方式并入本文。

[0426] 在一个实施方案中，如本文所述的包含位点特异性HNF4α靶向部分的破坏剂被配制为脂质复合物，例如但不限于ATUPLEX™系统、DACC系统、DBTC系统和来自Silence

Therapeutics(London,United Kingdom)的其它siRNA脂质复合物技术、来自STEMGENT®(Cambridge,Mass.)的STEMFECFM和聚乙烯亚胺(PE1)或基于鱼精蛋白的靶向和非靶向核酸递送(Aleku等,Cancer Res.2008 68:9788-9798;Strumberg等,Int J Clin Pharmacol Ther 2012 50:76-78;Santel等,Gene Ther 2006 13:1222-1234;Santel等,Gene Ther 2006 13:1360-1370;Gutbier等,PulmPharmacol.Ther.2010 23:334-344;Kaufmann等,Microvasc Res 2010 80:286-293;Weide等,J Immunother.2009 32:498-507;Weide等,J Immnnother.2008 31:180-188;Pascolo Expert Opin.Biol.Ther.4:1285-1294;Fotin-Mleczek等,2011 J.Immunother.34:1-15;Song等,Nature Biotechnol.2005,23:709-717;Peer等,Proc NatlAcad Sci USA.2007 6;104:4095-4100;deFougerollesHum Gene Ther.2008 19:125-132;前述所有均通过全文引用方式并入本文)。

[0427] 在一个实施方案中,还可以构建这样的制剂或改变组合物,使得它们在体内被动或主动地针对不同的细胞类型,所述细胞类型包括但不限于肝细胞、免疫细胞、肿瘤细胞、内皮细胞、抗原呈递细胞和白细胞(Akinc等,Mol Ther.2010 18:1357-1364;Song等,Nat Biotechnol.2005 23:709-717;Judge等,J Clinlnvest.2009 119:661-673;Kaufmann等,Microvasc Res 2010 80:286-293;Santel等,Gene Ther 2006 13:1222-1234;Santel等,Gene Ther 2006 13:1360-1370;Gutbier等,Pulm Pharmacol.Ther.2010 23:334-344;Basha等,Mol.Ther.2011 19:2186-2200;Fenske and Cullis,Expert Opin Drug Deliv.2008 5:25-44;Peer等,Science.2008 319:627-630;Peer and Lieberman,Gene Ther.2011 18:1127-1133;前述所有均通过全文引用方式并入本文)。制剂被动靶向肝细胞的一个示例包括基于DLin-DMA、DLin-KC2-DMA和DLin-MC3-DMA的脂质纳米颗粒制剂,其已显示结合载脂蛋白E并促进这些制剂在体内结合并被摄取至肝细胞中(Akinc等,Mol Ther.2010 18:1357-1364;其通过全文引用方式并入本文)。制剂也可通过在其表面上的不同配体的表达和抗体靶向方法而被选择性靶向,例如但不限于叶酸、转铁蛋白、N-乙酰半乳糖胺(GaINAc)(Kolhatkar等,Curr Drug DiScov Technol.2011 8:197-206;Musacchio和Torchilin,Front BioSci.2011 16:1388-1412;Yu等,Mol Membr BioI.2010 27:286-298;Patil等,Crit Rev Ther Drug Carrier Syst.2008 25:1-61;Benoit等,Biomacromolecules.2011 12:2708-2714;Zhao等,Expert Opin Drug Deliv.2008 5:309-319;Akinc等,Mol Ther.2010 18:1357-1364;Srinivasan等,Methods Mol BioI.2012 820:105-116;Ben-Arie等,Methods Mol Biol.2012 757:497-507;Peer 2010 J Control Release.20:63-68;Peer等,Proc Natl Acad Sci USA.2007 104:4095-4100;Kim等,Methods Mol BioI.2011 721:339-353;Subramanya等,Mol Ther.2010 18:2028-2037;Song等,Nat Biotechnol.2005 23:709-717;Peer等,Science.2008 319:627-630;Peer和Lieberman,Gene Ther.2011 18:1127-1133;前述所有均通过全文引用并入本文)。

[0428] 在一个实施方案中,本发明的包含位点特异性HNF4α靶向部分的破坏剂可被配制为固体脂质纳米颗粒。固体脂质纳米颗粒(SLN)可以是平均直径在10至1000nm之间的球形。SLN具有可以溶解亲脂性分子的固体脂质核心基质,并且可以用表面活性剂和/或乳化剂稳定。在另一个实施方案中,脂质纳米颗粒可以是自组装脂质-聚合物纳米颗粒(参见,Zhang等,ACS Nano,2008,2(8),pp 1696-1702;其内容通过全文引用并入本文)。作为非限制性示

例,SLN可以是PCT公开号WO2013/105101中描述的SLN,其内容通过全文引用并入本文。作为另一个非限制性示例,SLN可以通过PCT公开号WO2013/105101中描述的方法或工艺制备,其内容通过全文引用并入本文。

[0429] 脂质体、脂质复合物或脂质纳米颗粒可用于改善包含含有例如核酸分子的位点特异性HNF4α靶向部分的破坏剂指导蛋白质产生的功效,因为这些制剂可能能够增加核酸分子的细胞转染;和/或增加编码蛋白(例如本发明的效应物)的翻译。一个这样的示例包括使用脂质封装以能够有效地全身递送复合载体(polyplex)质粒DNA(Heyes等,Mol Ther.2007 15:713-720;其通过全文引用并入本文)。本发明的脂质体、脂质复合物或脂质纳米颗粒还可以提高包含含有例如核酸分子的位点特异性HNF4α靶向部分的破坏剂的稳定性。脂质体、脂质复合物或脂质纳米颗粒被描述于美国专利公开号2016/0038612中,其通过全文引用方式并入本文。

[0430] 在一个实施方案中,包含位点特异性HNF4α靶向部分的破坏剂可被配制用于受控释放和/或靶向递送。如本文所用,“受控释放”是指符合特定释放模式以实现治疗结果的药物组合物或化合物释放曲线。在一个实施方案中,如本文所述,包含位点特异性HNF4α靶向部分的破坏剂可以被包封至本文所述的和/或本领域已知的用于控制释放和/或靶向递送的递送剂中。如本文所用,术语“包封”意指封装、包围或包裹。当涉及本发明的化合物的制剂时,包封可以是基本上的、完全的或部分的。术语“基本上包封”是指至少大于50、60、70、80、85、90、95、96、97、98、99、99.9、99.9或大于99.999%的本发明的药物组合物或破坏剂可以被封装、包围或包裹在递送剂内。“部分包封”或“部分包封的”意指少于10、10、20、30、40或50或更少的本发明的药物组合物或破坏剂可以被封装、包围或包裹在递送剂内。有利地,可以通过使用荧光和/或电子显微照片测量本发明的药物组合物或化合物的逃逸或活性来测定包封。例如,至少1、5、10、20、30、40、50、60、70、80、85、90、95、96、97、98、99、99.9、99.99%或大于99.99%的本发明的药物组合物或破坏剂被包封在递送剂中。

[0431] 在一个实施方案中,如本文所述的包含位点特异性HNF4α靶向部分的破坏剂可以包封在治疗性纳米颗粒(例如,来自BIND Therapeutics的治疗性纳米颗粒)中。治疗性纳米颗粒可通过本文所述和本领域已知的方法配制,例如但不限于PCT公布号WO2010/005740、WO2010/030763、WO2010/005721、WO2010/005723、WO2012/054923、美国专利公布号2201/10262491、2010/0104645、2010/0087337、2010/0068285、2011/0274759、2010/0068286、2012/0288541、2013/0123351、2013/0230567、2013/0236500、2013/0302433、2013/0302432、1013/0280339和2013/0251757以及美国专利8,206,747、8,293,276、8,318,208、8,318,211、8,623,417、8,617,608、8,613,954、8,613,951、8,609,142、8,603,534和8,563,041;其中每一个通过全文引用并入本文。在另一个实施方案中,治疗性聚合物纳米颗粒可通过美国专利公布2012/0140790中所述的方法制备,其通过全文引用并入本文。作为非限制性示例,治疗性纳米颗粒可包含约4至约25重量%的破坏剂和约10至约99重量%的包含聚(乳酸)酸的二嵌段聚(乳酸)-聚(乙二醇)共聚物(如美国专利公开号2013/0236500(Bind)中所描述,其通过全文引用并入本文)。作为另一个非限制性示例,纳米颗粒可包含约0.2至约35重量%的破坏剂和约10至约99重量%的二嵌段聚(乳酸)-聚(乙二醇)共聚物(如美国专利公布号2013/0280339(Bind)和2010251757和美国专利号8,652,528中所述,其中每一个通过全文引用并入本文)。

[0432] 在一个实施方案中，配制在治疗性纳米颗粒中的破坏剂可以肌内、皮内或静脉内施用。

[0433] 在一个实施方案中，配制在ACCURINS™纳米颗粒中的破坏剂可以肌内、皮内或静脉内施用。

[0434] 在一个实施方案中，破坏剂可以在具有高玻璃化转变温度的治疗性纳米颗粒中递送，例如但不限于美国专利公开号2014/0030351和2011/0294717中描述的纳米颗粒，其中每一个通过全文引用并入本文。

[0435] 在一个实施方案中，治疗性纳米颗粒可被配制用于持续释放。如本文所用，“持续释放”是指药物组合物或化合物符合在特定时间段内的释放速率。该时间段可包括但不限于数小时、数天、数周、数月和数年。作为非限制性示例，持续释放纳米颗粒可以包括聚合物和本发明的破坏剂(参见PCT公开号WO2010075072和美国专利公开号2010/0216804、2011/0217377、2012/0201859、2013/0243848和2013/0243827，其中每一个通过全文引用并入本文)。

[0436] 在一个实施方案中，本发明的破坏剂可以包封在合成纳米载体中、连接至合成纳米载体和/或与合成纳米载体缔合。合成纳米载体包括但不限于PCT公开号WO2010/005740、WO2010/030763、WO2012/13501、WO2012/149252、WO2012149255、WO2012149259、WO2012149265、WO2012149268、WO2012149282、WO2012149301、WO2012149393、WO2012149405、WO2012149411和WO2012149454以及美国专利公开号20110262491、20100104645、20100087337、20120244222和US20130236533以及美国专利号8,652,487中所描述的那些，其中每一个通过全文引用并入本文。合成纳米载体可以使用本领域已知的和/或本文所述的方法配制。作为非限制性示例，合成纳米载体可以通过PCT公开号WO2010005740、WO2010030763和WO201213501以及美国专利公开号20110262491、20100104645、20100087337和20120244222中描述的方法配制，其中每一个通过全文引用并入本文。在另一个实施方案中，合成纳米载体制剂可以通过PCT公开号WO2011072218和美国专利号8,211,473中描述的方法冻干；其中每一个通过全文引用并入本文。在又一个实施方案中，本发明的制剂(其包括但不限于合成纳米载体)可以通过美国专利公开号20130230568中描述的方法冻干或重构，其通过全文引用并入本文。

[0437] 在一个实施方案中，包含破坏剂的合成纳米载体可以肌内、皮内或静脉内施用。

[0438] 在一些实施方案中，破坏剂可以使用较小的LNP配制用于递送。这样的颗粒可以包含从小于0.1μm至高达1000μm的直径，例如但不限于小于0.1μm、小于1.0μm、小于5μm、小于10μm、小于15μm、小于20μm、小于25μm、小于30μm、小于35μm、小于40μm、小于50μm、小于55μm、小于60μm、小于65μm、小于70μm、小于75μm、小于80μm、小于85μm、小于90μm、小于95μm、小于100μm、小于125μm、小于150μm、小于175μm、小于200μm、小于225μm、小于250μm、小于275μm、小于300μm、小于325μm、小于350μm、小于375μm、小于400μm、小于425μm、小于450μm、小于475μm、小于500μm、小于525μm、小于550μm、小于575μm、小于600μm、小于625μm、小于650μm、小于675μm、小于700μm、小于725μm、小于750μm、小于775μm、小于800μm、小于825μm、小于850μm、小于875μm、小于900μm、小于925μm、小于950μm、小于975μm。

[0439] 在另一个实施方案中，破坏剂可以使用较小的LNP配制用于递送，所述较小的LNP可以包含约1nm至约100nm、约1nm至约10nm、约1nm至约20nm、约1nm至约30nm、约1nm至约

40nm、约1nm至约50nm、约1nm至约60nm、约1nm至约70nm、约1nm至约80nm、约1nm至约90nm、约5nm至约100nm、约5nm至约10nm、约5nm至约20nm、约5nm至约30nm、约5nm至约40nm、约5nm至约50nm、约5nm至约60nm、约5nm至约70nm、约5nm至约80nm、约5nm至约90nm、约10至约50nm、约20至约50nm、约30至约50nm、约40至约50nm、约20至约60nm、约30至约60nm、约40至约60nm、约20至约70nm、约30至约70nm、约40至约70nm、约50至约70nm、约60至约70nm、约20至约80nm、约30至约80nm、约40至约80nm、约50至约80nm、约60至约80nm、约20至约90nm、约30至约90nm、约40至约90nm、约50至约90nm、约60至约90nm和/或约70至约90nm的直径。

[0440] 在一个实施方案中，破坏剂可以配制在较小的LNP中，并且可以肌内、皮内或静脉内施用。

[0441] 在一个实施方案中，破坏剂可以使用PCT专利公开号WO2013063468或美国专利号8,440,614中描述的药物包封微球配制用于递送，其中每一个通过全文引用方式并入本文。在另一个方面，氨基酸、肽、多肽、脂质(APPL)可用于将本发明的破坏剂递送至细胞(参见PCT专利公开号WO2013063468，其通过全文引用并入本文)。

[0442] 在一个方面，脂质纳米颗粒可以是PCT专利公开号WO2013059922中描述的限制尺寸的脂质纳米颗粒，其通过全文引用并入本文。限制尺寸的脂质纳米颗粒可以包含围绕水性核心或疏水性核心的脂质双层；其中所述脂质双层可包含磷脂，例如但不限于二酰基磷脂酰胆碱、二酰基磷脂酰乙醇胺、神经酰胺、鞘磷脂、双氢鞘磷脂、脑磷脂、脑苷脂、C8-C20脂肪酸二酰基磷脂酰胆碱和I-棕榈酰-2-油酰磷脂酰胆碱(POPC)。在另一个方面，限制尺寸的脂质纳米颗粒可包含聚乙二醇-脂质，例如但不限于DLPEPEG、DMPE-PEG、DPPC-PEG和DSPE-PEG。

[0443] 在一个实施方案中，可以使用PCT专利公开号WO2013063530中描述的递送方法将本发明的破坏剂递送、定位和/或聚集于特定位置，其通过全文引用并入本文。作为非限制性示例，可以在向受试者递送破坏剂之前、同时或之后向受试者施用空的聚合物颗粒。一旦与受试者接触，空的聚合物颗粒就经历体积变化，并在受试者体内的特定位置处被捕获、嵌入、固定或诱捕。

[0444] 在一个实施方案中，破坏剂可被配制在活性物质释放系统中(参见例如美国专利公开号20130102545，其通过全文引用并入本文)。活性物质释放系统可以包括：1)至少一种键合至寡核苷酸抑制链的纳米颗粒，所述寡核苷酸抑制链与催化活性核酸杂交，和2)与至少一种键合至治疗活性物质的底物分子键合的化合物(例如，本发明的破坏剂)，其中所述治疗活性物质通过催化活性核酸对底物分子的裂解而释放。

[0445] 在一个实施方案中，本发明的纳米颗粒可以是水溶性纳米颗粒，例如但不限于在PCT公开号WO2013090601中描述的那些，其通过全文引用并入本文。纳米颗粒可以是具有致密两性离子配体的无机纳米颗粒以显示良好的水溶性。纳米颗粒还可以具有小的流体动力学直径(HD)，相对于时间、pH和盐度的稳定性以及低水平的非特异性蛋白质结合。

[0446] 在一个实施方案中，本发明的纳米颗粒是隐形纳米颗粒或靶标特异性隐形纳米颗粒，例如但不限于美国专利公开号20130172406(Bind)、US20130251817(Bind)、2013251816(Bind)和20130251766(Bind)中所述的那些，其中每一个通过全文引用并入本文。隐形纳米颗粒可以包含二嵌段共聚物和化学治疗剂。这些隐形纳米颗粒可以通过美国专利公开号20130172406、20130251817、2013251816和20130251766中描述的方法制备，其每一个通过

全文引用并入本文。作为非限制性示例，隐形纳米颗粒可以靶向癌细胞，例如美国专利公开号20130172406、20130251817、2013251816和20130251766中描述的纳米颗粒，其中每一个通过全文引用并入本文。

[0447] 在一个实施方案中，包含本发明的破坏剂的隐形纳米颗粒可以肌内、皮内或静脉内施用。

[0448] 在一个实施方案中，本发明的破坏剂可在包含多种阳离子脂质的脂质纳米颗粒中被配制和/或递送，例如但不限于美国专利公开号20130017223中描述的脂质纳米颗粒，其通过全文引用并入本文。作为非限制性示例，LNP制剂可以包含第一阳离子脂质和第二阳离子脂质。作为另一个非限制性示例，LNP制剂可以包含DLin-MC2-DMA和DLinMC4-DMA。作为另一个非限制性示例，LNP制剂可以包含DLin-MC3-DMA和CI2-200。在一个实施方案中，LNP制剂包含多种阳离子脂质(例如但不限于美国专利公开号US20130017223中描述的那些，其通过全文引用并入本文)，并且可以肌内、皮内或静脉内施用。

[0449] 在一个实施方案中，如本文所述的破坏剂可以在包含阳离子脂质DLin-MC3-DMA和中性脂质DOPE的脂质纳米颗粒中配制和/或递送。脂质纳米颗粒还可包含基于PEG的脂质和胆固醇或抗氧化剂。包含DLin-MC3-DMA和DOPE和破坏剂的这些脂质纳米颗粒制剂可以肌内、皮内或静脉内施用。

[0450] 在一个实施方案中，包含DLin-MC3-DMA和DOPE的脂质纳米颗粒可包含PEG脂质，例如但不限于季戊四醇PEG酯四琥珀酰亚胺基和季戊四醇PEG醚四硫醇、PEGc-DOMG、PEG-DMG(1,2-二肉豆蔻酰-sn-甘油、聚乙二醇单甲醚)、PEG-DSG(1,2-二硬脂酰-sn-甘油、聚乙二醇单甲醚)、PEG-DPG(1,2-二棕榈酰-sn-甘油、聚乙二醇单甲醚)、PEG-DSA(与1,2-二硬脂酰氧基丙基-3-胺偶联的PEG)、PEG-DMA(与1,2-二肉豆蔻酰氧基丙基-3-胺偶联的PEG)、PEG-c-DNA、PEG-c-DMA、PEG-S-DSG、PEG-c-DMA、PEG-DPG、PEG-DMG2000和本文所述和/或本领域内已知的那些。

[0451] 在一个实施方案中，包含DLin-MC3-DMA和DOPE的脂质纳米颗粒可包含0.5％至约3.0％、约1.0％至约3.5％、约1.5％至约4.0％、约2.0％至约4.5％、约2.5％至约5.0％和/或约3.0％至约6.0％的PEG脂质的脂质摩尔比。

[0452] 在一个实施方案中，包含DLin-MC3-DMA和DOPE的脂质纳米粒子可包含25.0％胆固醇至约50.0％胆固醇、约30.0％胆固醇至约45.0％胆固醇、约35.0％胆固醇至约50.0％胆固醇和/或约48.5％胆固醇至约60％胆固醇。在一个实施方案中，制剂可以包含选自由28.5％、31.5％、33.5％、36.5％、37.0％、38.5％、39.0％、43.5％和48.5％组成的组的胆固醇百分比。

[0453] 在一个实施方案中，包含DLin-MC3-DMA和DOPE的脂质纳米粒子可包含25.0％抗氧化剂至约50.0％抗氧化剂、约30.0％抗氧化剂至约45.0％抗氧化剂、约35.0％抗氧化剂至约50.0％抗氧化剂和/或约48.5％抗氧化剂至约60％抗氧化剂。在一个实施方案中，制剂可包含选自由28.5％、31.5％、33.5％、36.5％、37.0％、38.5％、39.0％、43.5％和48.5％组成的组的抗氧化剂百分比。

[0454] 本发明的破坏剂可以使用天然和/或合成聚合物配制。可用于递送的聚合物的非限制性示例包括但不限于来自MIRUS® Bio(Madison,Wis.)和Roche Madison(Madison,Wis.)的DYNAMIC POLYCONJUGATE ®(Arrowhead Research Corp.,

Pasadena,Calif.)制剂,PHASERXTM聚合物制剂,例如但不限于SMARTT POLYMERTECHNOLOGYTM(Seattle,Wash.)、DMRIIDOPE、泊洛沙姆、来自Vical(San Diego,Calif.)的VAXFECTIN®辅助剂、壳聚糖、来自Calando Pharmaceuticals(Pasadena,Calif.)的环糊精、树枝状大分子和聚(乳酸-共-乙醇酸)(PLGA)聚合物、RONDELTM(RNAi/寡核苷酸纳米颗粒递送)聚合物(Arrowhead Research Corporation,Pasadena,Calif.)和pH响应共嵌段聚合物,例如但不限于PHASERXTM(Seattle,Wash.)。

[0455] 聚合物制剂可以允许破坏剂的持续或延迟释放(例如,在肌内、皮内或皮下注射后)。破坏剂的改变的释放曲线可导致例如编码蛋白在延长的时间段内的翻译。聚合物制剂也可用于增强破坏剂的稳定性。例如,可生物降解的聚合物先前已经用于保护经修饰的mRNA以外的核酸免于降解,并且已经显示出导致有效负荷在体内的持续释放(Rozema等,Proc Natl Acad Sci USA.2007 104:12982-12887;Sullivan等,Expert Opin Drug Deliv.2010 7:1433-1446;Convertine等,Biomacromolecules.2010 Oct.1;Chu等,Acc Chern Res.2012Jan.13;Manganiello等,Biomaterials.2012 33:2301-2309;Benoit等,Biomacromolecules.2011 12:2708-2714;Singha等,Nucleic Acid Ther.2011 2:133-147;deFougerolles Hnm Gene Ther.2008 19:125-132;Schaffert and Wagner,Gene Ther.2008 16:1131-1138;Chaturvedi等,Expert Opin Drug Deliv.2011 8:1455-1468;Davis,Mol Pharm.2009 6:659-668;Davis,Nature 201 0464:1067-1070;其中每一个通过全文引用并入本文)。

[0456] 在一个实施方案中,药物组合物可以是持续释放制剂。在另一个实施方案中,持续释放制剂可以用于皮下递送。持续释放制剂可包括但不限于PLGA微球、乙烯乙酸乙烯酯(EVAc)、泊洛沙姆、GELSITE®(Nanotherapeutics,Inc.Alachua,Fla.)、HYLENEX®(Halozyme Therapeutics,San Diego Calif.)、外科密封剂例如纤维蛋白原聚合物(Ethic on Inc.Cornelia,Ga.)、TISSELL®(Baxter International,Inc Deerfield,Ill.)、基于PEG的密封剂和COSEAL®(Baxter International,Inc Deerfield,Ill.)。

[0457] B.本发明的载体编码的位点特异性HNF4α破坏剂

[0458] 包含含有例如核酸分子的位点特异性HNF4α靶向部分的破坏剂可以由插入DNA或RNA载体中的转录单元表达(参见,例如Couture,A,等,TIG.(1996),12:5-10;WO00/22113、WO00/22114和US6,054,299)。在一些实施方案中,根据所用的特定构建体和靶组织或细胞类型,表达是持续的(数月或更长)。这些转基因可以作为可以是整合或非整合载体的线性构建体、环状质粒或病毒载体引入。转基因也可被构建为允许其作为染色体外质粒遗传(Gassmann等,(1995)Proc.Natl.Acad.Sci.USA 92:1292)。破坏剂的不同组分(例如gRNA和效应物)可位于可共同转导入(例如通过转染或感染)靶细胞中的单独表达载体上。或者,每个单独的组分可以通过位于同一表达质粒上的启动子转录。

[0459] 破坏剂表达载体的递送可以是全身的,例如通过静脉内或肌内施用,通过施用至从患者外植的靶细胞后再引入所述患者,或通过允许引入所需靶细胞中的任何其它方式。

[0460] 在某些实施方案中,本文所述的核酸或编码本文所述的蛋白质(例如效应物)的核酸被并入载体(例如病毒载体)中。

[0461] 包含含有核酸分子的位点特异性HNF4α靶向部分的破坏剂的单个链或多个链可以从表达载体中的启动子转录。当要表达两条单独的链以产生例如dsRNA时，可将两个单独的表达载体可被共引入(例如通过转染或感染)靶细胞中。或者，核酸分子的每条单独链可通过均位于同一表达质粒上的启动子转录。在一个实施方案中，核酸分子表达为通过接头多核苷酸序列接合的反向重复多核苷酸，使得核酸分子具有茎和环结构。

[0462] 表达载体通常是DNA质粒或病毒载体。与真核细胞相容的表达载体，优选与脊椎动物细胞相容的表达载体，可用于产生用于本文所述的破坏剂的表达的重组构建体。

[0463] 用于破坏剂的重组表达的构建体通常将需要调控元件(例如启动子、增强子等)以确保破坏剂在靶细胞中的表达。

[0464] 天然或合成核酸的表达通常通过将编码目的核酸的核酸可操作地连接至调控区(例如启动子)并将构建体并入表达载体中来实现。载体可适于真核生物中的复制和整合。

[0465] 适合于可操作地连接至核酸分子的调控区(例如启动子)可以可操作地连接至调控区(例如启动子)，可以来自任何物种。任何类型的启动子都可以可操作地连接至核酸序列。启动子的示例包括但不限于组织特异性启动子、组成型启动子和对特定刺激有反应或无反应的启动子(例如诱导型启动子)。其他启动子元件(例如增强序列)调节转录起始的频率。通常，这些位于起始位点上游30-110bp的区域中，尽管最近发现许多启动子也包含起始位点下游的功能元件。启动子元件之间的间隔通常是灵活的，使得当元件相对于彼此反转或移动时，启动子功能得到保留。在胸苷激酶(tk)启动子中，在活性开始下降之前，启动子元件之间的间隔可以增加到相隔50bp。取决于启动子，单个元件可以协同或独立地发挥作用以激活转录。

[0466] 合适启动子的一个示例是立即早期巨细胞病毒(CMV)启动子序列。该启动子序列是能够驱动与其可操作地连接的任何多核苷酸序列的高水平表达的强组成型启动子序列。合适的启动子的另一个示例是延伸生长因子-1a(EF-1a)。但是，也可以使用其它组成型启动子序列，其包括但不限于猿病毒40(SV40)早期启动子、小鼠乳腺肿瘤病毒(MMTV)、人免疫缺陷病毒(HIV)长末端重复序列(LTR)启动子、MoMuLV启动子、禽白血病病毒启动子、Epstein-Barr病毒立即早期启动子、鲁斯氏肉瘤病毒启动子以及人基因启动子，例如但不限于肌动蛋白启动子、肌球蛋白启动子、血红蛋白启动子和肌酸激酶启动子。

[0467] 此外，本发明不应限于使用组成型启动子。诱导型启动子也被认为是本发明的一部分。诱导型启动子的使用提供了一种分子开关，当需要这样的表达时，该开关能够开启可操作地连接的多核苷酸序列的表达，或当不需要表达时，能够关闭该表达。诱导型启动子的示例包括但不限于金属硫蛋白启动子、糖皮质激素启动子、孕酮启动子和四环素启动子。

[0468] 可用于核酸构建体的其它调控区包括但不限于转录和翻译终止子、起始序列、聚腺苷酸化序列、翻译控制序列(例如内部核糖体进入片段，IRES)、增强子、诱导型元件或内含子。这样的调控区可以不是必需的，尽管它们可以通过影响转录、mRNA的稳定性、翻译效率等来增加表达。这样的调控区可以根据需要被包含在核酸构建体中以获得核酸在细胞中的最佳表达。但是，在没有这些附加元件的情况下有时可以获得足够的表达。

[0469] 待引入的表达载体还可以包含选择标记基因或报道基因或两者，以促进寻求转染或通过病毒载体感染的细胞群体中的表达细胞的鉴定和选择。在其它方面，选择标记可以携带在DNA的单独片段上并用于共转染程序。选择标记和报道基因都可以与合适的转录控

制序列侧接以能够在宿主细胞中表达。有用的选择标记包括例如抗生素抗性基因，如neo等。选择标记的非限制性示例包括嘌呤霉素、更昔洛韦、腺苷脱氨酶(ADA)、氨基糖苷磷酸转移酶(neo、G418、APH)、二氢叶酸还原酶(DHFR)、潮霉素-B-磷酸转移酶、胸核激酶(TK)和黄嘌呤-鸟嘌呤磷酸核糖基转移酶(XGPRT)。这些标记可用于选择培养中的稳定转化体。其它选择标记包括荧光多肽，如绿色荧光蛋白或黄色荧光蛋白。

[0470] 信号肽也可被包括并可被使用，使得编码的多肽针对特定的细胞位置(例如细胞表面)。

[0471] 报道基因可用于鉴定潜在转染的细胞和评价转录控制序列的功能。通常，报道基因是一种不存在于受体来源或不由受体来源表达且编码其表达通过一些容易检测的性质(例如酶活性)表现的多肽的基因。在将DNA导入受体细胞后的合适时间测定报道基因的表达。合适的报告基因可包括编码荧光素酶、β-半乳糖苷酶、氯霉素乙酰转移酶、分泌型碱性磷酸酶的基因或绿色荧光蛋白基因(例如，Ui-Tei等，2000FEBS Letters 479:79-82)。合适的表达系统是众所周知的，并且可以使用已知技术制备或商购获得。通常，展现出报道基因最高表达水平的具有最小5'侧翼区的构建体被鉴定为启动子。这样的启动子区可以与报道基因连接并用于评价试剂调节启动子驱动的转录的能力。

[0472] 对于载体和构建体要考虑的其它方面是本领域已知的。

[0473] 在一些实施方案中，载体(例如病毒载体)包含破坏剂，所述破坏剂包含含有核酸分子的位点特异性HNF4α靶向部分。

[0474] 可与本文所述的方法和组合物一起使用的病毒载体系统包括但不限于：(a)腺病毒载体(例如Ad5/F35载体)；(b)逆转录病毒载体，包括但不限于慢病毒载体(包括有整合能力的或整合缺陷的慢病毒载体)、莫洛尼鼠白血病病毒等；(c)腺相关病毒载体；(d)单纯疱疹病毒载体；(e)SV 40载体；(f)多瘤病毒载体；(g)乳头瘤病毒载体；(h)小核糖核酸病毒载体；(i)痘病毒载体，例如正痘病毒(例如牛痘病毒载体)，或禽痘病毒(例如金丝雀痘病毒或禽痘病毒)；和(j)辅助依赖性或无肠腺病毒。复制缺陷型病毒也可能是有利的。不同的载体将并入或不并入细胞的基因组中。如果需要，构建体可以包括用于转染的病毒序列。或者，构建体可被掺入能够附加型复制的载体中，例如EPV和EBV载体。参见，例如美国专利号6,534,261;6,607,882;6,824,978;6,933,113;6,979,539;7,013,219和7,163,824，其中每一个通过全文引用并入本文。

[0475] 载体，包括源自逆转录病毒(例如腺病毒和腺相关病毒和慢病毒)的那些，是实现长期基因转移的合适工具，因为它们允许转基因长期且稳定的整合及其在子代细胞中的增殖。载体的示例包括表达载体、复制载体、探针生成载体和测序载体。表达载体可以病毒载体的形式提供给细胞。病毒载体技术是本领域众所周知的，并且描述于各种病毒学和分子生物学手册。

[0476] 在一个实施方案中，用于本发明的合适的病毒载体是腺相关病毒载体，如重组腺相关病毒载体。

[0477] 重组腺相关病毒载体(rAAV)是基于缺陷型和非致病性细小病毒腺相关2型病毒的基因递送系统。所有载体均源自仅保留位于转基因表达盒侧翼的AAV 145bp反向末端重复序列的质粒。由于向转导细胞的基因组中的整合，有效的基因转移和稳定的转基因递送是该载体系统的关键特征。(Wagner等，Lancet351:91171702-3(1998)，Kearns等，Gene

Ther.9:748-55(1996))。根据本发明可以使用AAV血清型,其包括AAV1、AAV2、AAV3、AAV4、AAV5、AAV6、AAV7、AAV8和AAV9。

[0478] 复制缺陷型重组腺病毒载体(Ad)可以高滴度产生,并且容易感染许多不同的细胞类型。大多数腺病毒载体被工程化以使转基因取代Ad E1a、E1b和/或E3基因;随后,复制缺陷型载体在提供反式缺失基因功能的人293细胞中扩增。Ad载体可以在体内转导多种类型的组织,包括不分裂的分化细胞,例如在肝、肾和肌肉中发现的那些。传统的Ad载体具有大承载能力。临床试验中使用Ad载体的示例涉及用肌内注射进行抗肿瘤免疫的多核苷酸疗法(Sterman等,Hum.Gene Ther.7:1083-9(1998))。在临床试验中使用腺病毒载体进行基因转移的其它示例包括Rosenecker等,Infection24:15-10(1996);Sterman等,Hum.Gene Ther.9:71083-1089(1998);Welsh等,Hum.Gene Ther.2:205-18(1995);Alvarez等,Hum.Gene Ther.5:597-613(1997);Topf等,Gene Ther.5:507-513(1998);Sterman等,Hum.Gene Ther.7:1083-1089(1998)。

[0479] 包装细胞用于形成能够感染宿主细胞的病毒颗粒。这些细胞包括包装腺病毒的293细胞和包装逆转录病毒的Ψ2细胞或PA317细胞。用于基因治疗的病毒载体通常由将核酸载体包装至病毒颗粒中的生产细胞系产生。载体通常包含包装和随后整合入宿主(如果适用)中所需的最小病毒序列,其它病毒序列被编码要表达的蛋白质的表达盒取代。缺失的病毒功能由包装细胞系反式提供。例如,用于基因治疗的AAV载体通常仅具有包装和整合入宿主基因组所必需的来自AAV基因组的反向末端重复(ITR)序列。病毒DNA包装在细胞系中,该细胞系包含编码其它AAV基因(即rep和cap),但缺乏ITR序列的辅助质粒。细胞系也被作为辅助者的腺病毒感染。辅助病毒促进AAV载体的复制和来自辅助质粒的AAV基因的表达。由于缺乏ITR序列,辅助质粒没有被大量包装。腺病毒的污染可以通过例如对热处理比AAV更敏感的腺病毒来减少。

[0480] IV.本发明的方法

[0481] 本发明还提供了使用本文所述的试剂和组合物调节细胞中肝细胞核因子4α(HNF4α)表达的方法。所述方法包括使细胞与位点特异性HNF4α破坏剂接触,所述破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分和效应分子,从而调节细胞中HNF4α的表达。位点特异性破坏剂、效应物、或位点特异性破坏剂和效应物两者可以存在于组合物中,例如上述组合物。在一些实施方案中,位点特异性破坏剂和效应物存在于相同的组合物中。在其它实施方案中,位点特异性破坏剂和效应物存在于不同的组合物中。在一些实施方案中,本发明的方法包括使细胞与两种位点特异性HNF4α破坏剂(第一和第二试剂)接触。两种位点特异性HNF4α破坏剂可存在于相同组合物(例如药物组合物,例如包含LNP的药物组合物)中,或存在于分开的组合物(例如药物组合物,例如包含LNP的药物组合物)中。细胞可一次与第一位点特异性HNF4α破坏剂接触,并第二次与第二位点特异性HNF4α破坏剂接触,或者细胞可与两种试剂同时接触。

[0482] 如上所述,在纤维化肝病中,HNF4α是失调的,结果,其网络中的基因表达显著下降或停止。如Guzman-Lepe(Guzman-Lepe J等,Liver-enriched transcription factor expression relates to chronic hepatic failure in humans.Hepatol Commun.2018;2(5):582-594.doi:10.1002/hep4.1172)所报道的,HNF4α表达被下调并与肝功能障碍(P＝0.001)、纤维化分期(P＝0.0005)和血清总胆红素水平(P＝0.009;r＝0.35)、白蛋白(P＜

0.001;r＝0.52)和凝血酶原时间活性(P＝0.002;r＝0.41)密切相关。HNF4α表达也与CYP3A4、鸟氨酸转氨甲酰酶(OTC)和F7以及CDH1 RNA水平相关。网络的这种失调造成器官自身中肝衰竭的病理学,并造成整个患者的并存疾病。除了抑制与健康肝脏相关的蛋白质(例如白蛋白和CYP3A酶产生)之外,还激活造成纤维化产生的蛋白质,其中包括COL1a1和αSMA。

[0483] 已经在若干研究中证实了HNF4α的表达的增加可以将衰老的和不可逆的功能失调的肝细胞从终末啮齿动物肝脏恢复到正常功能的原理证明(Nishikawa,同上;Scholten D,Trebicka J,Liedtke C,Weiskirchen R.The carbon tetrachloride model in mice.Lab Anim.2015;49(1Suppl):4-11.doi:10.1177/0023677215571192;Varga J,Brenner DA,Phan SH,eds.Fibrosis Research:Methods and Protocols.Humana Press;2005.doi:10.1385/1592599400)。有趣的是,如Nishikawa等人所报道的(Nishikawa,同上),变性肝病中的肝衰竭逆转并不绝对需要扭曲细胞外基质的逆转,因为在HNF4α的强制再表达后两周以及记录肝功能改善后,通过组织学仅发现纤维化的最小消退。然而,在100天时观察到组织学显著改善。此外,尽管强制再表达仅产生HNF4α内源水平的0.01％,但仍发生长期校正。因此,肝功能的改善可能仅需要在晚期退行性疾病中相对适度数量的肝细胞中HNF4α的表达增加。

[0484] 最近,Huang等人(Huang K-W等,Liver Activation of Hepatocellular Nuclear Factor-4α by Small Activating RNA Rescues Dyslipidemia and Improves Metabolic Profile.Mol Ther Nucleic Acids.2019;19:361-370.doi:10.1016/j.omtn.2019.10.044)还观察到在非酒精性脂肪肝病(NAFLD)的大鼠模型中用小激活RNA刺激HNF4α表达恢复了代谢调节并改善脂质代谢。

[0485] 如以下实施例所示,本发明的一个实施方案是通过将工程化转录因子递送至病理性失调的基因来增加HNF4α基因的表达。转录激活因子VPR(Chavez A等,Highly efficient Cas9-mediated transcriptional programming.Nat Methods.2015;12(4):326-328.doi:10.1038/nmeth.3312)是HSV转录激活物VP16、核因子NF-kappa-B p65亚基和EBV R反式激活物的多联体。这些转录因子中的每一种能够单独地吸引细胞转录机制,从而导致来自靶基因座的RNA产生的上调。作为一组,它们的协同合作导致靶基因的生理或超生理表达。

[0486] 相比于例如未与位点特异性HNF4α破坏剂接触的细胞,HNF4α的表达可增加或降低。基因表达的调节可通过本领域已知的任何方法评估。例如,表达的调节可以通过使用本领域内技术人员已知的常规方法(例如RNA印迹法、qRT-PCR)测定例如细胞、多个细胞和/或组织样品中基因的mRNA表达水平来确定;通过使用本领域内技术人员已知的常规方法(例如蛋白质印迹、免疫学技术)测定基因的蛋白质水平。

[0487] 在受试者中HNF4α基因表达或HNF4α蛋白产生的水平或疾病标志物或症状的背景下,术语“降低的”是指这种水平的统计上显著的降低。降低可以是例如至少20％、25％、30％、35％、40％、45％、50％、55％、60％、65％、70％、75％、80％、85％、90％或95％、或低于检测方法的检测水平。在某些实施方案中,靶标的表达被标准化,即朝向未患此类病症的个体在正常范围内能接受的水平降低或降低到该水平。如本文所用,受试者中的“较低”可指降低受试者细胞中的基因表达或蛋白质产生不需要降低受试者的所有细胞或组织中的表达。例如,如本文所用,受试者中的降低可包括受试者肝脏中基因表达或蛋白质产生的降低。

[0488] 术语“降低的”还可以与正常化疾病或病症的症状结合使用，即降低患有HNF4α相关疾病的受试者的水平与未患有HNF4α相关疾病的正常受试者的水平之间的差异。如本文所用，如果疾病与症状的升高值相关，则“正常”被认为是正常的上限。如果疾病与症状的降低值相关，则“正常”被认为是正常的下限。

[0489] 在受试者中HNF4α基因表达或HNF4α蛋白产生的水平或疾病标志物或症状的背景下，术语“增加的”是指这种水平的统计上显著的增加。增加可以是例如至少20％、25％、30％、35％、40％、45％、50％、55％、60％、65％、70％、75％、80％、85％、90％或95％、或高于检测方法的检测水平。在某些实施方案中，靶标的表达被标准化，即朝向未患此类病症的个体在正常范围内能接受的水平增加或增加到该水平。如本文所用，受试者中的“较高”可指增加受试者细胞中的基因表达或蛋白质产生不需要增加受试者的所有细胞或组织中的表达。例如，如本文所用，受试者中的增加可包括受试者肝脏中基因表达或蛋白质产生的增加。

[0490] 术语“增加的”还可以与正常化疾病或病症的症状结合使用，即增加患有HNF4α相关疾病的受试者的水平与未患有HNF4α相关疾病的正常受试者的水平之间的差异。如本文所用，如果疾病与症状的升高值相关，则“正常”被认为是正常的上限。如果疾病与症状的降低值相关，则“正常”被认为是正常的下限。

[0491] 在一些实施方案中，用于本发明方法的合适细胞是哺乳动物细胞。在一些实施方案中，细胞是体细胞。在一些实施方案中，细胞是原代细胞。例如，在一些实施方案中，细胞是哺乳动物体细胞。在一些实施方案中，哺乳动物体细胞是原代细胞。在一些实施方案中，哺乳动物体细胞是非胚胎细胞。

[0492] 接触步骤可以在体外、在体内(即细胞可以在受试者体内)或离体进行。在一些实施方案中，接触细胞是离体进行的，并且方法还包括在接触步骤之前从受试者去除细胞(例如哺乳动物细胞)的步骤。在一些实施方案中，方法在接触步骤之后还包括(b)向受试者施用细胞(例如哺乳动物细胞)的步骤。

[0493] 本发明的体内方法可包括向受试者施用本发明的试剂或组合物。

[0494] 如本文所用，术语“受试者”是指生物体，例如哺乳动物(例如人类、非人类哺乳动物、非人类灵长类动物、灵长类动物、实验室动物、小鼠、大鼠、仓鼠、沙鼠、猫或狗)。在一些实施方案中，人类受试者是成人、青少年或儿童受试者。在一些实施方案中，受试者患有疾病或病症。在一些实施方案中，受试者患有疾病、紊乱或病症，例如可如本文提供治疗的疾病、紊乱或病症。在一些实施方案中，受试者易患疾病、紊乱或病症；在一些实施方案中，易患病受试者易患疾病、紊乱或病症和/或显示出增强的患疾病、紊乱或病症的风险(与在参照受试者或群体中观察到的平均风险相比)。在一些实施方案中，受试者表现出疾病、紊乱或病症的一种或多种症状。在一些实施方案中，受试者不表现出特定症状(例如疾病的临床表现)或疾病、紊乱或病症的特征。在一些实施方案中，受试者不表现出疾病、紊乱或病症的任何症状或特征。在一些实施方案中，受试者是患者。在一些实施方案中，受试者是被诊断和/或被治疗和/或已经被诊断和/或治疗的个体。

[0495] 将受益于本发明的方法的受试者包括患有“HNF4α相关疾病”的受试者或处于“HNF4α相关疾病”风险中的受试者。

[0496] 因此，本发明还提供了治疗有需要的受试者的方法。本发明的治疗方法包括以治

疗有效量向受试者(例如将受益于调节HNF4α表达的受试者,例如患有HNF4α相关疾病的受试者)施用本发明的试剂或组合物。在一些实施方案中,本发明的方法包括受试者可被施用两种位点特异性HNF4α破坏剂(第一和第二试剂)。两种位点特异性HNF4α破坏剂可存在于相同组合物(例如药物组合物,例如包含LNP的药物组合物)中,或存在于分开的组合物(例如药物组合物,例如包含LNP的药物组合物)中。受试者可一次施用第一位点特异性HNF4α破坏剂并第二次施用第二位点特异性HNF4α破坏剂,或受试者可被同时施用两种试剂。

[0497] 此外,本发明提供了通过向受试者施用预防有效量的本发明的试剂或组合物来预防受试者中的至少一种症状的方法,其中所述受试者将受益于HNF4α表达的调节,例如患有HNF4α相关疾病的受试者。

[0498] 如本文所用,"治疗有效量"旨在包括当施用于患者以治疗患有HNF4α相关疾病的受试者时,足以实现疾病治疗(例如通过减少、改善或维持现有疾病或疾病或其相关并发症的一种或多种症状)的试剂或组合物的量。"治疗有效量"可根据试剂或组合物、如何施用、疾病及其严重程度和病史、年龄、体重、家族史、遗传组成、由HNF4α基因表达介导的病理过程的阶段、先前或伴随治疗的类型(如果有的话)和待治疗患者的其它个体特征而变化。

[0499] 如本文所用,"预防有效量"旨在包括当施用于尚未经历或展现出HNF4α相关疾病的症状但可能易患HNF4α相关疾病的受试者时,足以在具有临床意义的时间段中预防或延迟疾病或疾病的一种或多种症状的发展或进展的试剂或组合物的量。"预防有效量"可以根据试剂或组合物、如何施用、疾病的风险程度及病史、年龄、体重、家族史、遗传组成、先前或伴随治疗的类型(如果有的话)和待治疗患者的其它个体特征而变化。

[0500] 如本文所用,"预防(prevention)"或"防止(preventing)"当用于提及将受益于HNF4α基因的表达或HNF4α蛋白的产生的减少的疾病、紊乱或病症时,是指受试者将发展与此类疾病、紊乱或病状相关的症状(例如HNF4α基因表达或HNF4α活性的征兆或症状)的可能性的降低。

[0501] "治疗有效量"或"预防有效量"也包括以适用于任何治疗的合理益处/风险比产生一些需要的局部或全身作用的试剂或组合物的量。本发明的方法中使用的试剂和组合物可以足够的量施用以产生适用于此类治疗的合理的益处/风险比。在一些实施方案中,治疗有效量或预防有效量以单次剂量施用;在一些实施方案中,需要多个单位剂量来递送治疗或预防有效量。

[0502] 如本文所用,当特定疾病、紊乱或病症的一种或多种症状在量值(例如强度、严重度等)和/或频率降低时,可使用短语"症状减轻"。在一些实施方案中,特定症状发作的延迟被认为是降低该症状频率的一种形式。

[0503] 当待治疗的受试者是哺乳动物(例如人类)时,组合物可以通过本领域已知的任何方式施用,其中包括但不限于口服、腹腔内或肠胃外途径,包括颅内(例如脑室内、实质内和鞘内)、静脉内、肌内、皮下、透皮、气道(气雾剂)、鼻、直肠和局部(包括口腔和舌下)施用。在某些实施方案中,组合物通过静脉内输液或注射施用。在某些实施方案中,组合物通过皮下注射施用。

[0504] 如本文所用,术语"HNF4α相关疾病"是由HNF4α基因表达或HNF4α蛋白产生引起或与其相关疾病或病症。术语"HNF4α相关疾病"包括受益于HNF4α基因表达、复制或蛋白质活性降低的疾病、紊乱或病症。HNF4α相关疾病的非限制性示例包括例如肝病(例如脂肪肝、脂

肪性肝炎，其中包括非酒精性脂肪性肝炎(NASH))、炎症性肠病(IBD)、肝细胞癌、MODY I、多囊性肾病、血脂障碍(例如高脂血症、高LDL胆固醇、低HDL胆固醇、高甘油三酯血症、餐后高甘油三酯血症)、血糖控制紊乱(例如与对胰岛素的免疫反应无关的胰岛素抗性、II型糖尿病)、心血管疾病(例如高血压、内皮细胞功能障碍)、肾病(例如，急性肾病、肾小管功能障碍、近端肾小管的促炎改变、慢性肾病)、代谢综合征、脂质沉积或功能障碍的疾病(例如脂肪细胞功能障碍、内脏脂肪沉积、肥胖)、尿酸升高的疾病(例如高尿酸血症、痛风)和饮食障碍(例如过度的糖渴望)。关于各种疾病或病症的体征和症状的进一步细节在本文中提供并且是本领域众所周知的。

[0505] 在一个实施方案中，HNF4α相关疾病选自脂肪肝(脂肪变性)、非酒精性脂肪性肝炎(NASH)、肝硬化、肝脏内脂肪堆积、肝脏炎症、肝细胞坏死、肝纤维化和非酒精性脂肪肝病(NAFLD)、多囊性肾病、炎症性肠病(IBD)和MODY I。

[0506] 根据本发明的方法的试剂或组合物的施用可导致患有HNF4α相关疾病或病症的患者中HNF4α相关疾病或病症的严重程度、体征、症状或标志物的降低。在此背景下的“降低”是指这种水平的统计学上显著的降低。降低(绝对降低或受试者中升高的水平与正常水平之间的差异的降低)可以是例如至少约20％、25％、30％、35％、40％、45％、50％、55％、60％、65％、70％、75％、80％、85％、90％或95％、或至低于所用测定的检测水平。

[0507] 根据本发明的方法的试剂或组合物的施用可以稳定地或瞬时地调节靶基因的表达。在一些实施方案中，表达的调节持续至少约1小时至约30天，或至少约2小时、6小时、12小时、18小时、24小时、2天、3天、4天、5天、6天、7天、8天、9天、10天、11天、12天、13天、14天、15天、16天、17天、18天、19天、20天、21天、22天、23天、24天、25天、26天、27天、28天、29天、30天或更长时间或其间的任何时间。在一些其它实施方案中，表达的调节持续不超过约30分钟至约7天、或不超过约1小时、2小时、3小时、4小时、5小时、6小时、7小时、8小时、9小时、10小时、11小时、12小时、13小时、14小时、15小时、16小时、17小时、18小时、19小时、20小时、21小时、22小时、24小时、36小时、48小时、60小时、72小时、4天、5天、6天、7天或其间的任何时间。

[0508] 试剂或组合物可以向受试者施用一次，或者，可以在一段时间内进行多次施用。例如，可以在一次治疗期间或在一段时间内给予受试者两次、三次、四次、五次或多次施用。在一些实施方案中，可以在一个治疗期间或在作为治疗方案的一段时间内给予受试者六次、八次、十次、十二次、十五次或二十次或更多次施用。

[0509] 在一些实施方案中，可以根据需要给予施用(例如，只要与疾病、紊乱或病症相关的症状持续)。在一些实施方案中，重复施用适用于受试者生命的剩余部分。治疗期间可以变化并且可以是例如一天、两天、三天、一周、两周、一个月、两个月、三个月、六个月、一年或更长。

[0510] 可以例如通过测定疾病进展、疾病缓解、症状严重性、疼痛减轻、生活质量、维持治疗效果所需的药物剂量、疾病标志物的水平或适合于待治疗或靶向预防的给定疾病的任何其它可测量参数来评估疾病的治疗或预防的功效。通过测量这些参数中的任何一个或参数的任何组合来监测治疗或预防的功效在本领域技术人员的能力范围内。如本文所讨论的，待测量的具体参数取决于受试者所患的HNF4α相关疾病。

[0511] 在后读数与初始读数的比较为医生提供了治疗是否有效的指示。通过测量这些参

数中的任何一个或参数的任何组合来监测治疗或预防的功效在本领域技术人员的能力范围内。与试剂或组合物的施用相关，“有效对抗”HNF4α相关的病症表明以临床上合适的方式施用对至少统计学上明显的患者部分导致有益效果，例如症状的改善、治愈、疾病的减少、生命的延长、生活质量的改善或熟悉治疗HNF4α相关的病症的医生通常认为积极的其它效果。

[0512] 当在疾病状态的一个或多个参数存在统计学上显著的改善，或没有恶化或没有发生否则预期应当出现的症状时，治疗或预防效果是明显的。举个例子，疾病的可测量参数的至少10％、优选至少20％、30％、40％、50％或更多的有利变化可表明有效治疗。还可以使用本领域已知的给定疾病的实验动物模型来判断给定试剂或组合物的功效。当使用实验动物模型时，治疗的功效在观察到标志物或症状的统计学显著的减少时被证实。

[0513] 或者，可通过由诊断领域内技术人员基于临床上接受的疾病严重程度分级表确定的疾病严重程度的降低来测量功效。导致例如使用适当分级表测量的疾病严重性减轻的任何积极变化表示使用本文所述的试剂或组合物的适当治疗。

[0514] 如本文所用，术语“治疗(treating)”或“处理(treatment)”是指有益的或期望的结果，其中包括但不限于与HNF4α基因表达或HNF4α蛋白产生相关的一种或多种体征或症状的减轻或改善。“治疗”还可以指相比于未治疗时的预期存活的延长存活。

[0515] 接下来通过以下实施例描述本发明。但是，在说明书中任何地方使用这些和其它实施例仅是说明性的，而不以任何形式限制本发明或任何示例形式的范围和含义。本发明不限于这里描述的任何特定的优选实施方案。本发明的许多修改和变化对于本领域技术人员是显而易见的，并且可以在不脱离其精神和范围的情况下做出。本申请全文(包括附图和非正式序列表)引用的所有参考文献、专利和公开的专利申请的内容通过引用并入本文。

[0516] 实施例

[0517] 实施例1.HNF4α表达的调节

[0518] 本实施例描述了用位点特异性HNF4α破坏剂使HNF4α表达沉默，所述位点特异性HNF4α破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分(即指导RNA)和包含含有dCAS9和KRAB的融合分子的效应物。

[0519] 指导RNA被设计为位点特异性靶向包含HNF4α基因的启动子1(靠近转录起始位点)的转录控制区(参见例如图1)，并根据用于合成寡核苷酸的标准方法合成。指导RNA的核苷酸序列提供于下表2中。被设计为用于位点特异性靶向包含HNF4α基因的启动子2(靠近转录起始位点)的转录控制区的示例性指导RNA也被设计并提供于下表3中。被设计为用于位点特异性靶向包含HNF4α基因的启动子2(靠近转录起始位点)的转录控制区的其它示例性指导RNA也被设计并提供于下表9中。下表4包括表2和表3中的指导RNA的未修饰的核苷酸序列、反向互补核苷酸序列和染色体坐标。

[0520] 转染前24小时将HepG2细胞接种于96孔板(密度为3×10E4细胞/孔)的适当培养基中。根据标准方法，用含有编码dCAS9-KRAB的融合蛋白的mRNA(MR_28122)和指导RNA(sgRNA)的SSOP脂质纳米颗粒(LNP)转染细胞(参见例如Akita等，Advanced Healthcare Materials(2013)2:8.:1120-1125)。

[0521] 将使用单个sgRNA或sgRNA池制备的LNP制剂(参见图1)加入细胞中，最终浓度为5.0、2.5、1.25或0.625μg/ml。72小时后通过在用于下游mRNA纯化的RLT缓冲液中裂解/冷冻

或用Cell Titer Glo 2试剂处理以定量最终细胞数来结束实验。使用HNF4α和ACTB探针进行qPCR以定量相对HNF4α RNA转录。

[0522] 图2表明，相对于单独的dCAS、SH-KRAB和未处理，与效应物dCAS-KRAB组合的池1或池2指导以剂量依赖性方式抑制HNF4α表达。dCAS单独确实在一些情况下影响转录，不希望受理论束缚，该抑制可以是dCAS干扰聚合酶结合的结果。

[0523] 此外，如图3所示，池1在最高浓度时具有最强的沉默活性，而指导RNA(GD-28432和GD-28433)各自单独具有强沉默活性，甚至在最低浓度时也具有强沉默活性。

[0524] 实施例2 HNF4α表达的调节

[0525] 本实施例描述了用位点特异性HNF4α破坏剂激活HNF4α表达，所述位点特异性HNF4α破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分(即指导RNA)和包含含有dCAS9(非编辑性Cas9蛋白)和VPR的融合分子的效应物。

[0526] 指导RNAs被设计为位点特异性靶向包含HNF4α基因的启动子1(靠近转录起始位点)的转录控制区(参见例如图1)，并根据用于合成寡核苷酸的标准方法合成。指导RNA的核苷酸序列提供于下表2中。被设计为用于位点特异性靶向包含HNF4α基因的启动子2(靠近转录起始位点)的转录控制区的示例性指导RNA也被设计并提供于下表3中。被设计为用于位点特异性靶向包含HNF4α基因启动子2(靠近转录起始位点)的转录控制区的其它示例性指导RNA也被设计并提供于下表9中。下表4包括表2和表3中的指导RNA的未修饰的核苷酸序列、反向互补核苷酸序列和染色体坐标。

[0527] 转染前24小时将LX-2、A549和HepG2细胞接种在96孔板(密度为1×10E4细胞/孔)中的适当培养基中。LX-2细胞正常地不表达HNF4α；HepG2细胞(肝癌细胞系细胞)通常比正常的非癌性肝细胞表达更多的HNF4α。

[0528] 用编码针对dCAS9-VPR的融合蛋白的mRNA(MR_28196)和指导RNA(sgRNA)转染细胞。使用制造商描述的Lipofectamine MessengerMAX转染方案制备单个sgRNA或sgRNA池。实验中还包括未处理的HepG2细胞作为内部对照(比较物)。

[0529] 简言之，将每μg RNA 2.5μl脂质体与OptiMEM培养基混合，并在室温(RT)下孵育10分钟，然后以培养基体积与细胞的1:10比例加入到细胞中。将Lipofectmine培养基混合物与总体积为120μl的RNA混合，最终浓度为100μg/ml。在室温下孵育该混合物5分钟并加入细胞中至最终浓度为5.0、2.5、1.25、0.625μg/ml。

[0530] 48小时后通过在用于下游mRNA纯化的RLT缓冲液中裂解/冷冻或用Cell Titer Glo 2试剂处理以定量最终细胞数来结束实验。简言之，用PBS洗涤用于RNA提取的板三次，然后将150μL RLT缓冲液加入到每个孔中。然后将板在-80℃冷冻用于随后的RNA加工。解冻平板后，使用Qiagen RNeasy 96孔试剂盒提取RNA。使用Ribogreen定量RNA。按照通过RT-qPCR对mRNA表达进行绝对定量的方案进行逆转录和qPCR。

[0531] HNF4α和β-肌动蛋白(ACTB)的标准曲线制备如下：在无核酸酶的水中制备浓度为10mg/mL的HNF4α和ACTB基因储备液(目标eDNA的合成参考拷贝)。通过将5μL各单独的基因储备液和40μL H_2O混合至终体积为50μL来制备0.5mg/mL各基因储备液的混合物。然后连续稀释(10倍稀释)该混合物8次。将2微升(2μL)各标准曲线稀释液用作标准曲线的cDNA，向其中加入8μL具有探针的Taqman Master Mix。一式两份建立标准曲线。孔三次技术重复进行分析。

[0532] 提取RNA并通过qPCR测定HNF4α mRNA水平。

[0533] 使用HNF4α和ACTB探针进行qPCR以定量相对HNF4α RNA转录。测量HepG2 HNF4α RNA表达作为阳性对照。

[0534] 图4A和4B表明,相对于SH-VPR和未处理的,池1指导与效应物dCAS-VPR组合以剂量依赖性方式在A549和LX-2中强烈激活HNF4α表达。

[0535] 使用Lipofectamine MessengerMAX Transfection递送dCAS9-P300也上调HNF4α,但显著低于dCAS-VPR(数据未显示)。

[0536] 使用Dlin-MC3-DMA(MC3)(一种配制用于体内递送的LNP)进行类似的实验以评估包含dCas9-VPR和靶向HNF4α的启动子区的指导的dCas9融合蛋白的作用。使用MC3-LNP、针对dCas9-VPR的mRNA以及单个sgRNA和合并的sgRNA(池1)递送至培养物中的细胞。提取RNA并如上所述通过qPCR测定HNF4α mRNA水平。实验中包括未处理的HepG2细胞作为内部对照(比较物)。

[0537] 图5表明,在该实验中,与HepG2(内部对照)的HNF4α水平相比,MC3 LNP在转染LX-2细胞方面比Messanger Max更有效。靶向HNF4α启动子的单个sgRNA显示上调,但显著低于合并的指导。

[0538] 还评价了使用MC3-LNP介导的递送在HepG2细胞中HNF4α的激活。HepG2细胞表达高于正常细胞的基础水平的HNF4α。超生理表达可以促进效力的更强的持久性。

[0539] 使用MC3-LNP,针对dCas9-VPR的mRNA和合并的sgRNA递送至培养物中的HepG2细胞。还包括dCas9-VPR对照,具有对照的SH(安全港非靶向对照)指导。通过qPCR测定HNF4α mRNA水平。

[0540] 图6表明MC3-LNP制剂诱导HepG2细胞中HNF4α的过表达。观察到表达水平高达对照水平的约200%。这样的表达水平在培养的细胞中是耐受的。SH对照的结果证明HNF4α的上调特异性地归因于活化效应物的启动子靶向递送。

[0541] 为了研究dCas9-VPR池1诱导的HNF4α蛋白是否定位于细胞的核,用针对dCas9-VPR的mRNA和合并的sgRNA(池1)转染LX-2细胞。为了使细胞可视化,固定并渗透经处理的LX-2细胞。使细胞在具有黑色壁和透明底部的96孔板中生长。去除培养基。所有孵育均在室温(RT)下静止进行。所有溶液均用10X PBS储备溶液制备。去除培养基并用1X PBS洗涤细胞2次。为了洗涤细胞,加入100μl的1X PBS,并除去。重复洗涤两次。加入100微升(100μl)1X PBS中的4%PFA并在室温下孵育15分钟。用1X PBS洗涤细胞3次,每次洗涤之间孵育5分钟。然后在室温下在100μl的1X PBS中的0.1%Triton X中孵育细胞15分钟。加入100微升(100μl)含有0.1%Triton X100的1X PBS中的10%正常山羊血清,并保持4℃直至进一步使用。

[0542] 用抗HNF4α抗体和DAPI染色固定和渗透细胞。图7显示通过dCas9-VPR池1诱导的HNF4α蛋白可被检测到并转移到细胞核。

[0543] 表2.位点特异性HNF4α启动子1靶向部分(sgRNA)--以下每个部分中的前20个核苷酸包含该所述部分的靶向部分。

[0544]

识别号	SEQ ID NO.	修饰的核苷酸序列 5'-3'
GD-28431	68	mAs; mUs; mUs; rG; rA; rA; rU; rU; rA; rG; rG; rG; rG; rA; rU; rC; rU; rC; rG; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28432	69	mGs; mAs; mCs; rU; rU; rG; rG; rG; rG; rU; rG; rA; rC; rA; rA; rU; rG; rG; rC; rU; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28433	70	mAs; mAs; mCs; rU; rG; rA; rA; rC; rA; rU; rC; rG; rG; rU; rG; rA; rG; rU; rU; rA; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA;
		rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28434	71	mUs; mGs; mGs; rU; rU; rU; rC; rU; rG; rG; rC; rU; rG; rA; rC; rA; rC; rC; rC; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28435	72	mAs; mUs; mGs; rG; rU; rU; rA; rA; rU; rC; rG; rG; rU; rC; rC; rC; rC; rC; rG; rC; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28436	73	mGs; mUs; mCs; rC; rU; rC; rU; rG; rG; rG; rA; rA; rG; rA; rU; rC; rU; rG; rC; rU; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28437	74	mGs; mGs; mUs; rU; rU; rG; rA; rA; rA; rG; rG; rA; rA; rG; rG; rC; rA; rG; rA; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28438	75	mAs; mCs; mCs; rC; rU; rG; rG; rG; rC; rG; rC; rC; rC; rA; rC; rC; rC; rC; rG; rA; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD-28439	76	mUs; mUs; mCs; rU; rC; rC; rC; rU; rG; rC; rC; rU; rC; rC; rA; rC; rG; rC; rC; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU

[0545]

[0546] 表3.位点特异性HNF4α启动子2靶向部分(sgRNA)--以下每个部分中的前20个核苷酸包含该所述部分的靶向部分。

[0547]

识别号	SEQ ID NO.	修饰的核苷酸序列 5'-3'
GD28427	77	mAs; mUs; mGs; rC; rC; rC; rC; rC; rA; rG; rC; rU; rC; rU; rC; rC; rG; rG; rC; rU; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA;
		rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD28428	78	mCs; mAs; mGs; rC; rG; rU; rG; rA; rA; rC; rG; rC; rG; rC; rC; rC; rC; rU; rC; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD28429	79	mCs; mUs; mUs; rA; rC; rG; rG; rU; rA; rA; rG; rU; rG; rG; rG; rG; rC; rU; rG; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD28430	80	mCs; mCs; mCs; rG; rU; rA; rA; rG; rA; rA; rA; rC; rA; rC; rA; rC; rG; rG; rG; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU
GD28431	68	mAs; mUs; mUs; rG; rA; rA; rU; rU; rA; rG; rG; rG; rG; rA; rU; rC; rU; rC; rG; rG; rG; rU; rU; rU; rU; rA; rG; rA; rG; rC; rU; rA; rG; rA; rA; rA; rU; rA; rG; rC; rA; rA; rG; rU; rU; rA; rA; rA; rA; rU; rA; rA; rG; rG; rC; rU; rA; rG; rU; rC; rC; rG; rU; rU; rA; rU; rC; rA; rA; rC; rU; rU; rG; rA; rA; rA; rA; rA; rG; rU; rG; rG; rC; rA; rC; rC; rG; rA; rG; rU; rC; rG; rG; rU; rG; rC; rUs; mUs; mUs; mU

[0548]

[0549] 表4.表2和3中位点特异性HNF4α靶向部分的靶向部分的未修饰的核苷酸序列。

[0550]

识别号	SEQ ID NO.	未修饰的核苷酸序列 5'至 3'	SEQ ID NO.	反向互补核苷酸序列 5'至 3'	染色体坐标
GD-28427		ATGCCCCCAGC TCTCCGGCT		AGCCGGAGAGCT GGGGGCAT	chr20:42984411-42984433
GD-28428		CAGCGTGAACG CGCCCCTCG		CGAGGGGCGCGT TCACGCTG	chr20:42984450-42984472
GD-28429		CTTACGGTAAG TGGGGCTGG		CCAGCCCCACTT ACCGTAAG	chr20:42984488-42984510
GD-28430		CCCGTAAGAAA CACACGGGG		CCCCGTGTGTTT CTTACGGG	chr20:42984560-42984582
GD-28431		ATTGAATTAGG GGATCTCGG		CCGAGATCCCCT AATTCAAT	chr20:43029535-43029557
GD-28432		GACTTGGGGTG		AGCCATTGTCAC	chr20:43029596-430

[0551]

		ACAATGGCT		CCCAAGTC	29618
GD-28433	81	AACTGAACATC GGTGAGTTA	82	TAACTCACCGAT GTTCAGTT	chr20:43029685-43029707
GD-28434	83	TGGTTTCTGGCT GACACCCG	84	CGGGTGTCAGCC AGAAACCA	chr20:43029729-43029751
GD-28435	85	ATGGTTAATCG GTCCCCCGC	86	GCGGGGGACCGA TTAACCAT	chr20:43029792-43029814
GD-28436	87	GTCCTCTGGGA AGATCTGCT	88	AGCAGATCTTCC CAGAGGAC	chr20:43029873-43029895
GD-28437	89	GGTTTGAAAGG AAGGCAGAG	90	CTCTGCCTTCCTT TCAAACC	chr20:43029896-43029918
GD-28438	91	ACCCTGGGCGC CCACCCCGA	92	TCGGGGTGGGCG CCCAGGGT	chr20:43029957-43029979
GD-28439	92	TTCTCCCTGCCT CCACGCCG	94	CGGCGTGGAGGC AGGGAGAA	chr20:43029991-43030013

[0552] 表5.核苷酸序列表示中使用的核苷酸单体的缩写。应当理解，当这些单体存在于寡核苷酸中时，它们通过5’-3’-磷酸二酯键相互连接。

[0553]

缩写	核苷酸
A	腺苷-3’-磷酸
As	腺苷-3’-硫代磷酸
C	胞苷-3’-磷酸
Cs	胞苷-3’-硫代磷酸
G	鸟苷-3’-磷酸
Gs	鸟苷-3’-硫代磷酸
U	尿苷-3’-磷酸
Us	尿苷-3’-硫代磷酸
N	任何修饰的或未修饰的核苷酸
mA	2’-O-甲基腺苷-3’-磷酸
mAs	2’-O-甲基腺苷-3’-硫代磷酸
mC	2’-O-甲基胞苷-3’-磷酸
mCs	2’-O-甲基胞苷-3’-硫代磷酸
mG	2’-O-甲基鸟苷-3’-磷酸
mGs	2’-O-甲基鸟苷-3’-硫代磷酸
mU	2’-O-甲基尿苷-3’-磷酸
mUs	2’-O-甲基尿苷-3’-硫代磷酸
S	硫代磷酸酯键

[0554]

缩写	核苷酸
r	核糖核苷酸

[0555] 实施例3.锌指DNA结合域和TALE融合蛋白的设计

[0556] 如实施例1和2中所述，使用dCas9融合蛋白和针对HNF4α基因的启动子1的5’的特

定核酸区域的指导识别HNF4α基因表达的有效激活位点。基于这些数据，设计锌指DNA结合域多肽(ZF)和TALE多肽以靶向HNF4α基因的启动子1的5'的相同或相似序列区域。图9描绘了用于设计本发明的示例性ZF蛋白和TALE蛋白的靶区域。

[0557] 图10描绘了示例性位点特异性HNF4α破坏剂的结构，其包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分(例如锌指(ZF)或TALE)，和包含例如本发明的VPR的效应物(例如ZF-VPR或TALE-VPR融合蛋白)。如图10所示，示例性ZF-VPR蛋白可包含一个或多个核定位信号(NLS)，例如SV40NLS或核质蛋白NLS。在一些实施方案中，NLS位于N-末端、VP64和RelA(p65)激活结构域(VPR)之间和C-末端。

[0558] 在一些实施方案中，编码ZF融合蛋白或TAL融合蛋白的mRNA可以包含在5'末端的"天然帽"结构，例如mRNA可以是cap0(无甲基)、cap1(第一核糖上的甲基)、cap2(第二核糖上的甲基)。

[0559] 帽的下游是5'非翻译区(UTR)，其是被设计用于促进高水平蛋白质翻译的序列。5'UTR的下游是编码序列、3'UTR和polyA尾。

[0560] 用于构建体的5'UTR的示例性核苷酸序列是AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACC(SEQ ID NO:)。

[0561] 用于构建体的3'UTR的示例性核苷酸序列是CUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAG(SEQ ID NO:)

[0562] 用于构建体的poly-A尾的示例性核苷酸序列是AAAAA

[0566]

1 栏 包含锌指 DNA 结合域和效应物的示例性 HNF4α 破坏剂 名称	2 栏 1 栏中破坏剂的氨基酸序列（SEQ ID NO:）	3 栏 1 栏中破坏剂的核苷酸序列（SEQ ID NO:）	4 栏 1 栏中破坏剂靶向的 HNF4α 表达控制区中靶位点的序列（SEQ ID NO:）	5 栏 1 栏中破坏剂的 DNA 结合域的氨基酸序列（SEQ ID NO:）	6 栏 1 栏中破坏剂的 DNA 结合域的核苷酸序列（SEQ ID NO:）	7 栏 HNF4α 表达控制区中靶位点的基因组坐标（基因组参考联盟人构建 37(GRCh37): 染色体 20）（SEQ ID NO:）
ZF1-VPR	100	101	102	103	211	GrCh37: chr20:43029991-43030011
ZF2-VPR	104	105	106	107	212	GrCh37: chr20:43029959-43029979
ZF3-VPR	108	109	110	111	213	GrCh37: chr20:43029897-43029917
ZF4-VPR	112	113	114	115	214	GrCh37: chr20:43029874-43029894
ZF5-VPR	116	117	118	119	215	GRCh37: chr20:43029794-43029814
ZF6-VPR	120	121	122	123	216	CRCh37: chr20:43029731-43029751

[0567]

ZF7-VPR	124	125	126	127	217	GRCh37: chr20:43029686-43029706
ZF8-VPR	128	129	130	131	218	GrCh37: chr20:43029598-43029618
ZF9-VPR	132	133	134	135	219	GrCh37: chr20:43029536-43029558
ZF10-VPR	136	137	138	139	220	GrCh37: chr20:43029767-43029787
ZF11-VPR	140	141	142	143	221	GrCh37: chr20:43029820-43029840
ZF12-VPR	144	145	146	147	222	GrCh37: chr20:43029855-43029875
ZF13-VPR	148	149	150	151	223	GrCh37: chr20:43029766-43029786
ZF14-VPR	152	153	154	155	224	GRCh37: chr20:43029810-43029830
ZF15-VPR	156	157	158	159	225	GRCh37: chr20:43029832-43029852
ZF5-VPR ATUM Opt_1 (ZF5.1-VPR)	116	160	118	119	226	GRCh37: chr20:43029794-43029814
ZF5-VPR ATUM Opt_2 (ZF5.2-VPR)	116	161	118	119	227	GRCh37: chr20:43029794-43029814
ZF5-VPR ATUM Opt_3 (ZF5.3-VPR)	116	162	118	119	228	GRCh37: chr20:43029794-43029814
ZF5-VPR ATUM Opt_4 (ZF5.4-VPR)	116	163	118	119	229	GRCh37: chr20:43029794-43029814

[0568]

ZF5-VPR ATUM Opt_5 (ZF5.5-VPR)	116	164	118	119	230	GRCh37: chr20:43029794-43029814
ZF5-VPR ATUM Opt_6 (ZF5.6-VPR)	116	165	118	119	231	GRCh37: chr20:43029794-43029814
ZF5-P300	166	167	118	119	232	GRCh37: chr20:43029794-43029814
ZF5-VPR + ZF7-VPR	116+124	117+125	118+126	119+127	215+217	GRCh37: chr20:43029794-43029814 GRCh37: chr20:43029686-43029706
ZF5-VPR ATUMOpt_3 + ZF7-VPR	116+124	162+125	118+126	119+127	228+217	GRCh37: chr20:43029794-43029814 GRCh37: chr20:43029686-43029706
ZF7-P300	168	169	126	127	233	GRCh37: chr20:43029686-43029706
ZF5.3-VPR3	170	171	118	119	234	GRCh37: chr20:43029794-43029814
ZF5-无效应物	174	175	118	119	235	GRCh37: chr20:43029794-43029814
ZF5.3-VPR-tPT2a-ZF7-VPR	176	177	118+126	119+127	236+237	GRCh37: chr20:43029794-43029814 GRCh37: chr20:43029686-43029706
ZF7-VPR-tPT2a-ZF5.3-VPR	178	179	126+118	127+119	238+239	GRCh37: chr20:43029686-43029706

[0569]

						GRCh37: chr20:43029794-43029814
ZF5.3-VPR-tPT2a-ZF7-p300	180	181	118+126	119+127	240+241	GRCh37: chr20:43029794-43029814 GRCh37: chr20:43029686-43029706
ZF7-p300-tPT2a-ZF5.3-VPR	182	183	126+118	127+119	242+243	GRCh37: chr20:43029686-43029706 GRCh37: chr20:43029794-43029814
TAL1-VPR	184	185	102	186	244	GrCh37: chr20:43029991-43030011
TAL2-VPR	187	188	106	189	245	GrCh37: chr20:43029959-43029979
TAL3-VPR	190	191	110	192	246	GrCh37: chr20:43029897-43029917
TAL4-VPR	193	194	114	195	247	GrCh37: chr20:43029874-43029894
TAL5-VPR	196	197	118	198	248	GRCh37: chr20:43029794-43029814
TAL6-VPR	199	200	122	201	249	CRCh37: chr20:43029731-43029751
TAL7-VPR	202	203	126	204	250	GRCh37: chr20:43029686-43029706
TAL8-VPR	205	206	130	207	251	GrCh37: chr20:43029598-43029618

[0570]

TAL9-VPR	208	209	134	210	252	GrCh37: chr20:43029536-43029558

[0571] 表6B.

[0572]

1栏 示例性HNF4α破坏剂的示例性效应融合蛋白 名称	2栏 1栏中效应融合蛋白的氨基酸序列(SEQ ID NO:)	3栏 1栏中效应融合蛋白的核苷酸序列(SEQ ID NO:)	4栏 1栏中效应融合蛋白的DNA结合域的氨基酸序列(SEQ ID NO:)
dCas9-VPR	95	96	97
dCas9-P300	98	99	97
dCas9-VPR3	172	173	97

[0573] 实施例4.通过ZF-融合蛋白调节HNF4α表达

[0574] 为了测试编码位点特异性HNF4α破坏剂的单一mRNA,所述位点特异性HNF4α破坏剂包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分(例如锌指(ZF)),和包含例如VPR的效应物(ZF-VPR融合蛋白),而不是具有合并的sgRNA的dCas9效应物融合体,如上所述设计锌指DNA结合域(DBD)-VPR(ZF-VPR)融合蛋白。评估结合与实施例1和2中描述的P1靶向指导RNA相似或相同的位点的此类融合蛋白在体外影响HNF4α表达的能力。

[0575] 构建了编码包含ZF DBD和VPR结构域的融合蛋白的几种mRNA(参见表6A)。将单个和合并的融合蛋白编码mRNA作为如上所述的MC3 LNP制剂递送至LX-2细胞。如上所述通过qPCR测量HNF4α的表达。包括未处理的HepG2和dCas9-VPR-池1作为阳性对照。

[0576] 如图11所示,发现ZF005-VPR(也称为ZF5-VPR)展现出HNF4α的强烈上调。ZF007-VPR(也称为ZF7-VPR)也展现出可定量的上调。

[0577] 实施例5.通过TALE融合蛋白调节HNF4α表达

[0578] 在使用编码位点特异性HNF4α破坏剂的单一mRNA的进一步努力中,设计了包含靶向HNF4α表达控制区的位点特异性HNF4α靶向部分(例如基于DNA结合域(DBD)的Talen)和包含例如VPR的效应物(TAL-VPR融合蛋白)。评估结合与实施例1和2中描述的P1靶向指导RNA相似或相同的位点的此类融合蛋白在体外影响HNF4α表达的能力。

[0579] 构建了编码具有VPR结构域的TALEN DBD的融合蛋白的几种mRNA(参见表6A)。将单个和合并的融合蛋白编码mRNA作为如上所述的MC3 LNP制剂递送至LX-2细胞。如上所述通过qPCR测量HNF4α的表达。包括未处理的HepG2和dCas9-VPR-池1作为阳性对照。ZF5-VPR和ZF7-VPR也作为比较物包括在研究中。

[0580] 下表7显示了合并TAL-VPR实验的实验设计。

[0581] 表7

[0582]

TAL1-VPR	池 X	通过 1:1:1 混合每种 TAL 融合蛋白制备池。
TAL2-VPR		
TAL3-VPR		
TAL4-VPR	池 Y	
TAL5-VPR		
TAL6-VPR		
TAL7-VPR	池 Z	
TAL8-VPR		
不相关域-VPR		

[0583] 如图12所示，发现合并的基于VPR的TALE融合蛋白展现出HNF4α表达的强烈上调。单独地，每种TAL-VPR融合蛋白不具有上调HNF4α表达的显著活性(数据未显示)。该图还证实以上对于ZF5-VPR和Z7-VPR所述的结果是可再现的。

[0584] 实施例6.用密码子优化的ZF5-VPR调节HNF4α表达以及ZF5-VPR和ZF7-VPR的组合在LX-2细胞中的协同作用

[0585] 在本实施例中，评价了具有密码子优化的ZF5-VPR融合蛋白在LX-2细胞中激活HNF4α。目的是分析ZF5-VPR的密码子优化是否会提高ZF5-VPR融合蛋白在HNF4α启动子处的活性。另一个目的是分析ZF5-VPR和ZF7-VPR融合蛋白的组合是否在激活HNF4α表达中具有协同作用。

[0586] ZF5-VPR融合蛋白的序列被送至ATUM进行密码子优化，其是一种使用a1算法重新设计理想的密码子频率和情境以优化翻译效率的过程。ATUM返回了6个新的变体，它们都编码相同的蛋白质，各自具有不同的RNA序列。(见表6A)。

[0587] 将所有5种ATUM密码子优化的ZF5-VPR、未改变的ZF5-VPR和ZF7-VPR的mRNA作为MC3 LNP转染至LX-2细胞中。转染后48小时通过qPCR测量HNF4α的表达。

[0588] 如图13所示，相比于其他密码子优化变体，ZF-5-VPR ATUM密码子优化的变体3(ZF5.3-VPR)展现出更强的HNF4a表达上调。共转染ZF5-VPR和ZF7-VPR导致HNF4α表达的超生理(＞200％)增加，这证实了这两种融合蛋白的组合的协同作用。(图13中，池1是dCas9-VPR+GD-28431+GD-28432+GD-28433;池2是dCas9-VPR+GD-28434+GD-28435+GD-28436)。

[0589] 实施例7.K562细胞中HNF4α表达的调节的持久性

[0590] 本实施例鉴定了能够诱导HNF4α表达的最长持续上调的效应物(VPR和/或P300)。本实施例还测量了当用各种ZF效应物融合蛋白和ZF效应物融合蛋白的各种组合处理时，K562中HNF4α的上调可持续多长时间。

[0591] 编码ZF效应物融合蛋白的各种单个mRNA和mRNA的组合被转染至K562细胞中并允许其在培养中生长10天。

[0592] 在用MC3 LNP转染的K562细胞中测试以下单个融合蛋白和组合:ZF5-VPR、ZF5-P300、ZF5-VPR和ZF5-P300的组合、或ZF5-VPR和ZF7-VPR的组合(参见表6A)。

[0593] 如上所述进行转染和定量。简言之，包括未处理的K562细胞作为试验对照。用单个的和不同的效应物组合(2.5μg/mL)处理K562细胞，重复三次。在10天内收集数据点。qPCR读数被用于测量mRNA表达。以100k/孔接种K562细胞，重复三次:每2天收集时间点，共10天。包括未处理的K562的三个孔作为对照。进行HNF4α的RT qPCR以测量类似处理的LX-2细胞在每

个时间点的HNF4α表达。

[0594] 如图14和15所示，当任何单个融合蛋白或融合蛋白的组合被转染时，在K562细胞中观察到HNF4α表达上调直到第6天。用编码ZF5-VPR和ZF7-VPR的mRNA共转染导致培养细胞中HNF4α表达的最高且最持久的增加，可检测到表达至10天。

[0595] 在另一个实验中，测定了当用ZF-5-VPR、ZF-5-P300、ZF5-VPR-ATUM 3和ZF7-VPR的组合(也称为ZF(5.3+7)或ZF5-PR和ZF7-VPR的组合(也称为ZF-(5+7)-VPR)处理时K562中HNF4α表达上调的持久性。

[0596] 用单个的和效应物的不同组合(2.5μg/mL)处理K562细胞，重复三次。在10天内收集时间点。qPCR读数用于测量mRNA表达。以100k/孔接种K562细胞，重复三次：每2天收集时间点，共10天。包括未处理的K562的三个孔作为对照。在每个时间点进行RTqPCR以测量HNF4α的表达。在MC3 LNP中配制融合蛋白。

[0597] 如图16所示，使用ZF5-VPR和ZF7-VPR以及ZF5.3-VPR和ZF7-VPR的组合在K562细胞中观察到HNF4α上调直到第6天。ZF5-VPR和ZF7-VPR以及ZF5.3-VPR和ZF7-VPR的组合在第8天和第10天均展现出轻微上调。

[0598] 实施例8.LX-2细胞中HNF4α激活后生物标志物基因表达的调节

[0599] 本实施例的第一个实验证实了LX-2细胞中HNF4α激活后下游生物标志物基因的表达水平的变化。本实验的目的是通过检测上调HNF4α表达对两个下游基因Cola1和aSMA表达的影响来证实在LX-2细胞中由dCas9-VPR诱导的HNF4α是活性转录因子。胶原1a1(Col1a1)和α-平滑肌肌动蛋白(aSMA)是在受损肝细胞中高度表达的两种蛋白，并且是晚期肝病中纤维化的关键驱动因子。这两种基因均被HNF4α负调节。

[0600] 用如上所述的dCas-VPR-池1转染高度表达Col1a1和aSMA的LX-2细胞，然后通过qPCR测量HNF4A、Col1a1和aSMA。

[0601] 如图17所示，HNF4α的上调显著下调Col1a1和aSMA的表达。

[0602] 本实施例的第二个实验证实了ZF-VPR融合蛋白也下调Col1a1和aSMA，纤维化肝病的生物标志物的表达。

[0603] 如图18所示，在用ZF5.3-VPR、ZF5-VPR和ZF7-VPR的组合或ZF5.3-VPR和ZF7-VPR的组合上调HNF4α后，LX-2细胞中纤维化肝病的生物标志物(即Cola1和aSMA)被下调。

[0604] 实施例9.其他ZF-VPR融合蛋白及其组合的筛选和dCas9-VPR3的评估

[0605] 本实施例证实除实施例4中测试的9种ZF-VPR蛋白外，其它ZF-VPR融合蛋白及其各种组合可上调LX-2细胞中HNF4α的表达。

[0606] 在第一个实验中，在LX-2细胞中筛选融合蛋白。包括未处理的HepG2细胞作为试验对照。将LX-2细胞用单一浓度的效应物(2.5μg/mL)处理(重复三次)并孵育48小时。ZF-5-VPR用作qPCR读数的阳性对照。如上所述使用MC3-LNP制剂转染LX-2细胞。编码以下ZF-VPR融合蛋白和各种组合的mRNA被转移：ZF5-VPR、ZF5-VPR-ATUM3(ZF5.3-VPR)、ZF-7-VPR、ZF-11-VPR、ZF-13-VPR和ZF-15-VPR或其组合。

[0607] 如图19所示，当ZF5-VPR或ZF5.3-VPR与ZF7-VPR组合时，观察到更强的上调。单独的ZF7-VPR将LX-2细胞中的HNF4α上调至低水平。

[0608] 在第二个实验中，使用dCas9-VPR3-池1或ZF-VPR融合蛋白组合评估HNF4α的激活。目的是评价各种ZF-VPR融合蛋白组合在LX-2细胞中的作用，并测试新效应物dCas9-VPR3对

LX-2细胞的作用。VPR3是融合至一行中的3个连续VPR结构域的dCas9 DNA结合域，表达为单一蛋白质。测试了轻微上调LX-2细胞中HNF4α的表达的ZF5.3-VPR和其它ZF-VPR的组合的可能的协同作用。用MC3LNP制剂中的单一浓度的效应物(2.5μg/mL)处理LX-2细胞48小时，重复三次。使用ZF-5-VPR作为阳性对照qPCR读数。测试了以下组合：ZF5.3-VPR和ZF10-VPR、ZF5.3-VPR和ZF14-VPR、以及ZF5.3-VPR和ZF15-VPR。

[0609] 如图20中所示，dCas9-VPR3池1上调LX-2细胞中的HNF4α。当单独转染时，ZF14-VPR和ZF 15-VPR引起HNF4α的低上调。当ZF14-VPR或ZF15-VPR与ZF5.3-VPR组合时，观察到强烈的协同上调(类似于用ZF5.3-VPR+ZF7-VPR观察到的协同上调)。

[0610] 实施例10.FRG-KO小鼠肝脏人源化肝细胞(Yecuris人肝细胞)中的HNF4α激活

[0611] Yecuris人肝细胞是被外植到免疫功能受损小鼠中的原代人肝细胞，允许其增殖，然后收获用于体外组织培养。获得作为细胞悬浮液的Yecuris肝细胞并以40K细胞/孔以96-孔形式铺板。用2.5μg/ml和1.25μg/ml两种浓度的ZF融合蛋白-MC3 LNP处理细胞24小时。处理后48小时测量HNF4α基因表达。使用ZF7.4-VPR代替ZF7-VPR。

[0612] 用编码ZF5-VPR、ZF5.3-VPR、ZF7.4-VPR、ZF5.3-VPR3(融合至一行中的3个连续VPR结构域的ZF5.3蛋白，其表达为单一蛋白)、ZF7.4-VPR3和单独的ZF5(没有与ZF5融合的VPR)的mRNA转染Yecuris细胞。

[0613] 如图21所示，与ZF5.3-VPR相比，ZF5.3-VPR3不增加HNF4α基因表达。与ZF7.4-VPR相比，用ZF7-VPR3观察到HNF4α基因表达的增加。与LX-2细胞相比，ZF7-VPR构建体上调HNF4α至更高水平。

[0614] 实施例11.用双顺反子ZF5.3-VPR和ZF7-VPR激活LX-2细胞

[0615] 本实施例评估了ZF5.3-VPR(ZF5-VPRATUM变体3)和ZF7-VPR双顺反子构建体在单独组合时是否将LX-2细胞中的HNF4α上调至与ZF5.3-VPR和ZF7-VPR相同的水平。

[0616] 包括未处理的Hep G 2细胞作为试验对照。用单一浓度的编码融合蛋白的mRNA(2.5μg/mL)处理LX-2细胞，重复三次。ZF5.3-VPR和ZF7-VPR的组合用作阳性对照。qPCR读数被用于测量mRNA表达。

[0617] 测试了以下双顺反子mRNA构建体：ZF5.3-VPR-tPT2A-ZF7-VPR、ZF7-VPR-tPT2A-ZF5.3-VPR、ZF5.3-VPR-tPT2A-ZF7-p300和ZF7-p300-tPT2A-ZF5.3-VPR(见表6A)。tPT2A是将第一融合蛋白共价连接至第二融合蛋白以产生双顺反子融合蛋白的接头。

[0618] 如图22所示，双顺反子mRNA ZF5.3-VPR-tPT2A-ZF7-VPR在LX-2细胞中诱导比所测试的其他三种双顺反子mRNA更强的HNF4α上调。

[0619] 实施例12.用VPR和p300重复给药Yecuris肝细胞对HNF4α基因表达的影响

[0620] 本实施例描述了向细胞递送多剂量的编码ZF效应物融合蛋白的mRNA的影响。目的是评价通过多次给药是否可以实现HNF4α的加和或协同上调。

[0621] 将Yecuris肝细胞以64K细胞/孔铺板。通过MC3 LNP制剂以1.25μg/ml的最终浓度用ZF5.3-VPR和ZF7-VPR或ZF7-p300的组合处理细胞。MC3 LNP制剂中的双顺反子mRNA ZF5.3-VPR-tPT2A-ZF7-VPR、ZF7-VPR-tPT2A-ZF5.3-VPR、ZF5.3-VPR-tPT2A-ZF7-p300、ZF7-p300-tPT2A-ZF5.3-VPR以1.25μg/ml的最终浓度用于处理细胞。

[0622] 在最后一次给药后48小时测量HNF4α的表达水平。本实验中遵循的给药和收获时间表提供于下表8中。

[0623] 表8.

[0624]

	剂量	收获
第 0 天	剂量 1	
第 1 天	媒介变化	
第 2 天		收获
第 3 天	剂量 2	
第 4 天	媒介变化	
第 5 天		收获
第 6 天	剂量 3	
第 7 天	媒介变化	
第 8 天		收获

[0625] 如图23所示，用含有编码ZF效应物融合蛋白的mRNA的MC3LNP制剂重复给药细胞导致HNF4α表达的累加的增加。ZF5.3-VPR和ZF7-VPR的组合在激活能力上强于ZF7-p300。此外，如图24所示，双顺反子构建体增加了Yecuris肝细胞中的HNF4α，其中ZF7-p300-tPT2A-ZF5.3-VPR提供了最强的上调。

[0626] 实施例13：双顺反子mRNA的K562细胞中HNF4α的激活--10天持久性研究

[0627] 本实施例描述了双顺反子构建体在K562细胞中的持久性。如上所述用单一浓度的MC3 LNP中的编码融合蛋白的mRNA(2.5μg/mL)处理K562细胞，重复三次。

[0628] 测试了编码以下构建体的双顺反子mRNA：ZF5.3-VPR-tPT2A-ZF7-VPR、ZF7-VPR-tPT2A-ZF5.3-VPR、ZF5.3-VPR-tPT2A-ZF7-p300、ZF7-p300-tPT2A-ZF5.3-VPR。

[0629] 如图25所示，与其它双顺反子构建体相比，ZF7-p300-tPT2A-ZF5(v3)-VPR在K562中在附后几天展现出更好的持久性。

[0630] 下表 9 提供了适用于本发明的示例性靶核苷酸序列和相应的 sgRNA 核苷酸序列。

表 9.

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					CCCTCACCCCCACCCCCTCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCCTCACCCC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029193	-1	CACCCCCTCC		CGG	AGTCGGTGCTTTTT	
					TCCGGGAGGGGGTGGGGGTGGTTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TCCGGGAGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029203	1	GGTGGGGGTG		AGG	AGTCGGTGCTTTTT	
					CCGGGAGGGGGTGGGGGTGAGTTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCGGGAGGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029204	1	GTGGGGGTGA		GGG	AGTCGGTGCTTTTT	
					GGGGTGGGGGTGAGGGAAACGTTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGGGTGGGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029211	1	TGAGGGAAAC		AGG	AGTCGGTGCTTTTT	

[0631]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		AGGGAAACAG			AGGGAAACAGGAGAATGTGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029223	1	GAGAATGTGA		TGG	AGTCGGTGCTTTT	
		GGGAAACAGG			GGGAAACAGGAGAATGTGATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029224	1	AGAATGTGAT		GGG	AGTCGGTGCTTTT	
		TGTGATGGGA			TGTGATGGGAAAATCCGAGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029238	1	AAATCCGAGA		TGG	AGTCGGTGCTTTT	
					GGCCCAGGCTGGCTCCATCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGCCCAGGCT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029241	-1	GGCTCCATCT		CGG	AGTCGGTGCTTTT	
					AATCCGAGATGGAGCCAGCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AATCCGAGAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029249	1	GGAGCCAGCC		TGG	AGTCGGTGCTTTT	
43029250	1	ATCCGAGATG		GGG	ATCCGAGATGGAGCCAGCCTGTTTTAGAG	

[0632]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GAGCCAGCCT			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		CCAGTGTTTC			CCAGTGTTTCTGGCCCAGGCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029252	-1	TGGCCCAGGC		TGG	AGTCGGTGCTTTT	
		GCTCCCAGTG			GCTCCCAGTGTTTCTGGCCCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029256	-1	TTTCTGGCCC		AGG	AGTCGGTGCTTTT	
		CCCACAGCTC			CCCACAGCTCCCAGTGTTTCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029262	-1	CCAGTGTTTC		TGG	AGTCGGTGCTTTT	
		CCAGCCTGGG			CCAGCCTGGGCCAGAAACACGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029263	1	CCAGAAACAC		TGG	AGTCGGTGCTTTT	
		CAGCCTGGGC			CAGCCTGGGCCAGAAACACTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029264	1	CAGAAACACT		GGG		

[0633]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		GCCAGAAACA			GCCAGAAACACTGGGAGCTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029272	1	CTGGGAGCTG		TGG	AGTCGGTGCTTTT	
		CCAGAAACAC			CCAGAAACACTGGGAGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029273	1	TGGGAGCTGT		GGG	AGTCGGTGCTTTT	
		ACACTGGGAG			ACACTGGGAGCTGTGGGAGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029279	1	CTGTGGGAGA		CGG	AGTCGGTGCTTTT	
		GGGAGCTGTG			GGGAGCTGTGGGAGACGGAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029284	1	GGAGACGGAG		AGG	AGTCGGTGCTTTT	
		GGAGCTGTGG			GGAGCTGTGGGAGACGGAGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029285	1	GAGACGGAGA		GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0634]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		GAGCTGTGGG			GAGCTGTGGGAGACGGAGAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029286	1	AGACGGAGAG		GGG	AGTCGGTGCTTTT	
		TGTGGGAGAC			TGTGGGAGACGGAGAGGGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029290	1	GGAGAGGGGC		AGG	AGTCGGTGCTTTT	
		GTGGGAGACG			GTGGGAGACGGAGAGGGGCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029291	1	GAGAGGGGCA		GGG	AGTCGGTGCTTTT	
		GGAGACGGAG			GGAGACGGAGAGGGGCAGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029294	1	AGGGGCAGGG		TGG	AGTCGGTGCTTTT	
		GAGACGGAGA			GAGACGGAGAGGGGCAGGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029295	1	GGGGCAGGGT		GGG	AGTCGGTGCTTTT	

[0635]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GAGGGGCAGG			GAGGGGCAGGGTGGGATCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029303	1	GTGGGATCAC		AGG	AGTCGGTGCTTTT	
		AGGGGCAGGG			AGGGGCAGGGTGGGATCACAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029304	1	TGGGATCACA		GGG	AGTCGGTGCTTTT	
					AGGGTGGGATCACAGGGAGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AGGGTGGGAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029310	1	CACAGGGAGC		AGG	AGTCGGTGCTTTT	
					GGGATCACAGGGAGCAGGAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGGATCACAG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029315	1	GGAGCAGGAG		CGG	AGTCGGTGCTTTT	
					GGATCACAGGGAGCAGGAGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGATCACAGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029316	1	GAGCAGGAGC		GGG	AGTCGGTGCTTTT	
43029317	1	GATCACAGGG		GGG	GATCACAGGGAGCAGGAGCGGTTTTAGAG	

[0636]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		AGCAGGAGCG			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		AGGGAGCAGG			AGGGAGCAGGAGCGGGGAATGTTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029323	1	AGCGGGGAAT		TGG	AGTCGGTGCTTTT	
		GAGCAGGAGC			GAGCAGGAGCGGGGAATTGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029326	1	GGGGAATTGG		AGG	AGTCGGTGCTTTT	
		CGGGGAATTG			CGGGGAATTGGAGGTGAATCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029335	1	GAGGTGAATC		TGG	AGTCGGTGCTTTT	
		AATGGACTGG			AATGGACTGGAAGTTTGGGAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029347	-1	AAGTTTGGGA		GGG	AGTCGGTGCTTTT	
		GAATGGACTG			GAATGGACTGGAAGTTTGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029348	-1	GAAGTTTGGG		AGG		

[0637]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		GCAGAATGGA			GCAGAATGGACTGGAAGTTTGTTTTAGAG	
		CTGGAAGTTT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029351	-1			GGG	AGTCGGTGCTTTT	
		AGCAGAATGG			AGCAGAATGGACTGGAAGTTGTTTTAGAG	
		ACTGGAAGTT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029352	-1			TGG	AGTCGGTGCTTTT	
		CCCCTGGGAG			CCCCTGGGAGCAGAATGGACGTTTTAGAG	
		CAGAATGGAC			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029360	-1			TGG	AGTCGGTGCTTTT	
		CGGTTCCCCT			CGGTTCCCCTGGGAGCAGAAGTTTTAGAG	
		GGGAGCAGAA			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029365	-1			TGG	AGTCGGTGCTTTT	
		TTCCAGTCCA			TTCCAGTCCATTCTGCTCCCGTTTTAGAG	
		TTCTGCTCCC			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029369	1			AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0638]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		TCCAGTCCAT			TCCAGTCCATTCTGCTCCCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029370	1	TCTGCTCCCA		GGG	AGTCGGTGCTTTT	
					CCAGTCCATTCTGCTCCCAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCAGTCCATT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029371	1	CTGCTCCCAG		GGG	AGTCGGTGCTTTT	
					CGCAGTTTCCCGGTTCCCCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CGCAGTTTCC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029375	-1	CGGTTCCCCT		GGG	AGTCGGTGCTTTT	
					CCGCAGTTTCCCGGTTCCCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCGCAGTTTC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029376	-1	CCGGTTCCCC		TGG	AGTCGGTGCTTTT	
					CATTCTGCTCCCAGGGGAACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CATTCTGCTC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029377	1	CCAGGGGAAC		CGG	AGTCGGTGCTTTT	

[0639]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		ATTCTGCTCC			ATTCTGCTCCCAGGGGAACCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029378	1	CAGGGGAACC		GGG	AGTCGGTGCTTTT	
		CCAGTTCCCC			CCAGTTCCCCCGCAGTTTCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029385	-1	CGCAGTTTCC		CGG	AGTCGGTGCTTTT	
		CCAGGGGAAC			CCAGGGGAACCGGGAAACTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029387	1	CGGGAAACTG		CGG	AGTCGGTGCTTTT	
		CCAGGGGAAC			CAGGGGAACCGGGAAACTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029388	1	GGGAAACTGC		GGG	AGTCGGTGCTTTT	
		AGGGGAACCG			AGGGGAACCGGGAAACTGCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029389	1	GGAAACTGCG		GGG	AGTCGGTGCTTTT	
43029390	1	GGGGAACCGG		GGG	GGGGAACCGGGAAACTGCGGGGTTTTAGAG	

[0640]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GAAACTGCGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
					CCGGGAAACTGCGGGGGAACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCGGGAAACT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029396	1	GCGGGGGAAC		TGG	AGTCGGTGCTTTT	
					GAAACTGCGGGGGAACTGGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GAAACTGCGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029400	1	GGGAACTGGA		AGG	AGTCGGTGCTTTT	
					AAACTGCGGGGGAACTGGAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AAACTGCGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029401	1	GGAACTGGAA		GGG	AGTCGGTGCTTTT	
					GGAAGGGAGCTCCCAGAACAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGAAGGGAGC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029417	1	TCCCAGAACA		AGG	AGTCGGTGCTTTT	
		ATCTTCTGGA			ATCTTCTGGATCCTTGTTCTGTTTTAGAG	
43029417	-1	TCCTTGTTCT		GGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	

[0641]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		AATCTTCTGG			AATCTTCTGGATCCTTGTTCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029418	-1	ATCCTTGTTC		TGG	AGTCGGTGCTTTT	
					AGAACAAGGATCCAGAAGATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AGAACAAGGA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029431	1	TCCAGAAGAT		TGG	AGTCGGTGCTTTT	
					GGCCCCAGATGCCAATCTTCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGCCCCAGAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029431	-1	GCCAATCTTC		TGG	AGTCGGTGCTTTT	
					GGATCCAGAAGATTGGCATCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGATCCAGAA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029438	1	GATTGGCATC		TGG	AGTCGGTGCTTTT	
					GATCCAGAAGATTGGCATCTGTTTTAGAG	
		GATCCAGAAG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029439	1	ATTGGCATCT		GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0642]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		ATCCAGAAGA			ATCCAGAAGATTGGCATCTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029440	1	TTGGCATCTG		GGG	AGTCGGTGCTTTT	
		GAAGATTGGC			GAAGATTGGCATCTGGGGCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029445	1	ATCTGGGGCC		TGG	AGTCGGTGCTTTT	
		AAGATTGGCA			AAGATTGGCATCTGGGGCCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029446	1	TCTGGGGCCT		GGG	AGTCGGTGCTTTT	
		GATTTAGAAA			GATTTAGAAACCTAAATCCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029452	-1	CCTAAATCCC		AGG	AGTCGGTGCTTTT	
		GCATCTGGGG			GCATCTGGGGCCTGGGATTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029453	1	CCTGGGATTT		AGG	AGTCGGTGCTTTT	

[0643]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GGATTTAGGT			GGATTTAGGTTTCTAAATCGGTTTTAGAG	
		TTCTAAATCG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029467	1			TGG	AGTCGGTGCTTTT	
		GATTTAGGTT			GATTTAGGTTTCTAAATCGTGTTTTAGAG	
		TCTAAATCGT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029468	1			GGG	AGTCGGTGCTTTT	
		GGTTTCTAAA			GGTTTCTAAATCGTGGGCCAGTTTTAGAG	
		TCGTGGGCCA			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029474	1			TGG	AGTCGGTGCTTTT	
		GTTTCTAAAT			GTTTCTAAATCGTGGGCCATGTTTTAGAG	
		CGTGGGCCAT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029475	1			GGG	AGTCGGTGCTTTT	
		TTTCTAAATC			TTTCTAAATCGTGGGCCATGGTTTTAGAG	
		GTGGGCCATG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029476	1			GGG	AGTCGGTGCTTTT	
43029480	-1	GCAGAGATAA		TGG	GCAGAGATAAGGCTGCCCCAGTTTTAGAG	

[0644]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GGCTGCCCCA			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		TCAATGCTTT			TCAATGCTTTTTGCAGAGATAGTTTTTAGAG	
		TGCAGAGATA			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029491	-1			AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		TTATCTCTGC			TTATCTCTGCAAAAGCATTGGTTTTTAGAG	
		AAAAGCATTG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029504	1			AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		TATCTCTGCA			TATCTCTGCAAAAGCATTGAGTTTTTAGAG	
		AAAGCATTGA			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029505	1			GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		GAGGGTAGAA			GAGGGTAGAAGTCAATGATTGTTTTTAGAG	
		GTCAATGATT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029523	1			TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		AGGGTAGAAG			AGGGTAGAAGTCAATGATTTGTTTTTAGAG	
		TCAATGATTT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029524	1			GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	

[0645]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		ATTTGGGAAG			ATTTGGGAAGTTATTGAATTGTTTTAGAG	
		TTATTGAATT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029540	1			AGG	AGTCGGTGCTTTT	
		TTTGGGAAGT			TTTGGGAAGTTATTGAATTAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029541	1	TATTGAATTA		GGG	AGTCGGTGCTTTT	
					TTGGGAAGTTATTGAATTAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TTGGGAAGTT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029542	1	ATTGAATTAG		GGG	AGTCGGTGCTTTT	
					GTTATTGAATTAGGGGATCTGTTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTTATTGAAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029549	1	TAGGGGATCT		CGG	AGTCGGTGCTTTT	
					ATTGAATTAGGGGATCTCGGGTTTTAGAG	
		ATTGAATTAG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029552	1	GGGATCTCGG		AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0646]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		AATTAGGGGA			AATTAGGGGATCTCGGAGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029556	1	TCTCGGAGGT		AGG	AGTCGGTGCTTTT	
					GCATTCTAACTGATACTATCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GCATTCTAAC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029577	-1	TGATACTATC		AGG	AGTCGGTGCTTTT	
					ATCAGTTAGAATGCCTGACTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		ATCAGTTAGA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029597	1	ATGCCTGACT		TGG	AGTCGGTGCTTTT	
					TCAGTTAGAATGCCTGACTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TCAGTTAGAA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029598	1	TGCCTGACTT		GGG	AGTCGGTGCTTTT	
					CAGTTAGAATGCCTGACTTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CAGTTAGAAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029599	1	GCCTGACTTG		GGG	AGTCGGTGCTTTT	

[0647]

基因组参考联盟人构建37(GRCh37)中靶起始位点的基因组坐标：染色体20	链	靶序列	SEQ ID NO	PAM	sgRNA序列 [请告知，无“Us”]	SEQ ID NO
		AGCCATTGTC			AGCCATTGTCACCCCAAGTCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029599	-1	ACCCCAAGTC		AGG	AGTCGGTGCTTTT	
		TGCCTGACTT			TGCCTGACTTGGGGTGACAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029608	1	GGGGTGACAA		TGG	AGTCGGTGCTTTT	
		GACTTGGGGT			GACTTGGGGTGACAATGGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029613	1	GACAATGGCT		TGG	AGTCGGTGCTTTT	
		TTGGGGTGAC			TTGGGGTGACAATGGCTTGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029616	1	AATGGCTTGG		AGG	AGTCGGTGCTTTT	
		TGGGGTGACA			TGGGGTGACAATGGCTTGGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029617	1	ATGGCTTGGA		GGG	AGTCGGTGCTTTT	
43029618	1	GGGGTGACAA		GGG	GGGGTGACAATGGCTTGGAGGTTTTAGAG	

[0648]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		TGGCTTGGAG			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		GTGACAATGG			GTGACAATGGCTTGGAGGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029621	1	CTTGGAGGGG		TGG	AGTCGGTGCTTTT	
		TGACAATGGC			TGACAATGGCTTGGAGGGGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029622	1	TTGGAGGGGT		GGG	AGTCGGTGCTTTT	
		TTGGAGGGGT			TTGGAGGGGTGGGTGAGTCAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029632	1	GGGTGAGTCA		AGG	AGTCGGTGCTTTT	
		TGGAGGGGTG			TGGAGGGGTGGGTGAGTCAAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029633	1	GGTGAGTCAA		GGG	AGTCGGTGCTTTT	
		AGGCAGGCAT			AGGCAGGCATCATGACTCACGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029656	-1	CATGACTCAC		GGG		

[0649]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		AAGGCAGGCA			AAGGCAGGCATCATGACTCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029657	-1	TCATGACTCA		CGG	AGTCGGTGCTTTT	
		AGTTATCAAT			AGTTATCAATTGTACAAGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029672	-1	TGTACAAGGC		AGG	AGTCGGTGCTTTT	
		GTTCAGTTAT			GTTCAGTTATCAATTGTACAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029676	-1	CAATTGTACA		AGG	AGTCGGTGCTTTT	
		TACAATTGAT			TACAATTGATAACTGAACATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029692	1	AACTGAACAT		CGG	AGTCGGTGCTTTT	
		TAACTGAACA			TAACTGAACATCGGTGAGTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029701	1	TCGGTGAGTT		AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0650]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		AACTGAACAT			AACTGAACATCGGTGAGTTAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029702	1	CGGTGAGTTA		GGG	AGTCGGTGCTTTT	
					GGTGCTAATTACAACTGCTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGTGCTAATT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029714	-1	ACAACTGCTG		GGG	AGTCGGTGCTTTT	
					GGGTGCTAATTACAACTGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGGTGCTAAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029715	-1	TACAACTGCT		GGG	AGTCGGTGCTTTT	
					GGGGTGCTAATTACAACTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGGGTGCTAA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029716	-1	TTACAACTGC		TGG	AGTCGGTGCTTTT	
					AGCAGTTGTAATTAGCACCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AGCAGTTGTA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029729	1	ATTAGCACCC		CGG	AGTCGGTGCTTTT	

[0651]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GCAGTTGTAA			GCAGTTGTAATTAGCACCCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029730	1	TTAGCACCCC		GGG	AGTCGGTGCTTTT	
		TGGTTTCTGG			TGGTTTCTGGCTGACACCCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029735	-1	CTGACACCCG		GGG	AGTCGGTGCTTTT	
					TTGGTTTCTGGCTGACACCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TTGGTTTCTG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029736	-1	GCTGACACCC		GGG	AGTCGGTGCTTTT	
					GTTGGTTTCTGGCTGACACCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTTGGTTTCT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029737	-1	GGCTGACACC		CGG	AGTCGGTGCTTTT	
					TTTGGCTGTTTGTTGGTTTCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TTTGGCTGTT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029748	-1	TGTTGGTTTC		TGG	AGTCGGTGCTTTT	
43029755	-1	GCAGGGATTT		TGG	GCAGGGATTTGGCTGTTTGTGTTTTAGAG	

[0652]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GGCTGTTTGT			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		TGGGCGGGGC			TGGGCGGGGCTGCAGGGATTGTTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029766	-1	TGCAGGGATT		TGG	AGTCGGTGCTTTT	
		ATAGGCTGGG			ATAGGCTGGGCGGGGCTGCAGTTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029772	-1	CGGGGCTGCA		GGG	AGTCGGTGCTTTT	
		GATAGGCTGG			GATAGGCTGGGCGGGGCTGCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029773	-1	GCGGGGCTGC		AGG	AGTCGGTGCTTTT	
		GCCGGTGGAT			GCCGGTGGATAGGCTGGGCGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029780	-1	AGGCTGGGCG		GGG	AGTCGGTGCTTTT	
		CGCCGGTGGA			CGCCGGTGGATAGGCTGGGCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029781	-1	TAGGCTGGGC		GGG		

[0653]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		CCGCCGGTGG			CCGCCGGTGGATAGGCTGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029782	-1	ATAGGCTGGG		CGG	AGTCGGTGCTTTT	
		CCCCCGCCGG			CCCCCGCCGGTGGATAGGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029785	-1	TGGATAGGCT		GGG	AGTCGGTGCTTTT	
		TCCCCCGCCG			TCCCCCGCCGGTGGATAGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029786	-1	GTGGATAGGC		TGG	AGTCGGTGCTTTT	
		GCCCCGCCCA			GCCCCGCCCAGCCTATCCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029790	1	GCCTATCCAC		CGG	AGTCGGTGCTTTT	
		TCGGTCCCCC			TCGGTCCCCCGCCGGTGGATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029790	-1	GCCGGTGGAT		AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0654]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		CCGCCCAGCC			CCGCCCAGCCTATCCACCGGGTTTTAGAG	
43029793	1	TATCCACCGG		CGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		CGCCCAGCCT			CGCCCAGCCTATCCACCGGCGTTTTAGAG	
43029794	1	ATCCACCGGC		GGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		GCCCAGCCTA			GCCCAGCCTATCCACCGGCGGTTTTAGAG	
43029795	1	TCCACCGGCG		GGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		GTTAATCGGT			GTTAATCGGTCCCCCGCCGGGTTTTAGAG	
43029795	-1	CCCCCGCCGG		TGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		CCCAGCCTAT			CCCAGCCTATCCACCGGCGGGTTTTAGAG	
43029796	1	CCACCGGCGG		GGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	

[0655]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					ATGGTTAATCGGTCCCCCGCGTTTTAGAG	
		ATGGTTAATC			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029798	-1	GGTCCCCCGC		CGG	AGTCGGTGCTTTT	
					GGTGGGGGTTAATGGTTAATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGTGGGGGTT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029809	-1	AATGGTTAAT		CGG	AGTCGGTGCTTTT	
					CGGGGAGGGGTGGGGGTTAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CGGGGAGGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029817	-1	TGGGGGTTAA		TGG	AGTCGGTGCTTTT	
					GCTCTGCCGGGGAGGGGTGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GCTCTGCCGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029824	-1	GGAGGGGTGG		GGG	AGTCGGTGCTTTT	
					GGCTCTGCCGGGGAGGGGTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGCTCTGCCG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029825	-1	GGGAGGGGTG		GGG	AGTCGGTGCTTTT	
43029826	-1	AGGCTCTGCC		GGG	AGGCTCTGCCGGGGAGGGGTGTTTTAGAG	

[0656]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GGGGAGGGGT			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029827	-1	GAGGCTCTGC CGGGGAGGGG		TGG	GAGGCTCTGCCGGGGAGGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029829	1	CATTAACCCC CACCCCTCCC		CGG	CATTAACCCCCACCCCTCCCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029830	-1	GTGGAGGCTC TGCCGGGGAG		GGG	GTGGAGGCTCTGCCGGGGAGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029831	-1	GGTGGAGGCT CTGCCGGGGA		GGG	GGTGGAGGCTCTGCCGGGGAGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029832	-1	GGGTGGAGGC TCTGCCGGGG		AGG	GGGTGGAGGCTCTGCCGGGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	

[0657]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		AAGGGGTGGA			AAGGGGTGGAGGCTCTGCCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029835	-1	GGCTCTGCCG		GGG	AGTCGGTGCTTTT	
					GAAGGGGTGGAGGCTCTGCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GAAGGGGTGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029836	-1	AGGCTCTGCC		GGG	AGTCGGTGCTTTT	
					TGAAGGGGTGGAGGCTCTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TGAAGGGGTG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029837	-1	GAGGCTCTGC		CGG	AGTCGGTGCTTTT	
					TAGCCTCTGTGAAGGGGTGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TAGCCTCTGT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029846	-1	GAAGGGGTGG		AGG	AGTCGGTGCTTTT	
					GCCTAGCCTCTGTGAAGGGGGTTTTAGAG	
		GCCTAGCCTC			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029849	-1	TGTGAAGGGG		TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0658]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		TTGGCCTAGC			TTGGCCTAGCCTCTGTGAAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029852	-1	CTCTGTGAAG		GGG	AGTCGGTGCTTTT	
					CTTGGCCTAGCCTCTGTGAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CTTGGCCTAG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029853	-1	CCTCTGTGAA		GGG	AGTCGGTGCTTTT	
					GAGCCTCCACCCCTTCACAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GAGCCTCCAC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029854	1	CCCTTCACAG		AGG	AGTCGGTGCTTTT	
					TCTTGGCCTAGCCTCTGTGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TCTTGGCCTA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029854	-1	GCCTCTGTGA		AGG	AGTCGGTGCTTTT	
					TCCACCCCTTCACAGAGGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TCCACCCCTT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029859	1	CACAGAGGCT		AGG	AGTCGGTGCTTTT	

[0659]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					GGAAGATCTGCTGGGAGTCTGTTTTAGAG	
		GGAAGATCTG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029871	-1	CTGGGAGTCT		TGG	AGTCGGTGCTTTT	
					GTCCTCTGGGAAGATCTGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTCCTCTGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029879	-1	AAGATCTGCT		GGG	AGTCGGTGCTTTT	
					CGTCCTCTGGGAAGATCTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CGTCCTCTGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029880	-1	GAAGATCTGC		TGG	AGTCGGTGCTTTT	
					CTCCCAGCAGATCTTCCCAGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CTCCCAGCAG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029888	1	ATCTTCCCAG		AGG	AGTCGGTGCTTTT	
					CAGCAGATCTTCCCAGAGGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CAGCAGATCT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029892	1	TCCCAGAGGA		CGG	AGTCGGTGCTTTT	
43029892	-1	TTCCTTTCAA		GGG	TTCCTTTCAAACCGTCCTCTGTTTTAGAG	

[0660]

基因组参考联盟人构建37(GRCh37)中靶起始位点的基因组坐标:染色体20	链	靶序列	SEQ ID NO	PAM	sgRNA序列 [请告知，无“Us”]	SEQ ID NO
		ACCGTCCTCT			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029893	-1	CTTCCTTTCA AACCGTCCTC		TGG	CTTCCTTTCAAACCGTCCTCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029901	1	TTCCCAGAGG ACGGTTTGAA		AGG	TTCCCAGAGGACGGTTTGAAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029905	1	CAGAGGACGG TTTGAAAGGA		AGG	CAGAGGACGGTTTGAAAGGAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029913	1	GGTTTGAAAG GAAGGCAGAG		AGG	GGTTTGAAAGGAAGGCAGAGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43029914	1	GTTTGAAAGG AAGGCAGAGA		GGG	GTTTGAAAGGAAGGCAGAGAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	

[0661]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTTT	
		AAGGAAGGCA			AAGGAAGGCAGAGAGGGCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029920	1	GAGAGGGCAC		TGG	AGTCGGTGCTTTTT	
					AGGAAGGCAGAGAGGGCACTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AGGAAGGCAG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029921	1	AGAGGGCACT		GGG	AGTCGGTGCTTTTT	
					AAGGCAGAGAGGGCACTGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		AAGGCAGAGA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029924	1	GGGCACTGGG		AGG	AGTCGGTGCTTTTT	
					GCAGAGAGGGCACTGGGAGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GCAGAGAGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029927	1	CACTGGGAGG		AGG	AGTCGGTGCTTTTT	
					AGGGCACTGGGAGGGAGGCAGGTTTTAGAG	
		AGGGCACTGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029933	1	GAGGAGGCAG		TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0662]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		GGGCACTGGG			GGGCACTGGGAGGAGGCAGTGTTTTAGAG	
43029934	1	AGGAGGCAGT		GGG	CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
					CACTGGGAGGAGGCAGTGGGGTTTTAGAG	
		CACTGGGAGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029937	1	AGGCAGTGGG		AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
					ACTGGGAGGAGGCAGTGGGAGTTTTAGAG	
		ACTGGGAGGA			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029938	1	GGCAGTGGGA		GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
					GGGAGGAGGCAGTGGGAGGGGTTTTAGAG	
		GGGAGGAGGC			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029941	1	AGTGGGAGGG		CGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
					AGGAGGCAGTGGGAGGGCGGGTTTTAGAG	
		AGGAGGCAGT			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029944	1	GGGAGGGCGG		AGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	

[0663]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		GGAGGCAGTG			GGAGGCAGTGGGAGGGCGGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029945	1	GGAGGGCGGA		GGG	AGTCGGTGCTTTT	
		GGCAGTGGGA			GGCAGTGGGAGGGCGGAGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029948	1	GGGCGGAGGG		CGG	AGTCGGTGCTTTT	
		GCAGTGGGAG			GCAGTGGGAGGGCGGAGGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029949	1	GGCGGAGGGC		GGG	AGTCGGTGCTTTT	
		CAGTGGGAGG			CAGTGGGAGGGCGGAGGGCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029950	1	GCGGAGGGCG		GGG	AGTCGGTGCTTTT	
		AGTGGGAGGG			AGTGGGAGGGCGGAGGGCGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029951	1	CGGAGGGCGG		GGG	AGTCGGTGCTTTT	
43029958	1	GGGCGGAGGG		CGG	GGGCGGAGGGCGGGGGGCCTTGTTTTAGAG	

[0664]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		CGGGGGCCTT			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		GGCGGAGGGC			GGCGGAGGGCGGGGGCCTTCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029959	1	GGGGGCCTTC		GGG	AGTCGGTGCTTTT	
		GCGGAGGGCG			GCGGAGGGCGGGGGCCTTCGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029960	1	GGGGCCTTCG		GGG	AGTCGGTGCTTTT	
		GAGGGCGGGG			GAGGGCGGGGGCCTTCGGGGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029963	1	GCCTTCGGGG		TGG	AGTCGGTGCTTTT	
		ACCCTGGGCG			ACCCTGGGCGCCCACCCCGAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029963	-1	CCCACCCCGA		AGG	AGTCGGTGCTTTT	
		AGGGCGGGGG			AGGGCGGGGGCCTTCGGGGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029964	1	CCTTCGGGGT		GGG		

[0665]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTTT	
		GGCCTTCGGGG			GGCCTTCGGGGTGGGCGCCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029972	1	GTGGGCGCCC		AGG	AGTCGGTGCTTTTT	
		GCCTTCGGGG			GCCTTCGGGGTGGGCGCCCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029973	1	TGGGCGCCCA		GGG	AGTCGGTGCTTTTT	
		TCGGGGTGGG			TCGGGGTGGGCGCCCCAGGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029977	1	CGCCCAGGGT		AGG	AGTCGGTGCTTTTT	
		CGGGGTGGGC			CGGGGTGGGCGCCCCAGGGTAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029978	1	GCCCAGGGTA		GGG	AGTCGGTGCTTTTT	
		GCGGCCACCT			GCGGCCACCTGCCCTACCCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43029978	-1	GCCCTACCCT		GGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0666]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		CGCGGCCACC			CGCGGCCACCCTGCCCTACCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029979	-1	TGCCCTACCC		TGG	AGTCGGTGCTTTT	
					GTGGGCGCCCAGGGTAGGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTGGGCGCCC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029982	1	AGGGTAGGGC		AGG	AGTCGGTGCTTTT	
					GGCGCCCAGGGTAGGGCAGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGCGCCCAGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029985	1	GTAGGGCAGG		TGG	AGTCGGTGCTTTT	
					CAGGGTAGGGCAGGGTGGCCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CAGGGTAGGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029991	1	CAGGTGGCCG		CGG	AGTCGGTGCTTTT	
					TAGGGCAGGTGGCCGCGGCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TAGGGCAGGT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029996	1	GGCCGCGGCG		TGG	AGTCGGTGCTTTT	

[0667]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		TTCTCCCTGC			TTCTCCCTGCCTCCACGCCGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029997	-1	CTCCACGCCG		CGG	AGTCGGTGCTTTT	
		GGCAGGTGGC			GGCAGGTGGCCGCGGCGTGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43029999	1	CGCGGCGTGG		AGG	AGTCGGTGCTTTT	
					GGTGGCCGCGGCGTGGAGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GGTGGCCGCG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030003	1	GCGTGGAGGC		AGG	AGTCGGTGCTTTT	
					GTGGCCGCGGCGTGGAGGCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTGGCCGCGG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030004	1	CGTGGAGGCA		GGG	AGTCGGTGCTTTT	
					GTCCATGTCGACGAGGGTTTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTCCATGTCG			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030029	-1	ACGAGGGTTT		TGG	AGTCGGTGCTTTT	
43030035	-1	GGCCATGTCC		GGG	GGCCATGTCCATGTCGACGAGTTTTAGAG	

[0668]

基因组参考联盟人构建37(GRCh37)中靶起始位点的基因组坐标：染色体20	链	靶序列	SEQ ID NO	PAM	sgRNA序列 [请告知，无“Us”]	SEQ ID NO
		ATGTCGACGA			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		CGGCCATGTC			CGGCCATGTCCATGTCGACGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030036	-1	CATGTCGACG		AGG		
		CTCCAAAACC			CTCCAAAACCCTCGTCGACAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030038	1	CTCGTCGACA		TGG		
		AACCCTCGTC			AACCCTCGTCGACATGGACAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030044	1	GACATGGACA		TGG		
		GTCCAGTGCA			GTCCAGTGCAGCACTGTAGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030056	-1	GCACTGTAGT		CGG		
		GGCCGACTAC			GGCCGACTACAGTGCTGCACGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43030065	1	AGTGCTGCAC		TGG		

[0669]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		ATTCCAGGGT			ATTCCAGGGTGGTGTAGGCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030078	-1	GGTGTAGGCT		GGG	AGTCGGTGCTTTT	
		AATTCCAGGG			AATTCCAGGGTGGTGTAGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030079	-1	TGGTGTAGGC		TGG	AGTCGGTGCTTTT	
		CTCAAATTCC			CTCAAATTCCAGGGTGGTGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030083	-1	AGGGTGGTGT		AGG	AGTCGGTGCTTTT	
		GGACCCAGCC			GGACCCAGCCTACACCACCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030086	1	TACACCACCC		TGG	AGTCGGTGCTTTT	
		CACATTCTCA			CACATTCTCAAATTCCAGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43030089	-1	AATTCCAGGG		TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0670]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		CTGCACATTC			CTGCACATTCTCAAATTCCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030092	-1	TCAAATTCCA		GGG	AGTCGGTGCTTTT	
		CCTGCACATT			CCTGCACATTCTCAAATTCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030093	-1	CTCAAATTCC		AGG	AGTCGGTGCTTTT	
		CCTGGAATTT			CCTGGAATTTGAGAATGTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030104	1	GAGAATGTGC		AGG	AGTCGGTGCTTTT	
		GAATGTGCAG			GAATGTGCAGGTGTTGACGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030116	1	GTGTTGACGA		TGG	AGTCGGTGCTTTT	
		AATGTGCAGG			AATGTGCAGGTGTTGACGATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030117	1	TGTTGACGAT		GGG	AGTCGGTGCTTTT	

[0671]

基因组参考联盟人构建37(GRCh37)中靶起始位点的基因组坐标：染色体20	链	靶序列	SEQ ID NO	PAM	sgRNA序列 [请告知，无“Us”]	SEQ ID NO
		CAGGTGTTGA			CAGGTGTTGACGATGGGCAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030123	1	CGATGGGCAA		TGG	AGTCGGTGCTTTT	
		TGTTGACGAT			TGTTGACGATGGGCAATGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030127	1	GGGCAATGGT		AGG	AGTCGGTGCTTTT	
		TGACGATGGG			TGACGATGGGCAATGGTAGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030130	1	CAATGGTAGG		TGG	AGTCGGTGCTTTT	
		GACGATGGGC			GACGATGGGCAATGGTAGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030131	1	AATGGTAGGT		GGG	AGTCGGTGCTTTT	
		ACGATGGGCA			ACGATGGGCAATGGTAGGTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030132	1	ATGGTAGGTG		GGG	AGTCGGTGCTTTT	
43030133	1	CGATGGGCAA		GGG	CGATGGGCAATGGTAGGTGGGTTTTAGAG	

[0672]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		TGGTAGGTGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
		AGGTGGGGGC			AGGTGGGGGCAGATGTGCCCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030147	1	AGATGTGCCC		AGG	AGTCGGTGCTTTT	
		CTGCCCCCAC			CTGCCCCCCACTGGCACACCTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030153	-1	TGGCACACCT		GGG	AGTCGGTGCTTTT	
		CCTGCCCCCA			CCTGCCCCCCACTGGCACACCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030154	-1	CTGGCACACC		TGG	AGTCGGTGCTTTT	
		GATGTGCCCA			GATGTGCCCAGGTGTGCCAGGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030158	1	GGTGTGCCAG		TGG	AGTCGGTGCTTTT	
		ATGTGCCCAG			ATGTGCCCAGGTGTGCCAGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43030159	1	GTGTGCCAGT		GGG		

[0673]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		TGTGCCCAGG			TGTGCCCAGGTGTTGCCAGTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030160	1	TGTGCCAGTG		GGG	AGTCGGTGCTTTT	
					GTGCCCAGGTGTTGCCAGTGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		GTGCCCAGGT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030161	1	GTGCCAGTGG		GGG	AGTCGGTGCTTTT	
					CCAGGCACACCTGCCCCCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCAGGCACAC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030163	-1	CTGCCCCCAC		TGG	AGTCGGTGCTTTT	
					CCAGGTGTGCCAGTGGGGGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CCAGGTGTGC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030165	1	CAGTGGGGGC		AGG	AGTCGGTGCTTTT	
					CCAGTGGGGGCAGGTGTGCCGTTTTAGAG	
		CCAGTGGGGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43030174	1	CAGGTGTGCC		TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0674]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		CAGTGGGGGC			CAGTGGGGGCAGGTGTGCCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030175	1	AGGTGTGCCT		GGG	AGTCGGTGCTTTT	
		GGGCAGGTGT			GGGCAGGTGTGCCTGGGTCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030181	1	GCCTGGGTCC		AGG	AGTCGGTGCTTTT	
		AAAGATCTGC			AAAGATCTGCTCCTGGACCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030181	-1	TCCTGGACCC		AGG	AGTCGGTGCTTTT	
		GAGTGCCAAA			GAGTGCCAAAGATCTGCTCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030188	-1	GATCTGCTCC		TGG	AGTCGGTGCTTTT	
		TGGGTCCAGG			TGGGTCCAGGAGCAGATCTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030194	1	AGCAGATCTT		TGG	AGTCGGTGCTTTT	

[0675]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		AGATCTTTGG			AGATCTTTGGCACTCAACTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030207	1	CACTCAACTT		TGG	AGTCGGTGCTTTT	
		GATCTTTGGC			GATCTTTGGCACTCAACTTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030208	1	ACTCAACTTT		GGG	AGTCGGTGCTTTT	
		ATCTTTGGCA			ATCTTTGGCACTCAACTTGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030209	1	CTCAACTTTG		GGG	AGTCGGTGCTTTT	
		TTGGCACTC			TTTGGCACTCAACTTTGGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030212	1	AACTTTGGGG		TGG	AGTCGGTGCTTTT	
		TTGGCACTCA			TTGGCACTCAACTTTGGGGTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030213	1	ACTTTGGGGT		GGG	AGTCGGTGCTTTT	
43030216	1	GCACTCAACT		AGG	GCACTCAACTTTGGGGTGGGGTTTTAGAG	

[0676]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		TTGGGGTGGG			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030233	1	GGGAGGAGAA TGATACAAAA		TGG	GGGAGGAGAAATGATACAAAAGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030237	1	GGAGAATGAT ACAAAATGGT		AGG	GGAGAATGATACAAAATGGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030241	1	AATGATACAA AATGGTAGGT		TGG	AATGATACAAAAATGGTAGGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030250	1	AAATGGTAGG TTGGTCCTAC		AGG	AAATGGTAGGTTGGTCCTACGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTT	
43030254	-1	CAACACCTGT GCTGGCCTGT		AGG	CAACACCTGTGCTGGCCTGTGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG	

[0677]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
					AGTCGGTGCTTTT	
		TTGGTCCTAC			TTGGTCCTACAGGCCAGCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030260	1	AGGCCAGCAC		AGG	AGTCGGTGCTTTT	
		TCACTTGGCA			TCACTTGGCAACACCTGTGCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030262	-1	ACACCTGTGC		TGG	AGTCGGTGCTTTT	
					CTGGGCACATGGGCTTCACTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CTGGGCACAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030277	-1	GGGCTTCACT		TGG	AGTCGGTGCTTTT	
					ATCACTGTGCCTGGGCACATGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		ATCACTGTGC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030287	-1	CTGGGCACAT		GGG	AGTCGGTGCTTTT	
					GATCACTGTGCCTGGGCACAGTTTTAGAG	
		GATCACTGTG			CTAGAAATAGCAAGTTAAAATAAGGCTAG	
43030288	-1	CCTGGGCACA		TGG	TCCGTTATCAACTTGAAAAAGTGGCACCG	

[0678]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
					AGTCGGTGCTTTT	
		CAAGTGAAGC			CAAGTGAAGCCCATGTGCCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030289	1	CCATGTGCCC		AGG	AGTCGGTGCTTTT	
					TGCCTGTGATCACTGTGCCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TGCCTGTGAT			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030295	-1	CACTGTGCCT		GGG	AGTCGGTGCTTTT	
					ATGCCTGTGATCACTGTGCCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		ATGCCTGTGA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030296	-1	TCACTGTGCC		TGG	AGTCGGTGCTTTT	
					TGCCCAGGCACAGTGATCACGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		TGCCCAGGCA			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030304	1	CAGTGATCAC		AGG	AGTCGGTGCTTTT	
					CACAGTGATCACAGGCATTCGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
		CACAGTGATC			TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030312	1	ACAGGCATTC		TGG	AGTCGGTGCTTTT	

[0679]

基因组参考联盟人构建 37(GRCh37)中靶起始位点的基因组坐标：染色体 20	链	靶序列	SEQ ID NO	PAM	sgRNA 序列 [请告知，无“Us”]	SEQ ID NO
		ACAGTGATCA			ACAGTGATCACAGGCATTCTGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030313	1	CAGGCATTCT		GGG	AGTCGGTGCTTTT	
		ATCACAGGCA			ATCACAGGCATTCTGGGTGAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030319	1	TTCTGGGTGA		AGG	AGTCGGTGCTTTT	
		TCACAGGCAT			TCACAGGCATTCTGGGTGAAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030320	1	TCTGGGTGAA		GGG	AGTCGGTGCTTTT	
		CAGGCATTCT			CAGGCATTCTGGGTGAAGGGGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030323	1	GGGTGAAGGG		AGG	AGTCGGTGCTTTT	
		TGGGTGAAGG			TGGGTGAAGGGAGGCCTGCAGTTTTAGAG	
					CTAGAAATAGCAAGTTAAAATAAGGCTAG	
					TCCGTTATCAACTTGAAAAAGTGGCACCG	
43030332	1	GAGGCCTGCA		AGG	AGTCGGTGCTTTT	
43030333	1	GGGTGAAGGG		GGG	GGGTGAAGGGAGGCCTGCAAGTTTTAGAG	

[0680]

基因组参考联盟人构建37(GRCh37)中靶起始位点的基因组坐标:染色体20	链	靶序列	SEQ ID NO	PAM	sgRNA序列 [请告知，无“Us”]	SEQ ID NO
		AGGCCTGCAA			CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTTT	
43030335	-1	TGCTGGAAAT TGGCCCTTGC		AGG	TGCTGGAAATTGGCCCTTGCGTTTTAGAG CTAGAAATAGCAAGTTAAAATAAGGCTAG TCCGTTATCAACTTGAAAAAGTGGCACCG AGTCGGTGCTTTTT	

[0681]

下表 10 提供了 HNF4α 表达控制基因组区域的示例性靶核苷酸序列和相应的锌指 DNA 结合域氨基酸序列，以及适用于本发明的包含锌指多肽和效应物的破坏剂融合蛋白的氨基酸结构。

通过表 10 中的示例性靶核苷酸序列靶向的 HNF4α 表达控制区的正向链包含以下核苷酸序列：

CTCCGGGAGGGGGTGGGGGTGAGGGAAACAGGAGAATGTGATGGGAAAATCCGAGATGGAGCCAGCCTGGGCCAGAAACACTGG

GAGCTGTGGGAGACGGAGAGGGCAGGGTGGGATCACAGGGAGCAGGAGCGGGGAATTGGAGGTGAATCTGGCCCTCCCAAACT

TCCAGTCCATTCTGCTCCCAGGGGAACCGGGAAACTGCGGGGGGAACTGGAAGGGAGCTCCCAGAACAAGGATCCAGAAGATTGG

CATCTGGGGCCTGGGATTTAGGTTTCTAAATCGTGGGCCATGGGGCAGCCTTATCTCTGCAAAAGCATTGAGGGTAGAAGTCAA

TGATTTGGGAAGTTTATTGAATTAGGGGATCTCGGAGGTAGGCTGTCAGTGCCTGATAGTATCAGTTAGAATGCCTGACTTGGGG

TGACAATGGCTTGGAGGGGTGGGTGAGTCAAGGGTCAAATGAGTGCCCGTGAGTCATGATGCCTGCCTTGTACAATTGATAACT

GAACATCGGTGAGTTAGGGCCCCAGCAGTTGTAATTAGCACCCCGGGTGTCAGCCAGAAACCAACAAACACAGCCAAATCCCTGCA

GCCCCGCCCAGCCTATCCACCGGCGGGGACCGATTAACCATTAACCCCCACCCCTCCCGGCAGAGCCTCCACCCCTTCACAG

AGGCTAGGCCAAGACTCCCAGCAGATCTTCCCAGAGGACGGTTTGAAAGGAAGGCAGAGAGGGCACTGGGAGGAGGCAGTGGGA

GGGCGGAGGGCGGGGGCCTTCGGGGTGGCGCCCAGGGTAGGGCAGGTGGCCGCGGCGTGGAGGCAGGGAGAATGCGACTCTCC

AAAACCCTCGTCGACATGGACATGGCCGACTACAGTGCTGCACTGGACCCAGCCTACACCACCCTGGAATTTGAGAATGTGCAG

GTGTTGACGATGGGCAATGGTAGGTGGGGGCAGATGTGTGCCCAGGTGTGCCAGTGGGGGCAGGTGTGCCTGGGTCCAGGAGCAGA

TCTTTGGCACTCAACTTTGGGTGGGAGGAGAATGATACAAAATGGTAGGTTGGTCCTACAGGCCAGCACAGGTGTTGCCAAGT

GAAGCCCATGTGCCCAGGCACAGTGATCACAGGCATTCTGGGTGAAGGGAGGCCTGCAAGGGCCAATTTCCAGCAAAAGTCGAT

通过表 10 中的示例性靶核苷酸序列靶向的 HNF4α 表达控制区的反向链包含以下序列：

[0682]

ATCGACTTTTGCTGGAAATTGGCCCTTGCAGGCCTCCCTTCACCCAGAATGCCTGTGATCACTGTGCCTGGGCACATGGGCTTC

ACTTGGCAACACACCTGTGCTGGCCTGTAGGACCAACCTACCATTTTGTATCATTCTCCTCCCACACCCCAAAGTTGAGTGCCAAAGA

TCTGCTCCTGGACCCCAGGCACACCTGCCCCCCACTGGCACACATCTCTGCCCCCACCTACCATTGCCCATCGTCAACAC

CTGCACATTCTCAAATTCCAGGGTGGTGTAGGCTGGGTCCAGTGCAGCACTGTAGTCGGCCATGTCCATGTCGACGAGGGTTTT

GGAGAGTCGCATTCTCCCTGCCTCCACGCCGCGGCCACCTGCCCTACCCTGGGCGCCCACACCCCGAAGGCCCCCCGCCTCCGCCC

TCCCACTGCCTCCTCCCAGTGCCCTCTCTGCCTTCCTTTCAAACCGTCCTCTGGGAAGATCTGCTGGGAGTCTTGGCCTAGCCT

CTGTGAAGGGGTGGAGGCTCTGCCGGGGAGGGGTGGGGGTTAATGGTTAATCGGTCCCCCGCCGGTGGATAGGCTGGGCGGGGC

TGCAGGGATTTGGCTGTTTGTTTCTGGCTGACACCCGGGGTGCTAATTACAACTGCTGGGGCCCTAACTCACCGATGTTC

AGTTATCAATTGTACAAGGCAGGCATCATGACTCACGGGCACTCATTTGACCCTTGACTCACCCACCCCTCCAAGCCATTGTCA

CCCCAAGTCAGGCATTCTAACTGATACTATCAGGCACTGACAGCCTACCTCCGAGATCCCCTAATTCAATAACTTCCCAAATCA

TTGACTTCTACCCTCAATGCTTTTGCAGAGATAAGGCTGCCCCATGGCCCACGATTTAGAAACCTAAATCCCAGGCCCCAGATG

CCAATCTTCTGGATCCTTGTTCTGGGAGCTCCCTTCCAGTTCCCCCGCAGTTTCCCCTGGGAGCAGAATGGACTGGA

AGTTTGGGAGGGCCAGATTCACCTCCAATTCCCCGCTCCTGTGCTCCCTGTGATCCCACCCTGCCCCTCTCCGTCTCCCACAGCTC

CCAGTGTTTCTGGCCCAGGCTGGCTCCATCTCGGATTTTCCCATCACATTCTCCTGTTTCCCTCACCCCCACCCCTCCCGGAG

在一些实施方案中，接头具有氨基酸序列 THPRAPIPKPFQ。在另一些实施方案中，接头具有氨基酸序列 TPNPHRRTDPSHKPFQ。

[0683]

表 10.

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X$	
			CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}C$	
	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
	TGG		FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
	CAG		DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agatggagc	CCT		KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
cagcctggg	ggg		AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
cca	CCA		S		$X_{29}X_{30}$	
cagcctggg	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ccagaaaca	CCT		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	

[0684]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ctg	ggg		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_1$	
	GAA		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X$	
	CTG		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAG		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_{19}$	
	CCT		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
agccagcct	ggg		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X_1$	
gggccagaa	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aca	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}X$	

[0685]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACA		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
			DNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
	AGC		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	CCT		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tggagccag	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
cctgggcca	CCA		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaa	GAA		EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	

[0686]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			SHLREHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			NSLTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRADNLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X$	
			CGKSFSERSHLREHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
	AGA		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
	AGC		AHLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccgagatgg	CAG		KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
agccagcct	CCT		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	

[0687]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSERSHLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	CCG		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGA		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
	TGG		DTLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aatccgaga	AGC		KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
tggagccag	CAG		VHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cct	CCT		S			
aggagaatg	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgatgggaa	AGA		FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	

[0688]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
aat	ATG		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAA		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}X$	
	AAT		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}$	
			FSRRDELNVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVH$X_{17}X_1$	
			AHLRAHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGG		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X_{19}$	
	AGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aacaggaga	ATG		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}X_1$	
atgtgatgg	TGA		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gaa	TGG		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X$	

[0689]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAA		CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
			FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRNDTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X$	
	AAT		CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tgatgggaa	CCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}$	
aatccgaga	AGA		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgg	TGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	

[0690]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			SHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SHLREHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
	AAT		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCG		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
	AGA		GNLTVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaaaatccg	TGG		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
agatggagc	AGC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	

[0691]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
			KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X$	
			CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
	GAA		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AAT		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
	CCG		SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgggaaaat	AGA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
ccgagatgg	TGG		THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agc	AGC		S			
cctgggcca	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gaaacactg	ggg		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	

[0692]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gga	CCA		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	
	GGA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAA		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}$	
	ACA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccagaaaca	CTG		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_1$	
ctgggagct	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtg	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X$	

[0693]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
			FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
	CCA		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
	ACA		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggccagaa	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
acactggga	GGA		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gct	GCT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	

[0694]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			HSLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQAGHLASHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELNVHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQLAHLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	GGA		FSDSGNLRVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAC		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	
	AGG		AHLERHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gagggaaac	AGA		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
aggagaatg	ATG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tga	TGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	

[0695]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLASHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_1$	
			KCPECGKSFSRRDELN		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X$	
			CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
	AAC		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
	AGA		GNLRVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggaaacagg	ATG		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_1$	
agaatgtga	TGA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgg	TGG		S			
atgtgatgg	ATG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gaaaatccg	TGA		FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	

[0696]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aga	TGG		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}X_1$	
	AAT		KCPECGKSFSTTGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCG		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}X$	
	AGA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRRDELN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ATG		FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}X_{19}$	
	TGA		EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
agaatgtga	TGG		GNLTVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}X_1$	
tgggaaaat	GAA		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccg	AAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X$	

[0697]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
			FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
			DELNVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_1$	
	ACA		KCPECGKSFSTSGELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
	GGA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gaaacactg	GCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
ggagctgtg	GTG		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gga	GGA		EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	

[0698]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			ADLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	GGA		FSDPGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAC		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{1}$	
	GGA		AHLERHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtgggagac	GAG		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
ggagagggg	ggg		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	

[0699]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
			CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}$	
	CTG		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
	GCT		DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
acactggga	GTG		KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
gctgtggga	GGA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gac	GAC		S		$X_{29}X_{30}$	
gctgtggga	GCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gacggagag	GTG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	

[0700]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggg	GGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAC		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$X	
	GGG		CGKSFSDPGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGA		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$	
	GCT		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgggagct	GTG		GNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}X_1$	
gtgggagac	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	GAC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$X	

[0701]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSRSDELVRHQR THTGEKPYKCPECGKS FSTSGELVRHQRTHTG EKPYKCPECGKSFSQR AHLERHQRTHTGEKPY KCPECGKSFSRNDALT EHQRTHTGEKPTGKKT S		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSRSDNLVRHQRTHTG EKPYKCPECGKSFSQR AHLERHQRTHTGEKPY KCPECGKSFSDPGNLV RHQRTHTGEKPYKCPE CGKSFSQRAHLERHQR THTGEKPYKCPECGKS FSRSDELVRHQRTHTG EKPYKCPECGKSFSTS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$ $_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$ $_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
ggagctgtg ggagacgga gag	GGA GCT GTG GGA GAC GGA GAG					

[0702]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDSGNLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	GGT		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	GGA		GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggggtgag	AAC		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
ggaaacagg	AGG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aga	AGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0703]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGA		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
	ggg		AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gacggagag	CAG		KCPECGKSFSDPGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
gggcagggt	GGT		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggg	GGG		S			
ggtgaggga	GGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aacaggaga	GAG		FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{19}$	

[0704]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
atg	GGA		EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAC		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGA		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	
	ATG		CGKSFSDSGNLRVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAC		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_{19}$	
	GGA		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggagacgga	GAG		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
gaggggcag	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggt	CAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0705]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGT		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDSGNLRVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
	GGT		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
	GGT		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggggtggg	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
ggtgaggga	GGA		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aac	AAC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0706]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLRVHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQRAHLE		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	GGG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
	GAG		DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggtgggggt	GGA		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
gagggaaac	AAC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agg	AGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	

[0707]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
			LEPGEKPYKCPECGKS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			FSQRAHLERHQRTHTG		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
			EKPYKCPECGKSFSRS		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			DNLVRHQRTHTGEKPY		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
			KCPECGKSFSTSGHLV		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			RHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			CGKSFSRSDKLVRHQR		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGA		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
	GGG		FSTSGHLVRHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
	GGG		DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggaggggt	GGT		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
ggggtgag	GAG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gga	GGA		S			
ccgggaggg	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_{19}$	
ggtgggggt	GGA		FSRSDNLVRHQRTHTG			

[0708]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gag	GGG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	GAG		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAG		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_{19}$	
	GGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cgggagggg	GTG		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
gtgggggtg	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
agg	gtg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0709]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AGG		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
	GGG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gaggggggtg	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
ggggtgagg	AGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaa	GAA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	

[0710]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	GTG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
	gtg		DELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggggtgggg	AGG		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
gtgagggaa	GAA		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aca	ACA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0711]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
			KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
	GGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	gtg		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
	AGG		DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtgggggtg	GAA		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
agggaaaca	ACA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gga	GGA		S		$X_{29}X_{30}$	
ggggtgagg	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gaaacagga	gtg		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_{19}$	

[0712]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gaa	AGG		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	
	GAA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGA		FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}X_{19}$	
	ggg		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggtgaggg	AAA		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
aaacaggag	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aat	gag		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X$	

[0713]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAT		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		ANLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	TGA		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggtgggggg	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}$	
tgagggaaa	AAA		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cag	CAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0714]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTVHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
	ggg		FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
	CAG		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgagggaaa	gag		KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
caggagaat	AAT		SHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtg	GTG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{1}$	

[0715]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSQRANLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGG		FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
	ggg		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgggggtga	AAA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
gggaaacag	CAG		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gag	GAG		S			
gggaggggg	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgggggtga	AGG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	

[0716]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggg	GGG		EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		GHLASHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X$	
	GGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_1$	
			RHQRTHTGEKPTGKKT S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
					$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGG		FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRANLRAH$X_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aggggtgg	GGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X_1$	
gggtgaggg	TGA		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aaa	ggg		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X$	

[0717]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAA		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AAA		FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{19}$	
	CAG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gag		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_1$	
	AAT		KCPECGKSFSTTGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gtg		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
	ATG		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggaaacag			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
gagaatgtg			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
atg			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	

[0718]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			ANLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELNVHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDELV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
			CGKSFSTTGNLTVHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}$	
	CAG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gag		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	AAT		DNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaacaggag	gtg		KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
aatgtgatg	ATG		AHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gga	GGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	

[0719]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
			KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	gag		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AAT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
	gtg		DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
caggagaat	ATG		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
gtgatggga	GGA		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
aaa	AAA		S			
ggccagaaa	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cactgggag	CAG		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	

[0720]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ctg	AAA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAC		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gag		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X$	
	CTG		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$	
			FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	
			DNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGC		FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_{19}$	
	CAG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgggccag	AAA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
aaacactgg	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gag	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	

[0721]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	GAG		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	CAC		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
	gag		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aaacactgg	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
gagctgtgg	TGG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gag	GAG		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	

[0722]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{1}$	
			AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			ANLRAHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRADNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
	AGC		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{1}$	
	GGC		SHLREHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gccagcctg	CAG		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{1}$	
ggccagaaa	AAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cac	CAC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	

[0723]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSQRANLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X$	
			CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
	CTG		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
	CAG		DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agcctgggc	AAA		KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVREHX_{17}X_1$	
cagaaacac	CAC		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgg	TGG		S			
cagaaacac	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgggagctg	AAA		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	

[0724]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
tgg	CAC		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	gag		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X$	
	TGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	
			ANLRAHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	GAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGA		FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_{19}$	
	GCC		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gatggagcc	AGC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
agcctgggc	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cag	GGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	

[0725]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAG		CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGA		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggagccagc	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
ctgggccag	CAG		FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aaa	AAA		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	

[0726]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DTILRDHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$RTDTLRDHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
	gag		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{1}$	
	TGG		DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgggagctg	gag		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{1}$	
tgggagacg	ACG		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gag	GAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{1}$	

[0727]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRTDTLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			DHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	gag		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	CTG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	gag		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gagctgtgg	ACG		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
gagacggag	gag		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agg	AGG		S			
ctgtgggag	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
acggagagg	TGG		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	

[0728]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggc	gag		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
	gag		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X$	
	GGC		CGKSFSRTDTLRDHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RTDTLRDHX$_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	gag		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ACG		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}$	
	gag		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gagacggag	AGG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
agggcagg	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtg	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	

[0729]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			DTLRDHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
	gag		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	gag		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tgggagacg	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
gagaggggc	GGC		FSRTDTLRDHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_1$	

[0730]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DNLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRTDTLRDHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	TGG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gag		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	CTG		DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cactgggag	TGG		KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
ctgtgggag	gag		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acg	ACG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	

[0731]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
	gag		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
	GGC		DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
acggagagg	AGG		KCPECGKSFSRTDTLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
ggcagggtg	GTG		DHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gga	GGA		S		$X_{29}X_{30}$	
cgagatgga	CGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gccagcctg	GAT		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	

[0732]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggc	GGA		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	AGC		KCPECGKSFSERSHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X$	
	GGC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	GCC		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcctgggcc	AGA		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_1$	
agaaacact	AAC		KCPECGKSFSDSGNLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	ACT		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X$	

[0733]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		GNLRVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X$	
	GCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccagcctgg	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
gccagaaac	AAC		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
act	ACT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	

[0734]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSTHLDLI		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X$	
			CGKSFSDSGNLRVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}$	
	GCC		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGA		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{1}$	
	AAC		RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgggccaga	ACT		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
aacactggg	ggg		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agc	AGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{1}$	

[0735]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	gag		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
	CCA		FSDCRDLARHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
	TGG		HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gagccagcc	GCC		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
tgggccaga	AGA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
aac	AAC		S		$X_{29}X_{30}$	
atggagcca	ATG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcctgggcc	gag		FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_{19}$	

[0736]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aga	CCA		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X$	
	AGA		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRRDELN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	gag		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ATG		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_{19}$	
	gag		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gagatggag	CCA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
ccagcctgg	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X$	

[0737]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			DELNVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	AGA		CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggagacgg	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}$	
agaggggca	GCA		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	

[0738]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			AHLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGDLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	CGG		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
	GGG		DKLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agacggaga	GCA		KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
ggggcaggg	GGG		AHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	

[0739]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
	AGA		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGG		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
	GCA		AHLRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cggagaggg	GGG		KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
gcagggtgg	TGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gat	GAT		S			
agaggggca	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gggtgggat	GGG		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

[0740]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cac	GCA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		GNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAT		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$X	
	CAC		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAC		FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gatcacagg	gag		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
gagcaggag	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cgg	gag		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$X	

[0741]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
	CGG		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			KALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
	GCA		KCPECGKSFSTSGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X$	
	TGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggggcaggg	GAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
tgggatcac	CAC		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0742]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GDLRRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSSKKALTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
	TGG		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{1}$	
	CAC		DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gggtgggat	AGG		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
cacagggag	gag		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0743]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	GAT		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
	AGG		GNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgggatcac	gag		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
agggagcag	CAG		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gag	GAG		S			
gcagggtgg	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gatcacagg	GGG		FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	

[0744]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gag	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	
	GAG		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gag		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$	
	CAG		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
agggagcag	gag		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
gagcgggga	CGG		KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
att	GGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X$	

[0745]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ATT		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAC		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gag		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
	CAG		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cacagggag	gag		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
caggagcgg	CGG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gga	GGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	

[0746]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTNHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			NALQNHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQRAHLE		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
			CGKSFSRSDKLTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gag		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
	CAG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gag		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	CGG		DNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gagcaggag	GGA		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
cggggaatt	ATT		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gga	GGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	

[0747]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			AHLERHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
			KCPECGKSFSHKNALQ		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	gag		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHQRTHTG$	
	GGA		DNLVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHQRTHTG$	
caggagcgg	ATT		KCPECGKSFSRADNLT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggaattgga	GGA		EHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
ggt	GGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
gagcgggga	gag		LEPGEKPYKCPECGKS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
attggaggt	CGG		FSQSSNLVRHQRTHTG		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	

[0748]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gaa	GGA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ATT		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$X	
	GAA		CGKSFSHKNALQNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			DKLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ACA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}$X$_{18}$X$_{19}$	
	AGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
acagggagc	AGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
aggagcggg	AGC		KCPECGKSFSERSHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gaa	GGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}$X	

[0749]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	GAA		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSTTGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCG		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
	ggg		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcaggagcg	AAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
gggaattgg	TGG		FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	

[0750]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQAGHLASHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSTTGNLTVHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}$	
	GCG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
	AAT		DDLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggagcgggg	TGG		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{1}$	
aattggagg	AGG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tga	TGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	

[0751]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDDLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	GGA		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSQR		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGA		AHLERHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
cagggagca	GCG		KCPECGKSFSRADNLT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggagcgggg	ggg		EHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
aat	AAT		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggagcagga	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcggggaat	GCA		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	

[0752]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tgg	GGA		EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCG		GNLTVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$X	
	TGG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCT		FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}$X$_{18}$X$_{19}$	
	CCC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggccctccc	AAA		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
aaacttcca	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtc	CCA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}$X	

[0753]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	GTC		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		GALVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}X_1$	
	CCC		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X$	
	CTT		CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cctcccaaa	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}$	
cttccagtc	GTC		FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cat	CAT		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	

[0754]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			KHLAEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLRVHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
	AAA		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
	CGG		ANLRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gggaaactg	ggg		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
cgggggaac	AAC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0755]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDSGNLRVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	ggg		FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AAA		EKPYKCPECGKSFSRS		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_1$	
	CTG		DKLVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
	CGG		KCPECGKSFSDKKDLT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
	ggg		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
	AAC		S			
aaactgcgg	AAA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_{19}$	
gggaactgg	CTG		FSRKDNLKNHQRTHTG			

[0756]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aag	CGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	AAC		KCPECGKSFSDSGNLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X$	
	AAG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
			DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ACC		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	ggg		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggaaccggg	AAA		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X_1$	
aaactgcgg	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	CGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	

[0757]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			KDLTRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQRANLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACC		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X$	
	ggg		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agggaacc	AAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
gggaaactg	CTG		FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cgg	CGG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	

[0758]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列（参见上述表1B及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLKNHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSDSGNLRVHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}$	
	CGG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
	AAC		DKLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctgcgggggg	TGG		KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
aactggaag	AAG		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gga	GGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	

[0759]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_{19}$	
			FSTSGELVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1X_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
			EKPYKCPECGKSFSQR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			AHLERHQRTHTGEKPY			
			KCPECGKSFSRKDNLK			
			NHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_1$	
			CGKSFSRSDHLTTHQR			
	CGG		THTGEKPYKCPECGKS			
	ggg		FSDSGNLRVHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
	AAC		EKPYKCPECGKSFSRS			
	TGG		DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
cgggggaac	AAG		KCPECGKSFSRSDKLT			
tggaaggga	GGA		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gct	GCT		S			
cccaggggga	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}$	
accgggaaa	AGG		FSRNDALTEHQRTHTG			

[0760]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ctg	GGA		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACC		ANLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	CTG		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_{19}$	
	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gctcccagg	GGA		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
ggaaccggg	ACC		KCPECGKSFSDKKDLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aaa	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X$	

[0761]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AAC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAG		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X_1$	
gggaactgg	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aagggagct	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
ccc	CCC		CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	

[0762]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLRVHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGELV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	TGG		FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
	GGA		DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aactggaag	GCT		KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
ggagctccc	CCC		VHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aga	AGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	

[0763]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_{19}$	
			LEPGEKPYKCPECGKS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			FSSPADLTRHQRTHTG		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
			EKPYKCPECGKSFSQL		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHLRAHQRTHTGEKPY		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$	
			KCPECGKSFSSKKHLA		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			EHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}$	
			CGKSFSTSGELVRHQR		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
	AAG		FSQRAHLERHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
	GCT		DNLKNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tggaaaggga	CCC		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
gctcccaga	AGA		THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
aca	ACA		S		$X_{29}X_{30}$	
aagggagct	AAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cccagaaca	GGA		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_{19}$	

[0764]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	GCT		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_{18}X$	
	AGG		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}$	
			FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRH$X_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERH$X_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDDLVRH$X_{17}X_{18}X_{19}$	
	AAC		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
caggggaac	CGG		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRH$X_{17}X_{18}X_1$	
cgggaaact	GAA		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcg	ACT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_{18}X$	

[0765]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCG		CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
			FSDSGNLRVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DDLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_1$	
	AAC		KCPECGKSFSTHLDLI		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X$	
	GAA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggaaccgg	ACT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
gaaactgcg	GCG		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	

[0766]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLRVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDDLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X$	
			CGKSFSTHLDLIRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}$	
	CGG		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{1}$	
	ACT		DKLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaccgggaa	GCG		KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{1}$	
actgcgggg	GGG		VHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaa	GAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{1}$	

[0767]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSQSSNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	GGG		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
	CTG		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcgggggaa	GAA		KCPECGKSFSRSDDLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
ctggaaggg	ggg		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	
agc	AGC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
actgcgggg	ACT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gaactggaa	GCG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	

[0768]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggg	GGG		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	
	GGG		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			DDLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAA		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}$	
	ACT		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cgggaaact	GCG		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
gcgggggaa	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ctg	GAA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0769]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CTG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}$	
			FSTHLDLIRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_1$	
	ACT		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
	GGG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gaaactgcg	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
ggggaactg	CTG		FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaa	GAA		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	

[0770]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			NALQNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
	CTG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
	CCT		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
catctgggg	ggg		KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
cctgggatt	ATT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tag	TAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	

[0771]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}C$	
	GAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	TGG		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	
	CTG		DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gattggcat	ggg		KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
ctgggcct	CCT		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
ggg	GGG		S		$X_{29}X_{30}$	
tggcatctg	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gggcctggg	CAT		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{19}$	

[0772]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
att	CTG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X$	
	ATT		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AAC		FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X_{19}$	
	AAG		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cagaacaag	GAT		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
gatccagaa	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gat	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X$	

[0773]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAT		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$	
			FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			GNLRVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAA		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	GAT		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	
	CAT		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gaagattgg	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
catctgggg	ggg		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cct	CCT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	

[0774]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSSNLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
			CGKSFSTSHSLTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
	AAG		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAT		EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{1}$	
	CCA		DNLKNHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aacaaggat	GAA		KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
ccagaagat	GAT		VHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	

[0775]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	GAA		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAT		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
	TGG		SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccagaagat	CAT		KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
tggcatctg	CTG		EHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
ggg	GGG		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gatccagaa	GAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gattggcat	CCA		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	

[0776]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ctg	GAA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GAT		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$X	
	CTG		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$	
			FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	AAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAT		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}$X$_{18}$X$_{19}$	
	CCA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aaggatcca	GAA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
gaagattgg	GAT		KCPECGKSFSTSGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cat	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$X	

[0777]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAT		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGSLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTG		DNLHTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_1$	
	ggg		KCPECGKSFSHKNALQ		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X$	
	ggg		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ctggggcct	ATT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
gggatttag	TAG		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtt	GTT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	

[0778]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSHSLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	AAT		FSSRRTCRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CGT		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{1}$	
	ggg		GNLTVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctaaatcgt	CCA		KCPECGKSFSQNSTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
gggccatgg	TGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggc	GGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{1}$	

[0779]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
	CGT		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSSR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
	CCA		RTCRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aatcgtggg	TGG		KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_1$	
ccatggggc	GGC		VHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
agc	AGC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cgtgggcca	CGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggggcagc	ggg		FSTTGALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_{19}$	

[0780]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ctt	CCA		EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		SHLREHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_1$	
	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	
	CTT		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSRRTCR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAA		FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X_{19}$	
	AAG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgcaaaag	CAT		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
cattgaggg	TGA		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
tag	GGG		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}X$	

[0781]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	TAG		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
			FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		DNLHTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X_1$	
	AAG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	TGA		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
caaaagcat	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}$	
tgagggtag	TAG		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aag	AAG		EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	

[0782]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DNLKNHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			AHLRAHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGHLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	AGC		FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ATT		EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{1}$	
	GAG		SHLREHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaaagcatt	GGT		KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{1}$	
gagggtaga	AGA		AHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agt	AGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	

[0783]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQAGHLASHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSHRTTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X$	
			CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ATT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
	GAG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
	AGA		DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
attgagggt	AGT		KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
agaagtcaa	CAA		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tga	TGA		S			
agcattgag	AGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggtagaagt	ATT		FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{19}$	

[0784]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
caa	GAG		EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGT		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X$	
	CAA		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			NALQNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ATG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ATT		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
atgatttgg	GAA		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
gaagttatt	GTT		KCPECGKSFSTSGSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gaa	ATT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{18}X$	

[0785]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			NALQNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRRDELN		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TAG		GHLASHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_1$	
	GCT		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
	AGT		CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
taggctgtc	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
agtgcctga	TGA		FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tag	TAG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	

[0786]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GELVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSREDNLH		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQAGHLASHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			RDLARHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{1}$	
			KCPECGKSFSHRTTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X$	
			CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
	TAG		FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCT		EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
	GTC		DNLHTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggtaggct	AGT		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{1}$	
gtcagtgcc	GCC		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tga	TGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[0787]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HRTTLTNH$X_{17}X_{18}X_1$	
			KCPECGKSFSDPGALV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRH$X_{17}X_{18}X$	
			CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRH$X_{17}X_{18}$	
	AGG		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTH$X_{17}X_1$	
	GCT		DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cggaggtag	GTC		KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_1$	
gctgtcagt	AGT		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gcc	GCC		S		$X_{29}X_{30}$	
tagaatgcc	TAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgacttggg	AAT		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}X_{19}$	

[0788]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gtg	GCC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}X$	
	GTG		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			GNLTVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSEDNLH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCC		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_{19}$	
	TGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aatgcctga	CTT		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
cttgggtg	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aca	gtg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0789]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACA		CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
			FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
			RDLARHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGT		GALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_1$	
	TAG		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAT		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
	GCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agttagaat	TGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
gcctgactt	CTT		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	

[0790]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DNLHTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSHRTTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			ADLTRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDELV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
	TGA		FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTT		EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{1}$	
	GGG		GHLASHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcctgactt	gtg		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{1}$	
ggggtgaca	ACA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
atg	ATG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	

[0791]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGG		LEPGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
	gtg		FSRSDHLTNHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
	ATG		DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggggtgaca	GCT		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
atggcttgg	TGG		RHQRTHTGEKPYKCPE		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
agg	AGG		CGKSFSRRDELNVHQR		$X_{29}X_{30}$	
tgacttggg	TGA		THTGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gtgacaatg	CTT		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS			
			DELVRHQRTHTGEKPY			
			KCPECGKSFSRSDKLV			
			RHQRTHTGEKPTGKKT			
			S			

[0792]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gct	GGG		EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gtg		DELNVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	
	GCT		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			GALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
			SHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGG		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	
	gtg		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cttggggtg	ACA		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_1$	
acaatggct	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
tgg	GCT		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X$	

[0793]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	TGG		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
			FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTTGALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCT		GHLASHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GGT		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcttggaggg	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
ggtgggtga	TGA		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtc	GTC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	

[0794]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GALVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQAGHLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	AGG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
	GGG		DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tggaggggt	TGA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
gggtgagtc	GTC		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aag	AAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	

[0795]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			FSTSGHLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSRS		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			DHLTNHQRTHTGEKPY		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSRSDHLT		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			THQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSTSGELVRHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}$	
	gtg		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACA		FSRRDELNVHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_1$	
	ATG		EKPYKCPECGKSFSSP		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCT		ADLTRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
gtgacaatg	TGG		KCPECGKSFSRSDELV		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcttggagg	AGG		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
ggt	GGT		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
atggcttgg	ATG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_{19}$	
aggggtggg	GCT		FSQAGHLASHQRTHTG			

[0796]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tga	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	TGA		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			GELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRRDELN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ACA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ATG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	GCT		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
acaatggct	TGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
tggaggggt	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GGT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	

[0797]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
			FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	
			DELNVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_1$	
	TGA		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X$	
	AAG		CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggtgagtc	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}$	
aagggtcaa	CAA		FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
atg	ATG		EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	

[0798]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLASHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			RTCRAHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDCRDLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
			CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
	CAA		FSRRDELNVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ATG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{1}$	
	AGT		GNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggtcaaatg	GCC		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
agtgcccgt	CGT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gag	GAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	

[0799]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			LEPGEKPYKCPECGKS		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			FSHRTTLTNHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			EKPYKCPECGKSFSRR		$_{2}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{1}$	
			DELNVHQRTHTGEKPY		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			KCPECGKSFSQSGNLT		$_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
			EHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
			CGKSFSTSGHLVRHQR		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	TGA		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
	GTC		FSRKDNLKNHQRTHTG		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAG		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{1}$	
	GGT		GALVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgagtcaag	CAA		KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{1}$	
ggtcaaatg	ATG		SHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agt	AGT		S			
gtcaagggt	GTC		LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
caaatgagt	AAG		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	

[0800]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcc	GGT		EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}X_1$	
	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGT		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}$X	
	GCC		CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}$	
			FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
			DNLKNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGALV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGT		FSSRRTCRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}$X$_{18}$X$_{19}$	
	CAA		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aagggtcaa	ATG		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
atgagtgcc	AGT		KCPECGKSFSHRTTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cgt	GCC		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}$X	

[0801]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CGT		CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
			FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DNLKNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_1$	
	GGT		KCPECGKSFSDPGALV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X$	
	TGA		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agggtggg	GTC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}$	
tgagtcaag	AAG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggt	GGT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0802]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRKDNLK		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X$	
			CGKSFSDPGALVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
	GGG		FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	TGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{1}$	
	GTC		DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggtgggtga	AAG		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
gtcaagggt	GGT		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
caa	CAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	

[0803]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTVHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X$	
			CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
	ACT		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	GGT		LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctgacttgg	GAC		KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
ggtgacaat	AAT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggc	GGC		S			
gggtgacaa	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggcttgga	TGA		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	

[0804]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggg	CAA		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}X$	
	GGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	TGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAA		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
tgacaatgg	CTT		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
cttggaggg	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtg	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X$	

[0805]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTG		CGKSFSTTGALTEHQR THTGEKPYKCPECGKS FSRSDHLTTHQRTHTG EKPYKCPECGKSFSQS GNLTEHQRTHTGEKPY KCPECGKSFSQAGHLA SHQRTHTGEKPTGKKT S		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$		
tggcttgga ggggtgggt gag	TGG CTT GGA GGG GTG GGT GAG		LEPGEKPYKCPECGKS FSRSDNLVRHQRTHTG EKPYKCPECGKSFSTS GHLVRHQRTHTGEKPY KCPECGKSFSRSDELV RHQRTHTGEKPYKCPE CGKSFSRSDKLVRHQR THTGEKPYKCPECGKS FSQRAHLERHQRTHTG EKPYKCPECGKSFSTT		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$ $_2X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$ $_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	

[0806]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GALTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	TGG		FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{1}$	
	GGA		DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
caatggctt	GGG		KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
ggaggggtg	GTG		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggt	GGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	

[0807]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSHRTTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	GGG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	gtg		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaggggtgg	AGT		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
gtgagtcaa	CAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggg	GGG		S			
agggtcaaa	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgagtgccc	GTC		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{19}$	

[0808]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gtg	AAA		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_1$	
	gtg		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}$X	
	GTG		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}$	
			FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	
			GALVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GTC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AAA		FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}$X$_{18}$X$_{19}$	
	TGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gtcaaatga	gtg		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
gtgcccgtg	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
agt	gtg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	

[0809]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AGT		CGKSFSRSDELVRHQR THTGEKPYKCPECGKS FSQAGHLASHQRTHTG EKPYKCPECGKSFSQR ANLRAHQRTHTGEKPY KCPECGKSFSDPGALV RHQRTHTGEKPTGKKT S		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$		
	AAA TGA gtg CCC gtg AGT CAT		LEPGEKPYKCPECGKS FSTSGNLTEHQRTHTG EKPYKCPECGKSFSHR TTLTNHQRTHTGEKPY KCPECGKSFSRSDELV RHQRTHTGEKPYKCPE CGKSFSSKKHLAEHQR THTGEKPYKCPECGKS FSRSDELVRHQRTHTG EKPYKCPECGKSFSQA		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$ $_2X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_1$ $_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
aaatgagtg cccgtgagt cat						

[0810]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GHLASHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{1}$	
			AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAH$X_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLVRH$X_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$TSGNLTEH$X_{17}X_{18}X_{1}$	
			KCPECGKSFSHRTTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNH$X_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}$	
	gtg		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{1}$	
	gtg		DELVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgagtgccc	AGT		KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{1}$	
gtgagtcat	CAT		SHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gat	GAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{1}$	

[0811]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSTSGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
			CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
	CCC		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	gtg		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
	AGT		KHLAEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAT		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
gtgcccgtg	GAT		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
agtcatgat	GCC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gcc						
ccgtgagtc	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
atgatgcct	TGA		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	

[0812]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcc	GTC		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ATG		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X$	
	GCC		CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}$	
			FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
gtcagccag aaaccaaca aac	GTC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGC		FSDSGNLRVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X_{19}$	
	CAG		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAA		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X$	

[0813]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAC		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
			SHLREHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGALV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGC		GNLRVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X_1$	
	CAG		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	
	CCA		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agccagaaa	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
ccaacaaac	AAC		FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agc	AGC		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	

[0814]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SHLREHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSDSGNLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X$	
			CGKSFSSPADLTRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}$	
	AAA		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCA		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{1}$	
	ACA		ANLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cagaaacca	AAC		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{1}$	
acaaacagc	AGC		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
caa	CAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{1}$	

[0815]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			NALQNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_1$	
			KCPECGKSFSQSSSLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}X$	
			CGKSFSTSGSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}$	
	CCA		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
	GTT		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gccccagca	GTA		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
gttgtaatt	ATT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}DCRDLARHX_{17}X_1$	
agc	AGC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cggtgagtt	CGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
agggcccca	TGA		FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{19}$	

[0816]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gca	GTT		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$X	
	GCA		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTC		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}$X$_{18}$X$_{19}$	
	AGC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggtgtcagc	CAG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
cagaaacca	AAA		KCPECGKSFSQRANLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aca	CCA		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}$X	

[0817]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACA		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$	
			FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_1$	
			GALVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		SSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSTSGSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{18}X$	
	GCA		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agggcccca	GTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
gcagttgta	GTA		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
att	ATT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	

[0818]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SHLREHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSHKNALQ		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X$	
			CGKSFSQSSSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{18}$	
	GCA		FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTT		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{1}$	
	GTA		GDLRRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccagcagtt	ATT		KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{1}$	
gtaattagc	AGC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acc	ACC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{1}$	

[0819]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGSLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLASHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X$	
			CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ATA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
	ACT		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
	CAT		LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ataactgaa	CGG		KCPECGKSFSQKSSLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
catcggtga	TGA		AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gtt	GTT		S		$X_{29}X_{30}$	
catcggtga	CAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gttagggcc	CGG		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	

[0820]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cca	TGA		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTT		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_{18}X$	
	CCA		CGKSFSTSGSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_{18}$	
			FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_1$	
			DKLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGT		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}X_{19}$	
	GTC		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccgggtgtc	AGC		ANLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRANLRAH$X_{17}X_{18}X_1$	
agccagaaa	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cca	AAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_{18}X$	

[0821]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	CCA		CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
			FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		GSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_1$	
	GAA		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
	CGG		CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
actgaacat	TGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
cggtgagtt	GTT		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	

[0822]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			SNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGSLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X$	
			CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}$	
	CAT		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
	TGA		GNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaacatcgg	GTT		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	
tgagttagg	AGG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcc	GCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	

[0823]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
			KCPECGKSFSERSHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X$	
			CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}$	
	CCG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
	GTC		DTLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
accccgggt	AGC		KCPECGKSFSDKKDLT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gtcagccag	CAG		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
aaa	AAA		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agcaccccg	AGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggtgtcagc	ACC		FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_{19}$	

[0824]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cag	CCG		EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		SHLREHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_1$	
	GTC		KCPECGKSFSDPGALV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}X$	
	CAG		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
			FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
			KDLTRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTT		FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_{19}$	
	GTA		EKPYKCPECGKSFSDK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcagttgta	ATT		KDLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_1$	
attagcacc	AGC		KCPECGKSFSERSHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccg	ACC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X$	

[0825]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCG		CGKSFSHKNALQNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}$	
			FSQSSSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	
			GSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ATT		GALVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_1$	
	AGC		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X$	
	CCG		CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
attagcacc	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
ccgggtgtc	GTC		FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agc	AGC		EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	

[0826]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			SHLREHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRNDTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X$	
			CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GTA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}$	
	ATT		FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGC		EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{1}$	
	ACC		NALQNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtaattagc	CCG		KCPECGKSFSQSSSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{1}$	
accccgggt	GGT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtc	GTC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{1}$	

[0827]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{19}$	
			FSTSGSLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSQS		$_2X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
			GDLRRHQRTHTGEKPY		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSTSHSLT		$_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
			EHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSDCRDLARHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
	TGA		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GTT		FSRSDHLTNHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
	AGG		EKPYKCPECGKSFSTS		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCC		GSLVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_1$	
tgagttagg	CCA		KCPECGKSFSQAGHLA		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gccccagca	GCA		SHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
gtt	GTT		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gttagggcc	GTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}X_{19}$	
ccagcagtt	AGG		FSQSSSLVRHQRTHTG			

[0828]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gta	GCC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		GSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{18}X_1$	
	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X$	
	GTA		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTA		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_{19}$	
	ATT		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gttgtaatt	AGC		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_1$	
agcaccccg	ACC		KCPECGKSFSDKKDLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggt	CCG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X$	

[0829]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGT		CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
			FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	
			SSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gtg		SHLREHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_1$	
	AGT		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gtgagttag	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggccccagc	AGC		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agt	AGT		EKPYKCPECGKSFSHR		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	

[0830]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			TTLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			ANLRAHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDSGNLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X$	
			CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}$	
	CCA		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
	ACC		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cagccagaa	AAC		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
accaacaaa	AAA		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	

[0831]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSQRANLRAHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAA		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_1$	
	ACC		FSDSGNLRVHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AAC		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
	AAA		KDLTRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaaaccaac	CAG		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
aaacagcca	CCA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
aat	AAT		S			
ccagaaacc	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aacaaacag	GAA		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	

[0832]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cca	ACC		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAC		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_{18}X_1$	
	AAA		KCPECGKSFSQRANLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAH$X_{17}X_{18}X$	
	CCA		CGKSFSDSGNLRVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVH$X_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ACC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AAC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}$	
	AAA		EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
accaacaaa	CAG		GNLTVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}X_1$	
cagccaaat	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccc	AAT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}X$	

[0833]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCC		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$	
			FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_1$	
			GNLRVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}X$	
	CAA		CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gccagaaac	CAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}$	
caacaaaca	ACA		FSDSGNLRVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcc	GCC		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_1$	

[0834]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			AHLRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			RDLARHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSPADLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X$	
			CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}$	
	AAC		FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAA		EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
	CAA		GNLRVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agaaaccaa	ACA		KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	
caaacagcc	GCC		AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaa	AAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	

[0835]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQNSTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			SHLREHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_1$	
			KCPECGKSFSSKKHLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
			CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
	GCA		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
	CCG		GDLRRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cctgcagcc	CCC		KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
ccgcccagc	AGC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cta	CTA		S			
accggcggg	ACC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggaccgatt	GGC		FSDSGNLRVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{18}X_{19}$	

[0836]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aac	GGG		EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGA		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
	CCG		KCPECGKSFSRNDTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X$	
	AAC		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGG		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_{19}$	
	GGA		EKPYKCPECGKSFSDS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggcgggggga	CCG		GNLRVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_{18}X_1$	
ccgattaac	ATT		KCPECGKSFSHKNALQ		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cat	AAC		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X$	

[0837]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAT		CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
	ACC		KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X$	
	CCC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cccacccct	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
ccccggcag	CAG		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agc	AGC		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	

[0838]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KDLTRHQRTHTGEKPY KCPECGKSFSSKKHLA EHQRTHTGEKPTGKKT S		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSRADNLTEHQRTHTG EKPYKCPECGKSFSRS DKLTEHQRTHTGEKPY KCPECGKSFSSKKHLA EHQRTHTGEKPYKCPE CGKSFSTKNSLTEHQR THTGEKPYKCPECGKS FSDKKDLTRHQRTHTG EKPYKCPECGKSFSSK KHLAEHQRTHTGEKPY KCPECGKSFSDKKDLT RHQRTHTGEKPTGKKT S		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$ ${}_{2}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X_{1}$ ${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$ ${}_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$ ${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{1}$	
accccacc cctccccgg cag	ACC CCC ACC CCT CCC CGG CAG					

[0839]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLKNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_1$	
			KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
			CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$	
	AGA		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
	TAG		AHLRAHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cacagaggc	GCC		KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
taggccaag	AAG		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
act	ACT		S			
agaggctag	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gccaagact	GGC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	

[0840]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ccc	TAG		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_1$	
	AAG		KCPECGKSFSRKDNLK		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}X$	
	CCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAC		FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}X_{19}$	
	AGA		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cttcacaga	GGC		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
ggctaggcc	TAG		KCPECGKSFSREDNLH		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aag	GCC		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X$	

[0841]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAG		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
			KALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTTGALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TAG		SHLREHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$	
	ACT		CGKSFSTHLDLIRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
taggccaag	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}$	
actcccagc	AGC		FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aga	AGA		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	

[0842]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSREDNLH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSERSHLREHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSTHLDLI		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X$	
			CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}$	
	TAG		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
	AAG		DNLHTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggctaggcc	ACT		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{1}$	
aagactccc	CCC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agc	AGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$	

[0843]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLHTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$REDNLHTH$X_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_{18}X$	
			CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_{18}$	
	CTT		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAC		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEH$X_{17}X_1$	
	AGA		GALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccccttcac	GGC		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEH$X_{17}X_1$	
agaggctag	TAG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gcc	GCC		S			
ccaccccctt	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cacagaggc	CCC		FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$REDNLHTH$X_{17}X_{18}X_{19}$	

[0844]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
tag	CTT		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}$X	
	TAG		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$	
			FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCA		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}$X$_{18}$X$_{19}$	
	CCC		EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cctcccacc	CTT		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
cttcacaga	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	AGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$X	

[0845]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		GALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_1$	
	gag		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
	CCA		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcagagcct	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
ccacccctt	CTT		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cac	CAC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	

[0846]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTTGALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gag		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CCT		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCA		EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
	CCC		NSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gagcctcca	CTT		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
cccctcac	CAC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aga	AGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	

[0847]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
			KCPECGKSFSTSHSLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
			CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
	GCA		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	gag		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
	CCT		GDLRRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccggcagag	CCA		KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
cctccaccc	CCC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ctt	CTT		S			
gcagatctt	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cccagagga	GAT		FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$	

[0848]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cgg	CTT		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGA		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X$	
	CGG		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$	
			FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCA		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
	GAT		EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccagcagat	CTT		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
cttcccaga	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	AGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$	

[0849]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
			FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
			GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	AGA		KCPECGKSFSTHLDLI		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcagagag	ACT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggcactggg	ggg		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	

[0850]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			AHLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			LDLIRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGHLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	GGC		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGA		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
	GAG		GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaaggcaga	GGC		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
gagggcact	ACT		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	

[0851]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGC		FSTHLDLIRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACT		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
	ggg		GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gagggcact	AGG		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
gggaggagg	AGG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cag	CAG		S			
agagagggc	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
actgggagg	GAG		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	

[0852]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
agg	GGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$X	
	AGG		CGKSFSTHLDLIRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGG		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggaggagg	CAG		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
cagtgggag	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	GAG		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$X	

[0853]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
	ACT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	AGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcactggg	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
aggaggcag	CAG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgg	TGG		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0854]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			LDLIRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGC		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
	ggg		GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gagggcgga	CGG		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
gggcgggggg	ggg		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cct	CCT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	

[0855]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
			KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	ggg		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
	AGG		DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
actgggagg	CAG		KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
aggcagtgg	TGG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}THLDLIRHX_{17}X_1$	
gag	GAG		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgaaaggaa	TGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggcagagag	AAG		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	

[0856]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggc	GAA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}$X	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_1$	
			DNLKNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			SHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAA		FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}$X$_{18}$X$_{19}$	
	GGC		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aaggaaggc	AGA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
agagagggc	GAG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
act	GGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}$X	

[0857]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACT		CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_1$	
	GAG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GGA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tgggagggc	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
ggagggcgg	CGG		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	

[0858]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQRAHLE		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	TGG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	GGC		DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cagtgggag	GGA		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
ggcggagggg	ggg		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cgg	CGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	

[0859]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			AHLERHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	CAG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	GAG		DNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aggcagtgg	GGC		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
gagggcgga	GGA		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggg	GGG		S			
aggaggcag	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgggagggc	AGG		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	

[0860]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gga	CAG		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	GAG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}$X	
	GGA		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGA		FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}$X$_{18}$X$_{19}$	
	AAG		EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gtttgaaag	GAA		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
gaaggcaga	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gag	AGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$X	

[0861]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAG		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
			FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
			GHLASHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
	GTT		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
	AAG		CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
acggtttga	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}$	
aaggaaggc	GGC		FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aga	AGA		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	

[0862]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GSLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRTDTLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{1}$	
			DHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRKDNLK		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X$	
			CGKSFSQAGHLASHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}$	
	ACG		FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTT		EKPYKCPECGKSFSRT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{1}$	
	TGA		DTLRDHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggacggtt	AAG		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{1}$	
tgaaaggaa	GAA		NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggc	GGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[0863]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLKNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_1$	
			KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
			CGKSFSTSGSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}$	
	AGG		FSRTDTLRDHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_1$	
	GTT		DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cagaggacg	TGA		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
gtttgaaag	AAG		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gaa	GAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
gggcgccca	ggg		LEPGEKPYKCPECGKS		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gggtagggc	CGC		FSRSDHLTNHQRTHTG		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	

[0864]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	CCA		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	TAG		KCPECGKSFSREDNLH		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X$	
	AGG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			GHLLEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCA		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	
	GGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cgcccaggg	TAG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
tagggcagg	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
tgg	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	

[0865]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	TGG		CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSHTGHLL		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	AGG		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	
	GAG		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggagggcg	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}$	
gagggcggg	GGG		FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	

[0866]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	CGT		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSSR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
	GGC		RTCRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cggcgtgga	AGG		KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{1}$	
ggcagggag	gag		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aat	AAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	

[0867]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GDLRRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	AAG		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
	gag		DNLKNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aggaaggca	AGG		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
gagagggca	GCA		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ctg	CTG		S			
tagggcagg	TAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggccgcgg	GGC		FSSRRTCRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X_{19}$	

[0868]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cgt	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X_1$	
	CCG		KCPECGKSFSRNDTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}$X	
	CGT		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TAG		FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}$X$_{18}$X$_{19}$	
	GGC		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggtagggc	AGG		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_1$	
aggtggccg	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cgg	CCG		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$X	

[0869]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			DNLHTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TAG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccagggtag	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggcaggtgg	TGG		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccg	CCG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	

[0870]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GAG		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
	GGG		DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcggagggc	GGC		KCPECGKSFSRSDDLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
ggggcctt	CTT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cgg	CGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{1}$	

[0871]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{19}$	
			FSQSGDLRRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSRS		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			DHLTNHQRTHTGEKPY		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSRSDNLV		$_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			RHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSQSGDLRRHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
	GAA		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		FSRKDNLKNHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_1$	
	AAG		EKPYKCPECGKSFSRS		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCA		DHLTNHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
gaaaggaag	gag		KCPECGKSFSQSSNLV		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcagagagg	AGG		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
gca	GCA		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggcagtggg	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
agggcggag	AGT		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	

[0872]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggc	ggg		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
	GCG		KCPECGKSFSRSDDLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X$	
	GGC		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			TTLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	AGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	AGG		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
agtgggagg	GCG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
gcggagggc	GAG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X$	

[0873]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSHRTTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
	GCG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
agggcggag	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggcgggggc	GGC		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctt	CTT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	

[0874]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DDLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGDLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	GCA		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gag		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	AGG		GDLRRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaggcagag	GCA		KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
agggcactg	CTG		NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gga	GGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	

[0875]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	CGG		FSSRRTCRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_1$	
	GGA		DKLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccgcggcgt	GGC		KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
ggaggcagg	AGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gag	GAG		S			
cgtggaggc	CGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
agggagaat	GGA		FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{19}$	

[0876]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcg	GGC		EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		GNLTVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}X_1$	
	gag		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}$X	
	GCG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSRRTCR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gag		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcagagagg	GCA		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
gcactggga	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	GGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$X	

[0877]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gag		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
	AGG		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gagagggca	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
ctgggagga	GGA		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	

[0878]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			AHLERHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSRRTCR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X$	
			CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
	TGG		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
	CGG		DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggtggccg	CGT		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
cggcgtgga	GGA		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggc	GGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[0879]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
	CCG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGG				$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
	CGT				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tggccgcgg	GGA				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
cgtggaggc	GGC				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agg	AGG					
ggcaggtgg	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ccgcggcgt	AGG		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	

[0880]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gga	TGG		EKPYKCPECGKSFSSR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCG		RTCRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SRRTCRAH$X_{17}X_{18}X_1$	
	CGG		KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_{18}X$	
	GGA		CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEH$X_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGC		FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$THLDLIRH$X_{17}X_{18}X_{19}$	
	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggaggcagg	gag		DDLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDDLVRH$X_{17}X_{18}X_1$	
gagaatgcg	AAT		KCPECGKSFSTTGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
act	gcg		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}X$	

[0881]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACT		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_1$	
	CTG		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
	GGA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcactggga	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
ggaggcagt	AGT		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	

[0882]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DDLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGC		FSHRTTLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGT		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{1}$	
	ggg		GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggaggcagt	AGG		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
gggagggcg	GCG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gag	GAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	

[0883]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			FSHRTTLTNHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
			EKPYKCPECGKSFSDP		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			GHLVRHQRTHTGEKPY			
			KCPECGKSFSQRAHLE			
			RHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			CGKSFSQRAHLERHQR			
	AGG		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
	GCA		FSRNDALTEHQRTHTG			
	CTG		EKPYKCPECGKSFSQS			
	GGA		GDLRRHQRTHTGEKPY			
agggcactg	GGA		KCPECGKSFSRSDHLT			
ggaggaggc	GGC		NHQRTHTGEKPTGKKT			
agt	AGT		S			
ctgggagga	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
ggcagtggg	GGA		FSRSDHLTNHQRTHTG			

[0884]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
agg	GGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	AGT		KCPECGKSFSHRTTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}X$	
	AGG		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	GGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
	CGC		EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggtgggcgc	CCA		DNLHTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X_1$	
ccagggtag	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	TAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0885]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
			FSHTGHLLEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	GGT		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
	CGC		CGKSFSHTGHLLEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cggggtggg	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}$	
cgcccaggg	GGG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tag	TAG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0886]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X$	
			CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
	GGG		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
	CTT		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggcgggggc	CGG		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
cttcgggggt	GGT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	

[0887]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			FSTSGHLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_{2}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_1$	
			EKPYKCPECGKSFSRS		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX{}_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X$	
			DKLTEHQRTHTGEKPY		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			KCPECGKSFSTTGALT		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
			EHQRTHTGEKPYKCPE		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAG		CGKSFSDPGHLVRHQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1{}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGC		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1{}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGG		FSRSDKLVRHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
	GGC		EKPYKCPECGKSFSDP		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
	CTT		GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gagggcggg	CGG		KCPECGKSFSRSDNLV			
ggccttcgg	GGT		RHQRTHTGEKPTGKKT			
ggt			S			
ggggggcctt	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}X_{19}$	
cggggtggg	GGC		FSHTGHLLEHQRTHTG			

[0888]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cgc	CTT		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	CGC		CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}$	
			FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGA		FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X_{19}$	
	GGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggaggaggc	AGT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
agtgggagg	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcg	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0889]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCG		CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GHLLEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}X_1$	
	CTT		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GGT		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggccttcgg	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
ggtgggcgc	CGC		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cca	CCA		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	

[0890]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			HSLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSHTGHLL		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	CGG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
	ggg		DKLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cttcggggt	CGC		KCPECGKSFSTTGALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
gggcgcccca	CCA		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{1}$	

[0891]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAG		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
	AGA		FSRSDKLVRHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
	CAC		AHLRAHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cagagaggg	TGG		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
cactgggag	GAG		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gag	GAG		S		$X_{29}X_{30}$	
agagggcac	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgggaggag	ggg		FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	

[0892]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gca	CAC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_{18}X_1$	
	GAG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_{18}X$	
	GCA		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}$	
			FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEH$X_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAC		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggcactgg	GAG		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGDLRRH$X_{17}X_{18}X_1$	
gaggaggca	GAG		KCPECGKSFSRSDNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtg	GCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_{18}X$	

[0893]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTG		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			KALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	CAG		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X$	
	ggg		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aggcagaga	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
gggcactgg	TGG		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gag	GAG		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	

[0894]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQRAHLE		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	GAG		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
	GTG		DNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaggaggca	GGA		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
gtgggaggg	ggg		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cgg	CGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	

[0895]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1{}_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX{}_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X{}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			LEPGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			AHLERHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			KCPECGKSFSRSDELV			
			RHQRTHTGEKPYKCPE			
			CGKSFSQSGDLRRHQR			
	TGG		THTGEKPYKCPECGKS			
	GAG		FSRSDNLVRHQRTHTG			
	GAG		EKPYKCPECGKSFSRS			
	GCA		DNLVRHQRTHTGEKPY			
tgggaggag	GTG		KCPECGKSFSRSDHLT			
gcagtggga	GGA		THQRTHTGEKPTGKKT			
ggg	GGG		S			
gaggcagtg	GAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
ggagggcgg	GCA		FSRSDHLTNHQRTHTG			

[0896]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	GTG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGA		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	AGG		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$	
			FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
	GAG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cactgggag	GAG		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
gaggcagtg	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	GTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X$	

[0897]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAA		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X$	
	CAG		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aaaggaagg	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
cagagaggg	ggg		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cac	CAC		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	

[0898]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
			AHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSQLAHLRAHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}$	
	AGG		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
	AGA		DHLTNHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggaaggcag	ggg		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
agagggcac	CAC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	

[0899]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GTG				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
	GGA				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ggg				$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
	CGG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
	GCG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gtgggaggg	GCA				$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cggagggcg	GTG				$X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{19}$	
ggg	GGG					
gcagtggga	GCA		LEPGEKPYKCPECGKS			
gggcggagg	GTG		FSRSDDLVRHQRTHTG			

[0900]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcg	GGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_{18}X_1$	
	CGG		KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEH$X_{17}X_{18}X$	
	GCG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERH$X_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}$	
	CGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggagggcgg	AGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X_1$	
agggcgggg	GCG		KCPECGKSFSRSDDLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRH$X_{17}X_{18}X$	

[0901]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CGC		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	GGC		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
	GAG		CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cgcggcgtg	GCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
gaggcaggg	ggg		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aga	AGA		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	

[0902]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSHTGHLL		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GDLRRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDNLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	CGC		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSHT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
	GTG		GHLLEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggccgcggc	GAG		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{1}$	
gtggaggca	GCA		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	

[0903]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
					$_{2}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_{1}$	
					$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{1}$	
	GTG		FSRSDNLVRHQRTHTG		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{1}$	
	GCA		DELVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggcgtggag	ggg		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$	
gcagggaga	AGA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
atg	ATG		S			
gtggaggca	GTG		LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
gggagaatg	GAG		FSQSGHLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_{18}X_{19}$	

[0904]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cga	GCA		EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DELNVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}$X	
	CGA		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTG		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}$X$_{18}$X$_{19}$	
	GGC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggggtgggc	GCC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
gcccagggt	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
agg	GGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$X	

[0905]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AGG		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
	GGC		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	CAG		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gtgggcgcc	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$	
cagggtagg	AGG		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gca	GCA		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	

[0906]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGHLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSHTGHLLEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}$	
	GGT		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
	CGC		GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcaggtggc	GGC		KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
cgcggcgtg	GTG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gag	GAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	

[0907]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
	GGC		FSHTGHLLEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGC		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_1$	
	GGC		GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggtggccgc	GTG		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
ggcgtggag	GAG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gca	GCA		S		$X_{29}X_{30}$	
agggcaggt	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggccgcggc	GCA		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}$	

[0908]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gtg	GGT		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	CGC		KCPECGKSFSHTGHLL		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}$X	
	GTG		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
			GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAG		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}$X$_{18}$X$_{19}$	
	GGT		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcccagggt	AGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
agggcaggt	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	GGT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$X	

[0909]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			DNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	GGT		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcgcccag	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
ggtagggca	GCA		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggt	GGT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	

[0910]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSHTGHLLEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
			CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
	GGT		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{1}$	
	GCA		GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cagggtagg	GGT		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{1}$	
gcaggtggc	GGC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cgc	CGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{1}$	

[0911]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
			FSDPGHLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSHT		$_{2}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}X_1$	
			GHLLEHQRTHTGEKPY		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSDPGHLV		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	
			RHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSTSGHLVRHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
	GGT		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		FSQSGDLRRHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
	GCA		EKPYKCPECGKSFSRS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		DHLTNHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
ggtagggca	GGC		KCPECGKSFSTSGHLV		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggtggccgc	CGC		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
ggc	GGC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agggtaggg	AGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X_{19}$	
caggtggcc	GTA		FSRSDDLVRHQRTHTG			

[0912]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcg	ggg		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAG		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
	GTG		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
	GCG		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			SSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGG		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_{19}$	
	GTA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cccagggta	ggg		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
gggcaggtg	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	GTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X$	

[0913]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSQSSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTA		DDLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_1$	
	ggg		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
	GTG		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gtagggcag	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
gtggccgcg	GCG		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcg	GCG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	

[0914]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSSSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DDLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDDLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X$	
			CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
	CAG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTG		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
	GCC		DNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gggcaggtg	GCG		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
gccgcggcg	GCG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0915]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X$	
			CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}$	
	GCC		FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCG		EKPYKCPECGKSFSDC		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCG		RDLARHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
	TGG		KCPECGKSFSRSDELV		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
	CAG		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
caggtggcc	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcggcgtgg	GTG		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_{19}$	

[0916]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	GCC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCG		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	GCG		KCPECGKSFSRSDDLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}$X	
	AGG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	gcg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcgcccagg	GTA		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
gtagggcag	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtg	CAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$X	

[0917]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTG		CGKSFSQSSSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDDLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		SSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gcg		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	CCC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gggtgggcg	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
cccagggta	GTA		FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	

[0918]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSSSLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	gcg		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
	AGG		DDLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgggcgccc	GTA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{1}$	
agggtaggg	ggg		THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	

[0919]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
			KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
	GCG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
	AGG		DDLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcggcgtgg	CAG		KCPECGKSFSRSDDLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	
aggcaggga	GGA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gaa	GAA		S		$X_{29}X_{30}$	
gccgcggcg	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggaggcag	GCG		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	

[0920]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gga	GCG		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	
	GGA		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	
			DDLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCT		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_{19}$	
	CGT		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aaccctcgt	CGA		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
cgacatgga	CAT		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cat	GGA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X$	

[0921]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAT		CGKSFSQSGHLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}$	
			FSSRRTCRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_1$	
	CGT		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X$	
	CAT		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cctcgtcga	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
catggacat	CAT		FSQSGHLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSSR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_1$	

[0922]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			RTCRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			STLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	GGA		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAT		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	
	GGC		AHLERHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
catggacat	CGA		KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
ggccgacta	CTA		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	

[0923]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_1$	
			KCPECGKSFSQSGHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_{18}X$	
			CGKSFSSRRTCRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_{18}$	
	AAC		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
	CGT		GNLRVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
caaaaccct	CGA		KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DSGNLRVHX$_{17}X_1$	
cgtcgacat	CAT		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gga	GGA		S		$X_{29}X_{30}$	
cgtcgacat	CGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggacatggc	CGA		FSQSGHLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_{18}X_{19}$	

[0924]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cga	CAT		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	CAT		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X$	
	CGA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$	
			FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	
			GHLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSRRTCR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAT		FSQNSTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X_{19}$	
	GGA		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cgacatgga	CAT		GHLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_{18}X_1$	
catggccga	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cta	CGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	

[0925]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CTA		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTC		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
	GAC		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATG		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X$	
	GAC		CGKSFSDPGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gtcgacatg	ATG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}$	
gacatggcc	GCC		FSRRDELNVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gac	GAC		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_1$	

[0926]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGALV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDKKDLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	CTG		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	
	TGG		DALTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtgctgcac	ACC		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
tggacccag	CAG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cct	CCT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	

[0927]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KDLTRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
	gtg		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSRS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAC		DELVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
acagtgctg	TGG		KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
cactggacc	ACC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cag	CAG		S			
ctgcactgg	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
acccagcct	CAC		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{19}$	

[0928]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aca	TGG		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACC		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$X	
	ACA		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			KALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}$X$_{18}$X$_{19}$	
	ACC		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cactggacc	CAG		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
cagcctaca	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cca	ACA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$X	

[0929]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCA		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gtg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
actacagtg	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
ctgcactgg	TGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
acc	ACC		EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	

[0930]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			ADLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSPADLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X$	
			CGKSFSTHLDLIRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}$	
	TGG		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
	ACT		DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acatggccg	ACA		KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
actacagtg	gtg		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctg	CTG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	

[0931]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$X_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_{19}$	
			LEPGEKPYKCPECGKS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1X_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
			FSRSDELVRHQRTHTG		$X_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			EKPYKCPECGKSFSSP		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1X_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1X_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1X_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			ADLTRHQRTHTGEKPY			
			KCPECGKSFSTHLDLI			
			RHQRTHTGEKPYKCPE			
			CGKSFSRNDTLTEHQR			
	TGG		THTGEKPYKCPECGKS			
	ACA		FSRSDHLTTHQRTHTG			
	TGG		EKPYKCPECGKSFSSP			
	CCG		ADLTRHQRTHTGEKPY			
tggacatgg	ACT		KCPECGKSFSRSDHLT			
ccgactaca	ACA		THQRTHTGEKPTGKKT			
gtg	GTG		S			
cagcctaca	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}X_{19}$	
ccaccctgg	CCT		FSTTGNLTVHQRTHTG			

[0932]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aat	ACA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	
	AAT		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
			FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
acatggaca tggccgact aca	ACA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}$X$_{18}$X$_{19}$	
	ACA		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_1$	
	CCG		KCPECGKSFSRNDTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}$X	

[0933]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACA		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
	ACC		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	
	CCT		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tggacccag	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$	
cctacacca	CCA		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccc	CCC		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	

[0934]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			KDLTRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSHSLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
			CGKSFSSPADLTRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
	CAG		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
	ACA		DNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acccagcct	CCA		KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
acaccaccc	CCC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{1}$	

[0935]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	ACT		FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACA		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
	gtg		LDLIRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccgactaca	CTG		KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
gtgctgcac	CAC		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgg	TGG		S			
tggccgact	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
acagtgctg	CCG		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

[0936]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cac	ACT		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	gtg		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
	CAC		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}$	
			FSTHLDLIRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_1$	
			DTLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCT		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_{19}$	
	GCA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
agtgctgca	CTG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
ctggaccca	GAC		KCPECGKSFSDPGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}X$	

[0937]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			GELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSHRTTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQAGHLASHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTA		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
	CAC		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X$	
	CCT		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ctacaccac	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$	
cctggaatt	ATT		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tga	TGA		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	

[0938]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KALTEHQRTHTGEKPY KCPECGKSFSQNSTLT EHQRTHTGEKPTGKKT S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSHKNALQNHQRTHTG EKPYKCPECGKSFSQR AHLERHQRTHTGEKPY KCPECGKSFSTKNSLT EHQRTHTGEKPYKCPE CGKSFSSKKALTEHQR THTGEKPYKCPECGKS FSSKKALTEHQRTHTG EKPYKCPECGKSFSQN STLTEHQRTHTGEKPY KCPECGKSFSERSHLR EHQRTHTGEKPTGKKT S		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$ $_{2}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{1}$ $_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{1}$	
agcctacac caccctgga att	AGC CTA CAC CAC CCT GGA ATT					

[0939]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLASHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X_1$	
			KCPECGKSFSHKNALQ		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	CAC		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
	GGA		KALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
caccaccct	ATT		KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
ggaatttga	TGA		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gaa	GAA		S			
ggacccagc	GGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ctacaccac	CCC		FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	

[0940]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cct	AGC		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTA		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X_1$	
	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	
	CCT		CGKSFSQNSTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}$	
			FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGC		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_{19}$	
	CTA		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cccagccta	CAC		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
caccaccct	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	

[0941]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
			FSQNSTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_1$	
			SHLREHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQNSTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X$	
	AGC		CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
actggaccc	CTA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
agcctacac	CAC		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cac	CAC		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	

[0942]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGDLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	TAG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTG		EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
	GGG		DNLHTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tggtaggtg	GCA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{1}$	
ggggcagat	GAT		THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtg	GTG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	

[0943]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TAG				$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
	GTG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGG				$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
	GCA				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
taggtgggg	GAT				$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1$	
gcagatgtg	gtg				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ccc	CCC					
gatgggcaa	GAT				$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggtaggtg	ggg				$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	

[0944]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggg	CAA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
	TAG		KCPECGKSFSREDNLH		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTG		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X$	
	GGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAA		FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggcaatgg	TAG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
taggtgggg	GTG		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gca	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	

[0945]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCA		CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GTG		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
caatggtag	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
gtgggggca	GCA		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gat	GAT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	

[0946]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDELV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
			CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}$	
	GGG		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
	GAT		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtgggggca	gtg		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
gatgtgccc	CCC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agg	AGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	

[0947]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLHTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}$	
	GAT		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ggg		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
	CAA		GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gacgatggg	TGG		KCPECGKSFSDPGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
caatggtag	TAG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}DPGNLVRHX_{17}X_1$	
gtg	GTG		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gttgacgat	GTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gggcaatgg	GAC		FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{19}$	

[0948]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tag	GAT		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ggg		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	CAA		KCPECGKSFSQSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}$X	
	TAG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$	
			FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGT		FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}$X$_{18}$X$_{19}$	
	GTT		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcaggtgtt	GAC		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
gacgatggg	GAT		KCPECGKSFSTSGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
caa	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$X	

[0949]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAA		CGKSFSDPGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}$	
			FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}X_1$	
	GTT		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	GAT		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggtgttgac	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$	
gatgggcaa	CAA		FSDPGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgg	TGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_1$	

[0950]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GSLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSTSGHLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
	ATG		FSQSSSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTA		EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{1}$	
	GGT		DELNVHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcaatggta	GGG		KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{1}$	
ggtgggggc	GGC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aga	AGA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	

[0951]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_1$	
	GCA		FSRRDELNVHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ATG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
	GTA		GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgggcaatg	GGT		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
gtaggtggg	GGG		THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
ggc	GGC		S		$X_{29}X_{30}$	
tgacgatgg	TGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcaatggta	CGA		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_{19}$	

[0952]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggt	TGG		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		SSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{18}X_1$	
	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTA		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X$	
	GGT		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			GHLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQAGHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_1$	
			SHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	GCA		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cgatgggca	ATG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
atggtaggt	GTA		KCPECGKSFSQSSSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GGT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{18}X$	

[0953]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	AAT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGT		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	AGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcaatggt	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
aggtgggggg	ggg		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cag	CAG		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	

[0954]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GNLTVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ATG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
	GGC		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAT		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
	GGT		GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
atgggcaat	AGG		KCPECGKSFSRRDELN		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
ggtaggtgg	TGG		VHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{1}$	

[0955]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
	GGT		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
	TGG		GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aatggtagg	ggg		KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_1$	
tgggggcag	CAG		VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
atg	ATG		S		$X_{29}X_{30}$	
acgatgggc	ACG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aatggtagg	ATG		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	

[0956]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tgg	GGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNH$X_{17}X_{18}X_1$	
	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{18}X$	
	TGG		CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_1$	
			DELNVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRTDTLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVH$X_{17}X_1$	
			DHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RTDTLRDH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X_{19}$	
	GCA		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gtgggggca	GGT		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X_1$	
ggtgtgcct	gtg		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	CCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}X$	

[0957]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_1$	
	GTG		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X$	
	GCA		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccagtgggg	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
gcaggtgtg	gtg		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cct	CCT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[0958]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGDLR		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	CCA		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
	GGG		HSLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtgccagtg	GCA		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
ggggcaggt	GGT		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtg	GTG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	

[0959]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			LEPGEKPYKCPECGKS		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	
			FSQSGDLRRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			EKPYKCPECGKSFSRS		$_{2}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{1}$	
			DKLVRHQRTHTGEKPY		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			KCPECGKSFSRSDELV		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	
			RHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
			CGKSFSTSHSLTEHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
	CCA		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGT		FSRSDELVRHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{1}$	
	gtg		EKPYKCPECGKSFSTS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCA		GHLVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{1}$	
ccaggtgtg	GTG		KCPECGKSFSTSHSLT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccagtgggg	GGG		EHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{1}$	
gca	GCA		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggtgtgcca	GGT		LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
gtgggggca	gtg		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_{19}$	

[0960]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggt	CCA		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTG		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	GGT		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGA		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X_{19}$	
	GCA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccaggagca	GAT		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
gatctttgg	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cac	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}X$	

[0961]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAC		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTG		GNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X_1$	
	GGT		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X$	
	GGA		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ctgggtcca	GCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$	
ggagcagat	GAT		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctt	CTT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	

[0962]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X$	
			CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
GGT			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
CCA			FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
GGA			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{1}$	
GCA			HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
GAT			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{1}$	
CTT			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
TGG			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{1}$	
ggtccagga						
gcagatctt						
tgg						

[0963]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSQKSSLI		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{18}X$	
			CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
	AGG		FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
	ATG		DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gggaggaga	ATA		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
atgatacaa	CAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
aat	AAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
tggggtggg	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aggagaatg	GGT		FSQKSSLIAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{18}X_{19}$	

[0964]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ata	ggg		EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DELNVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_1$	
	AGA		KCPECGKSFSQLAHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATG		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X$	
	ATA		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_{19}$	
	GGT		EKPYKCPECGKSFSQL		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cttggggt	ggg		AHLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_1$	
gggaggaga	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
atg	AGA		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	

[0965]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ATG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTTGALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$	
	ACT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAA		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	CTT		CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcactcaa	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
cttgggggt	GGT		FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_1$	

[0966]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTVHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X$	
			CGKSFSQKSSLIAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{18}$	
	AGA		FSRRDELNVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ATG		EKPYKCPECGKSFSQL		$CX_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{1}$	
	ATA		AHLRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggagaatg	CAA		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	
atacaaaat	AAT		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggt	GGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[0967]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSTTGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
			CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}$	
	ATG		FSQKSSLIAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ATA		EKPYKCPECGKSFSRR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_1$	
	CAA		DELNVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agaatgata	AAT		KCPECGKSFSQLAHLR		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
caaaatggt	GGT		AHQRTHTGEKPTGKKT			
agg	AGG		S			
ggtgggagg	GGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
agaatgata	ggg		FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{19}$	

[0968]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
caa	AGG		EKPYKCPECGKSFSQK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGA		SSLIAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QKSSLIAHX$_{17}X_{18}X_1$	
	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATA		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X$	
	CAA		CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	CAA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CTT		FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
caacttgg	GGT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
ggtgggagg	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aga	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	

[0969]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	AGA		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			GALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	CAA		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	TGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
actcaactt	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
tggggtggg	ggg		FSTTGALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_1$	

[0970]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTTGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	TGG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
	gag		DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gggtgggag	AAT		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
gagaatgat	GAT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aca	ACA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[0971]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
			KCPECGKSFSQRANLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X$	
			CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	gag		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}$	
	AAT		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAT		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
	ACA		GNLTVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gagaatgat	AAA		KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_1$	
acaaaatgg	TGG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tag	TAG		S			
tgggaggag	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aatgataca	GAG		FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_{19}$	

[0972]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
aaa	gag		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_1$	
	GAT		KCPECGKSFSTSGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRH$X_{17}X_{18}X$	
	AAA		CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVH$X_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRH$X_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gag		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}X_{19}$	
	AAT		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gaggagaat	GAT		ANLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRANLRAH$X_{17}X_{18}X_1$	
gatacaaaa	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
tgg	AAA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X$	

[0973]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	TGG		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}$	
			FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGSLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		DNLHTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_1$	
	GAT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	AAA		CGKSFSQRANLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aatgataca	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}$	
aaatggtag	TAG		FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtt	GTT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	

[0974]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{1}$	
			VHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRADNLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	CCT		FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ACA		EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
	GGC		NSLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggtcctaca	CAG		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
ggccagcac	CAC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agg	AGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	

[0975]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_{19}$	
			FSRADNLTEHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1{}_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1{}_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			EKPYKCPECGKSFSDP			
			GHLVRHQRTHTGEKPY			
			KCPECGKSFSSPADLT			
			RHQRTHTGEKPYKCPE		$X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			CGKSFSTKNSLTEHQR			
	TAG		THTGEKPYKCPECGKS			
	GTT		FSTSGHLVRHQRTHTG			
	GGT		EKPYKCPECGKSFSTS			
	CCT		GSLVRHQRTHTGEKPY			
taggttggt	ACA		KCPECGKSFSREDNLH			
cctacaggc	GGC		THQRTHTGEKPTGKKT			
cag	CAG		S			
tggtaggtt	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
ggtcctaca	TAG		FSDPGHLVRHQRTHTG			

[0976]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggc	GTT		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_1$	
	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X$	
	GGC		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{18}$	
			FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_1$	
			DNLHTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTH$X_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_{19}$	
	TAG		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aaatggtag	GTT		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X_1$	
gttggtcct	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aca	CCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{18}X$	

[0977]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACA		CGKSFSTSGSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}$	
			FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQRANLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$	
	AAA		KCPECGKSFSTSGSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X$	
	TAG		CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
acaaaatgg	GTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$	
taggttggt	GGT		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cct	CCT		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	

[0978]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			ANLRAHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GSLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSREDNLH		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	ACA		FSQRANLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAA		EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{1}$	
	TGG		ADLTRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gatacaaaa	TAG		KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
tggtaggtt	GTT		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggt	GGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{1}$	

[0979]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
	GGT		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
	ACA		GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gttggtcct	GGC		KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
acaggccag	CAG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
cac	CAC		S		$X_{29}X_{30}$	
gtcctacag	GTC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gccagcaca	CTA		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	

[0980]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggt	CAG		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}X_1$	
	AGC		KCPECGKSFSERSHLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREH$X_{17}X_{18}X$	
	GGT		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_1$	
			STLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGALV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEH$X_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCC		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_{19}$	
	AGC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
caggccagc	ACA		GSLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_{18}X_1$	
acaggtgtt	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	GTT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{18}X$	

[0981]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
			FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
			RDLARHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGSLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_1$	
	CAG		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X$	
	AGC		CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ctacaggcc	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}$	
agcacaggt	GGT		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtt	GTT		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	

[0982]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQNSTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSER		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			SHLREHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQAGHLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
			CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}$	
	GTT		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
	AAG		GSLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggtgttgcc	TGA		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{1}$	
aagtgaagc	AGC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cca	CCA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	

[0983]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
					$_{2}X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_{18}X_{1}$	
					$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
					$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
					$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
					$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREH$X_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}$ERSHLREH$X_{17}X_{18}X_{19}$	
	AGC		LEPGEKPYKCPECGKS			
	ACA		FSQAGHLASHQRTHTG			
	GGT		EKPYKCPECGKSFSRK			
	GTT		DNLKNHQRTHTGEKPY			
agcacaggt	GCC		KCPECGKSFSDCRDLA			
gttgccaag	AAG		RHQRTHTGEKPYKCPE			
tga	TGA		CGKSFSTSGSLVRHQR			
	AGC		THTGEKPYKCPECGKS			
	ACA		FSTSGHLVRHQRTHTG			
	GGT		EKPYKCPECGKSFSSP			
	GTT		ADLTRHQRTHTGEKPY			
agcacaggt	GCC		KCPECGKSFSERSHLR			
gttgccaag	AAG		EHQRTHTGEKPTGKKT			
tga	TGA		S			
acaggtgtt	ACA		LEPGEKPYKCPECGKS			
gccaagtga	GGT		FSERSHLREHQRTHTG			

[0984]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
agc	GTT		EKPYKCPECGKSFSQA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		GHLASHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X_1$	
	AAG		KCPECGKSFSRKDNLK		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGA		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_{18}X$	
	AGC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}$	
			FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRH$X_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGC		FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_{18}X_{19}$	
	ACA		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gccagcaca	GGT		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_1$	
ggtgttgcc	GTT		KCPECGKSFSTSGSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aag	GCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRH$X_{17}X_{18}X$	

[0985]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAG		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}$	
			FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
			SHLREHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X$	
	GAT		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aggcacagt	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}$	
gatcacagg	AGG		FSHRTTLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cat	CAT		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_1$	

[0986]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			KALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DELVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
			CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
	AGT		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSHR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
	GCC		TTLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccaagtgaa	CAT		KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{1}$	
gcccatgtg	gtg		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccc	CCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	

[0987]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			KCPECGKSFSSKKHLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	GCC		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	
	gtg		RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaagcccat	CCC		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
gtgcccagg	AGG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cac	CAC		S			
agtgaagcc	AGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
catgtgccc	GAA		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	

[0988]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	GCC		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAT		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_1$	
	gtg		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}$X	
	AGG		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSHRTTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	gtg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gtgcccagg	CAC		GNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X_1$	
cacagtgat	AGT		KCPECGKSFSHRTTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cac	GAT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}$X	

[0989]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAC		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
	CAT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gtg		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	CCC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcccatgtg	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
cccaggcac	CAC		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agt	AGT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	

[0990]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GNLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			TTILTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}HRTTILTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSKKALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X$	
			CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
	gtg		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
	AGG		DELVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
catgtgccc	CAC		KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
aggcacagt	AGT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gat	GAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	

[0991]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSTSGNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X$	
			CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
	AGG		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
	AGT		DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cccaggcac	GAT		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
agtgatcac	CAC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agg	AGG		S			
gggaggcct	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcaagggcc	AGG		FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	

[0992]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
aat	CCT		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	
	AAT		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
			FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GAA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ggg		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_{19}$	
	AGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gaagggagg	CCT		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
cctgcaagg	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X$	

[0993]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
	GGC		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
acaggcatt	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
ctgggtgaa	GAA		FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_1$	

[0994]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY KCPECGKSFSSPADLT RHQRTHTGEKPTGKKT S		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSQSGDLRRHQRTHTG EKPYKCPECGKSFSTK NSLTEHQRTHTGEKPY KCPECGKSFSRSDHLT NHQRTHTGEKPYKCPE CGKSFSRSDKLVRHQR THTGEKPYKCPECGKS FSQSSNLVRHQRTHTG EKPYKCPECGKSFSTS GHLVRHQRTHTGEKPY KCPECGKSFSRNDALT EHQRTHTGEKPTGKKT S		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$ ${}_{2}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_{1}$ ${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$ ${}_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$ ${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{1}$	
ctgggtgaa gggaggcct gca	CTG GGT GAA ggg AGG CCT GCA					

[0995]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ATT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
	CTG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
	GAA		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
attctgggt	ggg		KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
gaagggagg	AGG		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cct	CCT		S			
ggcattctg	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggtgaaggg	ATT		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	

[0996]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
agg	CTG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	GAA		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X$	
	AGG		CGKSFSTSGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			NALQNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GAA		FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_{19}$	
	ggg		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggtgaaggg	AGG		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_1$	
aggcctgca	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
agg	GCA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X$	

[0997]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	AGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGA		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
	GGC		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	CAA		CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggaggcctg	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}$	
caagggcca	CCA		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
att	ATT		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	

[0998]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRNDALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	AAG		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
	GGC		DNLKNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gtgaaggga	CTG		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
ggcctgcaa	CAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	

[0999]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			LEPGEKPYKCPECGKS		$X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}X_{19}$	
			FSQSGNLTEHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			EKPYKCPECGKSFSRN		$_{2}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{1}$	
			DALTEHQRTHTGEKPY		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			KCPECGKSFSDPGHLV		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	
			RHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
			CGKSFSQRAHLERHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}$	
	TGG		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gtg		FSRKDNLKNHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{1}$	
	AAG		EKPYKCPECGKSFSRS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGA		DELVRHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{1}$	
tgggtgaag	GGC		KCPECGKSFSRSDHLT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggaggcctg	CTG		THQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{1}$	
caa	CAA		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
aagggaggc	AAG		LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
ctgcaaggg	GGA		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_{19}$	

[1000]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cca	GGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	CAA		KCPECGKSFSQSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}X$	
	CCA		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ACT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gtg		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
	CCT		EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
actgtgcct	ggg		DELNVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_1$	
gggcacatg	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	ATG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	

[1001]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		GALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	CAT		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gcctgggca	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
catgggctt	CTT		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cac	CAC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	

[1002]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X$	
			CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$	
	GGC		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
	TAG		GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gctggcctg	GAC		KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
taggaccaa	CAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cct	CCT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	

[1003]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSQSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X$	
			CGKSFSDPGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}$	
	CTG		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TAG		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	
	GAC		DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggcctgtag	CAA		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
gaccaacct	CCT		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
acc	ACC		S			
ctgtaggac	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
caacctacc	TAG		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{19}$	

[1004]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
att	GAC		EKPYKCPECGKSFSDK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		KDLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{18}X_1$	
	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X$	
	ATT		CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEH$X_{17}X_{18}$	
			FSDPGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRH$X_{17}X_1$	
			DNLHTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}X_{19}$	
	CAA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccaccccaa	AGT		DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRH$X_{17}X_{18}X_1$	
agttgagtg	TGA		KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cca	gtg		SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASH$X_{17}X_{18}X$	

[1005]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCA		CGKSFSHRTTLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}$	
			FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
	CAA		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
	TGA		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccccaaagt	gtg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}$	
tgagtgcca	CCA		FSHRTTLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aag	AAG		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_1$	

[1006]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CCT		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
	CCC		NSLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gctcctgga	AGG		KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
cccaggcac	CAC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acc	ACC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	

[1007]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}C$	
	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	GAC		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCA		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
	GGC		GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctggaccca	ACA		KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_1$	
ggcacacct	CCT		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
gcc	GCC		S		$X_{29}X_{30}$	
gcccccact	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggcacacct	CCC		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	

[1008]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggg	ACT		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}$X	
	GGG		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSTHLDLIRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCC		FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}$X$_{18}$X$_{19}$	
	CCC		EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cctgccccc	ACT		ADLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_1$	
actggcaca	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cct	ACA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$X	

[1009]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCT		CGKSFSTHLDLIRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			RDLARHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_1$	
	ACA		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
	GCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcacacct	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
gcccccact	ACT		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	

[1010]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			ADLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTHLDLI		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ACA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CCT		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
	CCC		NSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acacctgcc	ACT		KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
cccactggc	GGC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aca	ACA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	

[1011]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCA				$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
	GGC				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACA				$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
	CCT				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccaggcaca	GCC				$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
cctgccccc	CCC				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
act	ACT				$X_{29}X_{30}$	
cccactggc	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
acacctggg	ACT		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

[1012]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cac	GGC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_{18}X_1$	
	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X$	
	CAC		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRH$X_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRH$X_{17}X_1$	
			LDLIRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCA		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{19}$	
	GGC		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gacccaggc	ACA		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARH$X_{17}X_{18}X_1$	
acacctgcc	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccc	GCC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_{18}X$	

[1013]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCC		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_1$	
	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
	CAC		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccactggca	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
cacctgggc	GGC		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aca	ACA		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	

[1014]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DALTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSHSLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CAC		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
	CCC		KALTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcacacctg	CCA		KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	
cccccactg	CTG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gca	GCA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	

[1015]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1{}_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1{}_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX{}_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X{}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			LEPGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KALTEHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1{}_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			RHQRTHTGEKPYKCPE			
			CGKSFSRNDALTEHQR			
	CTG		THTGEKPYKCPECGKS			
	CCC		FSTSHSLTEHQRTHTG			
	CCA		EKPYKCPECGKSFSSK			
	CTG		KHLAEHQRTHTGEKPY			
ctgcccccca	GCA		KCPECGKSFSRNDALT			
ctggcacac	CAC		EHQRTHTGEKPTGKKT			
ctg	CTG		S			
cccccactg	CCC		LEPGEKPYKCPECGKS			
gcacacctg	CCA		FSDPGHLVRHQRTHTG			

[1016]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggc	CTG		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$X	
	GGC		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCA		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}$X$_{18}$X$_{19}$	
	CAC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
caggcacac	CTG		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
ctgcccccca	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ctg	CCA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	

[1017]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
			FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	
			GDLRRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	ACC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	
	GCA		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tggacccag	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
gcacacctg	CTG		FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccc	CCC		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_1$	

[1018]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			KDLTRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEH$X_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}$SKKHLAEH$X_{17}X_{18}X_{1}$	
			KCPECGKSFSRNDALT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEH$X_{17}X_{18}X$	
			CGKSFSSKKALTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEH$X_{17}X_{18}$	
	CAG		FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GCA		EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRH$X_{17}X_{1}$	
	CAC		DNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acccaggca	CTG		KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEH$X_{17}X_{1}$	
cacctgccc	CCC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cca	CCA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRH$X_{17}X_{1}$	

[1019]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GDLRRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
			KCPECGKSFSRNDALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
			CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
	CTG		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
	CCC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
	CCA		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cacctgccc	CTG		KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
ccactggca	GCA		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cac	CAC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
ccacctacc	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
attgcccat	CCT		FSSRRTCRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X_{19}$	

[1020]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cgt	ACC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ATT		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$X	
	CGT		CGKSFSHKNALQNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAC		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}$X$_{18}$X$_{19}$	
	ACC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
tggcacacc	TGG		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_1$	
tgggcacat	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ctg	CAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$X	

[1021]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CTG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
			KALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAC		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAC		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	ACC		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cactggcac	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}$	
acctgggca	GCA		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cat	CAT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	

[1022]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			NALQNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDKKDLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X$	
			CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
	CCC		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCA		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
	CCT		KHLAEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctgccccca	ACC		KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
cctaccatt	ATT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcc	GCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	

[1023]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG				$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	
	GCA				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAT				$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
	CTG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tgggcacat	CCC				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
ctgccccca	CCA				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cct	CCT					
acctgggca	ACC				$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
catctgccc	TGG				$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	

[1024]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cca	GCA		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAT		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_1$	
	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	
	CCA		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAT		FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_{19}$	
	CTG		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcacatctg	CCC		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
cccccaccct	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
acc	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X$	

[1025]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ACC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		RTCRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X_1$	
	ACC		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
	GCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cctaccatt	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
gcccatcgt	CGT		FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
caa	CAA		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	

[1026]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KDLTRHQRTHTGEKPY KCPECGKSFSTKNSLT EHQRTHTGEKPTGKKT S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSHKNALQNHQRTHTG EKPYKCPECGKSFSDK KDLTRHQRTHTGEKPY KCPECGKSFSTKNSLT EHQRTHTGEKPYKCPE CGKSFSTSHSLTEHQR THTGEKPYKCPECGKS FSSKKHLAEHQRTHTG EKPYKCPECGKSFSRN DALTEHQRTHTGEKPY KCPECGKSFSTSGNLT EHQRTHTGEKPTGKKT S		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$ $_{2}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_{1}$ $_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{1}$ $_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{1}$	
catctgccc ccacctacc att	CAT CTG CCC CCA CCT ACC ATT					

[1027]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
			KCPECGKSFSDKKDLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X$	
			CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}$	
	CAC		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	CAC		KALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccccactgg	ACC		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
cacacctgg	TGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gca	GCA		S			
ccccccacct	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
accattgcc	CCA		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$	

[1028]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cat	CCT		EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACC		RDLARHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X_1$	
	ATT		KCPECGKSFSHKNALQ		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X$	
	CAT		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}$	
			FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ACC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cacacctgg	GCA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
gcacatctg	CAT		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccc	CTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCC		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			KDLTRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ATT		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSQSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X$	
	CGT		CGKSFSSRRTCRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
attgcccat	CAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}$	
cgtcaacac	CAC		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctg	CTG		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRNDALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	
			CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$	
	CGT		FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAA		EKPYKCPECGKSFSSR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{1}$	
	CAC		RTCRAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
catcgtcaa	CTG		KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_{1}$	
cacctgcac	CAC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
att	ATT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{1}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSSRRTCR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SRRTCRAHX_{17}X_{18}X$	
			CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
	ATT		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCC		EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
	CAT		NALQNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
accattgcc	CGT		KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	
catcgtcaa	CAA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cac	CAC		S			
gcccatcgt	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
caacacctg	CAT		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cac	CGT		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X$	
	CAC		CGKSFSQSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{18}$	
			FSSRRTCRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SRRTCRAHX$_{17}X_1$	
			GNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGT		FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}X_{19}$	
	GGT		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cagggtggt	GTA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
gtaggctgg	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtc	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	

[1033]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTC		CGKSFSQSSSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{18}$	
			FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		GALVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_1$	
	GGT		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTA		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggtggtgta	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggctgggtc	GTC		FSQSSSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cag	CAG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	

[1034]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDELV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
			CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
	CTG		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$	
	CCA		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggctgggt	gtg		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
ccagtgcag	CAG		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cac	CAC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[1035]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
	ACT		FSQSSSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GTA		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	
	GTC		LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agcactgta	GGC		KCPECGKSFSERSHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
gtcggccat	CAT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gtc	GTC		S			
actgtagtc	ACT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggccatgtc	GTA		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$	

[1036]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cat	GTC		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GALVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}X_1$	
	CAT		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$X	
	CAT		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
			SSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GTA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTC		FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}$X$_{18}$X$_{19}$	
	GGC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gtagtcggc	CAT		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_1$	
catgtccat	GTC		KCPECGKSFSDPGALV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtc	CAT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_{18}$X	

[1037]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GTC		CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			GALVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSSSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GTC		GALVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_1$	
	GGC		KCPECGKSFSTSGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
	GTC		CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gtcggccat	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
gtccatgtc	GTC		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gac	GAC		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	

[1038]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GHLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGALV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGALV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X$	
			CGKSFSTSGNLTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}$	
	CAT		FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{1}$	
	CAT		GNLTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggccatgtc	GTC		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{1}$	
catgtcgac	GAC		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gag	GAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	

[1039]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_{18}X$	
			CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}C$	
	CAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
	GTC		FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CAT		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_1$	
	GTC		GALVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
catgtccat	GAC		KCPECGKSFSTSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	
gtcgacgag	GAG		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
ggt	GGT		S		$X_{29}X_{30}$	
ctgcctcca	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cgccgcggc	CCT		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

[1040]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
cac	CCA		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CGC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	CGC		KCPECGKSFSHTGHLL		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}X$	
	CAC		CGKSFSHTGHLLEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCA		FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}$	
	CGC		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cctccacgc	CGC		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}X_1$	
cgcggccac	GGC		KCPECGKSFSDPGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ctg	CAC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	

[1041]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CTG		CGKSFSHTGHLLEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}$	
			FSHTGHLLEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_1$	
			HSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_1$	
	CGC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X$	
	GGC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccacgccgc	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
ggccacctg	CTG		FSHTGHLLEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccc	CCC		EKPYKCPECGKSFSHT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_1$	

[1042]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GHLLEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQNSTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X$	
			CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
	CCA		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
	GCC		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cggccacct	CTA		KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
gccctaccc	CCC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
tgg	TGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	

[1043]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQNSTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			RDLARHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_1$	
			KCPECGKSFSTKNSLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X$	
			CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
	CCG		FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGG		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_1$	
	CCA		DTLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
acgccgcgg	CCT		KCPECGKSFSRTDTLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
ccacctgcc	GCC		DHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cta	CTA		S			
ccgcggcca	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cctgcccta	CGG		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	

[1044]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ccc	CCA		EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		STLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X$	
	CCC		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$	
			FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
			DKLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCT		FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X_{19}$	
	GCC		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccacctgcc	CTA		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
ctaccctgg	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcg	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$	

[1045]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCG		CGKSFSQNSTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		DDLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTA		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
	CCC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cctgcccta	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
ccctgggcg	gcg		FSQNSTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccc	CCC		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_1$	

[1046]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDKKDLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDDLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
	CTA		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSQN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{1}$	
	TGG		STLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gccctaccc	gcg		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{1}$	
tgggcgccc	CCC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
acc	ACC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	

[1047]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			LEPGEKPYKCPECGKS		$X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X_{19}$	
			FSRKDNLKNHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSRN		$_2X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_1$	
			DTLTEHQRTHTGEKPY		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSDKKDLT		$_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X$	
			RHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSSKKHLAEHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CCC		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		FSRSDDLVRHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	
	gcg		EKPYKCPECGKSFSRS		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCC		DHLTTHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
ccctgggcg	ACC		KCPECGKSFSSKKHLA		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cccaccccg	CCG		EHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
aag	AAG		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgggcgccc	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
accccgaag	gcg		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	

[1048]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gcc	CCC		EKPYKCPECGKSFSRK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACC		DNLKNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_{18}X_1$	
	CCG		KCPECGKSFSRNDTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X$	
	GCC		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			DDLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_{19}$	
	TGG		EKPYKCPECGKSFSDK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctaccctgg	gcg		KDLTRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_{18}X_1$	
gcgcccacc	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccg	ACC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X$	

[1049]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQNSTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
	ACC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
	AAG		CGKSFSRKDNLKNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cccacccccg	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}$	
aaggcccccc	CCC		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcc	GCC		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	

[1050]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KDLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			RDLARHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRKDNLK		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{18}X$	
			CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	gcg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
	CCC		FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ACC		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{1}$	
	CCG		KHLAEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcgcccacc	AAG		KCPECGKSFSRSDDLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
ccgaaggcc	GCC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccc	CCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{1}$	

[1051]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSDCRDLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	ACC		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSDK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
	GGC		KDLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cctaccctg	GCC		KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_1$	
ggcgcccac	CAC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ccc	CCC		S			
ctgggcgcc	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cacccgaa	GGC		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	

[1052]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ggc	GCC		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAC		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	
	GGC		CGKSFSSKKALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	ACC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CTG		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}$X$_{18}$X$_{19}$	
	GGC		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
accctgggc	GCC		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_1$	
gcccacccc	CAC		KCPECGKSFSSKKALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gaa	CCC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_{18}$X	

[1053]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAA		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDKKDLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X$	
	CCC		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggcgcccac	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$	
cccgaaggc	GGC		FSSKKALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ccc	CCC		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKALTEHX$_{17}X_1$	

[1054]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLLEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSKKHLA		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	CCC		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
	GGC		KHLAEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
caccccgaa	CCC		KCPECGKSFSSKKALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
ggcccccgc	CGC		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cct	CCT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{1}$	

[1055]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHTGHLLEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
	CAC		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKHLAEHX_{17}X_1$	
	GAA		KALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcccacccc	GGC		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_1$	
gaaggcccc	CCC		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}DCRDLARHX_{17}X_1$	
cgc	CGC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cccgaaggc	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ccccgcccct	GAA		FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_{19}$	

[1056]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ccg	GGC		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
	CGC		KCPECGKSFSHTGHLL		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_{18}$X	
	CCG		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$	
			FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			SNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GAA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}$X$_{18}$X$_{19}$	
	CCC		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gaaggcccc	CGC		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_1$	
cgccctccg	CCT		KCPECGKSFSTKNSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ccc	CCG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}$X	

[1057]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCC		CGKSFSHTGHLLEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCT		GHLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}X_1$	
	ggg		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
	CCA		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
cctgggcgc	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$	
ccacccccga	CGA		FSHTGHLLEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agg	AGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_1$	

[1058]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSQSGHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CGC		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCA		EKPYKCPECGKSFSHT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	
	CCC		GHLLEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gggcgccca	CGA		KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{1}$	
ccccgaagg	AGG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccc	CCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	

[1059]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSQSGHLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}$	
	CCA		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
	CGA		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cgcccaccc	AGG		KCPECGKSFSHTGHLL		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
cgaaggccc	CCC		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ccg	CCG		S			
ccacccccga	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aggcccccg	CCC		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	

[1060]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ccc	CGA		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_1$	
	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	
	CCC		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSQSGHLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CTG		FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}$X$_{18}$X$_{19}$	
	CCT		EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccactgcct	CCT		TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}X_1$	
cctcccagt	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gcc	AGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	

[1061]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCC		CGKSFSTKNSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}$	
			FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
			DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGALVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
	GAA		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tgggaagat	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
ctgctggga	GGA		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtc	GTC		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	

[1062]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			SNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			STLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GCT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}$	
	ggg		FSHRTTLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGT		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{1}$	
	CTT		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gctgggagt	GGC		KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
cttggccta	CTA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcc	GCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	

[1063]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_1$	
			KCPECGKSFSQAGHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			SHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	TAG		FSTKNSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCT		EKPYKCPECGKSFSRE		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
	CTG		DNLHTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gcctagcct	TGA		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	
ctgtgaagg	AGG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggt	GGT		S			
tagcctctg	TAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgaaggggt	CCT		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{19}$	

[1064]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gga	CTG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X$	
	GGA		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			NSLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSEDNLH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$REDNLHTHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CTG		FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_{19}$	
	TGA		EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cctctgtga	AGG		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X_1$	
aggggtgga	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggc	GGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	

[1065]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGC		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSQAGHLASHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QAGHLASHX_{17}X_1$	
			DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGG		DTLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_1$	
	GTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X$	
	GCT		CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggggtggag	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}$	
gctctgccg	CCG		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggg	GGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	

[1066]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DALTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGELV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
			CGKSFSRSDNLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
	GGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
	GAG		DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gaaggggtg	GCT		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
gaggctctg	CTG		RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccg	CCG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	

[1067]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GTG				$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	
	GAG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GCT				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
	CTG				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtggaggct	CCG				$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
ctgccgggg	ggg				$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
agg	AGG				$X_{29}X_{30}$	
gaggctctg	GAG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ccggggagg	GCT		FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	

[1068]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggt	CTG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCG		DHLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$X	
	GGT		CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			GELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CTG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}$X$_{18}$X$_{19}$	
	CCG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gctctgccg	ggg		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
gggaggggt	AGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GGT		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$X	

[1069]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
			DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
	CCG		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X$	
	AGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ctgccgggg	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
aggggtggg	GGG		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggt	GGT		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[1070]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DTLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GSLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	GGA		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
	GTG		AHLERHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cggggaggg	GGG		KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
gtgggggtt	GTT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aat	AAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	

[1071]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLTVHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_1$	
			KCPECGKSFSTSGSLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	GGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
	GTG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
	GGG		DKLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggaggggtg	GTT		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
ggggttaat	AAT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggt	GGT		S			
ggcggggct	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcagggatt	GGG		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	

[1072]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tgg	GCT		EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCA		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	TGG		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}$	
			FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGC		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$	
	GGG		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgggcggg	GCT		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
gctgcaggg	GCA		KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
att	ggg		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X$	

[1073]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ATT		CGKSFSTSGELVRHQR THTGEKPYKCPECGKS FSRSDKLVRHQRTHTG EKPYKCPECGKSFSDP GHLVRHQRTHTGEKPY KCPECGKSFSRNDALT EHQRTHTGEKPTGKKT S		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$		
	GGG GCT GCA ggg ATT TGG CTG		LEPGEKPYKCPECGKS FSRNDALTEHQRTHTG EKPYKCPECGKSFSRS DHLTTHQRTHTGEKPY KCPECGKSFSHKNALQ NHQRTHTGEKPYKCPE CGKSFSRSDKLVRHQR THTGEKPYKCPECGKS FSQSGDLRRHQRTHTG EKPYKCPECGKSFSTS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$ $_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$ $_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_1$		
ggggctgca gggatttgg ctg						

[1074]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GDLRRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGELV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
			CGKSFSRSDKLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
	CTG		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GGC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{1}$	
	GGG		DALTEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggctgggc	GCT		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
ggggctgca	GCA		NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggg	GGG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	

[1075]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTSGELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DKLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	GAT		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
	CTG		GNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gtggatagg	GGC		KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
ctgggcggg	GGG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
gct	GCT		S			
gataggctg	GAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggcgggggct	AGG		FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X_{19}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
gca	CTG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_1$	
	GGG		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	GCA		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
			DHLTNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GTG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	GAT		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ccggtggat	AGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
aggctgggc	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GGC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	

[1077]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCG		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_1$	
	CCG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GTG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
	GAT		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccgccggtg	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}$	
gataggctg	CTG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DTLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X$	
			CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}$	
	CCG		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCG		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
	GTG		DTLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccccgccg	GAT		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{1}$	
gtggatagg	AGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctg	CTG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDELV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{18}X$	
			CGKSFSRNDTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GGT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}$	
	CCC		FSRNDTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCG		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_1$	
	CCG		KHLAEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggtccccccg	GTG		KCPECGKSFSTSGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
ccggtggat	GAT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
agg	AGG		S			
ataggctgg	ATA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gcgggggctg	GGC		FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	

[1080]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cag	TGG		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCG		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	ggg		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
	CAG		CGKSFSRSDDLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}$	
			FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			GHLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQKSSLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QKSSLIAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_{19}$	
	ATA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cggtggata	GGC		DDLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X_1$	
ggctgggcg	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
ggg	GCG		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X$	

[1081]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGG		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSQKSSLIAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QKSSLIAHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		DKLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X_1$	
	ATA		KCPECGKSFSRSDDLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDDLVRHX$_{17}X_{18}X$	
	TGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tggataggc	GCG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
tgggcgggg	ggg		FSDPGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctg	CTG		EKPYKCPECGKSFSQK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_1$	

[1082]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			SSLIAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRSDDLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTTHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{1}$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
			CGKSFSQKSSLIAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{18}$	
	CGG		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
	ATA		DKLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cgccggtgg	GGC		KCPECGKSFSHTGHLL		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{1}$	
ataggctgg	TGG		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcg	GCG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_{1}$	

[1083]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			FSDPGHLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			EKPYKCPECGKSFSQK		$_2X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{18}X_1$	
			SSLIAHQRTHTGEKPY		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			KCPECGKSFSRSDHLT		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			THQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			CGKSFSRSDKLTEHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}$	
	GTC		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCC		FSHTGHLLEHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}HTGHLLEHX_{17}X_1$	
	CGC		EKPYKCPECGKSFSSK		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CGG		KHLAEHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
gtccccccgc	TGG		KCPECGKSFSDPGALV		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cggtggata	ATA		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	
ggc	GGC		S		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ccccgccgg	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tggataggc	CGC		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	

[1084]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
tgg	CGG		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X_1$	
	ATA		KCPECGKSFSQKSSLI		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGC		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QKSSLIAHX$_{17}X_{18}$X	
	TGG		CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$	
			FSRSDKLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_1$	
			GHLLEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HTGHLLEHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	TGG		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$	
	GCG		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggctgggcg	ggg		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
gggctgcag	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	CAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$X	

[1085]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSRSDDLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDDLVRHX_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGT		DKLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TAG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
	GCT		CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ggtggatag	ggg		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}$	
gctgggcgg	CGG		FSREDNLHTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_1$	

[1086]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY KCPECGKSFSTSGHLV RHQRTHTGEKPTGKKT S		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS FSRSDKLTEHQRTHTG EKPYKCPECGKSFSRS DKLVRHQRTHTGEKPY KCPECGKSFSTSGELV RHQRTHTGEKPYKCPE CGKSFSREDNLHTHQR THTGEKPYKCPECGKS FSQRAHLERHQRTHTG EKPYKCPECGKSFSTS GHLVRHQRTHTGEKPY KCPECGKSFSDCRDLA RHQRTHTGEKPTGKKT S		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}RSDKLTEHX_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$ ${}_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$ ${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$ ${}_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$ ${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_{1}$ ${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{1}$	
gccggtgga taggctggg cgg	GCC GGT GGA TAG GCT ggg CGG					

[1087]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X_1$	
			KCPECGKSFSREDNLH		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RE\text{-}DNLHTHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	GCC		FSTSGHLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGHLVRHX_{17}X_1$	
	GGA		RDLARHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cccgccggt	TAG		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
ggataggct	GCT		EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ggg	GGG		S			
gctgacacc	GCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
cgggtgct	GAC		FSTTGNLTVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_{19}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
aat	ACC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CGG		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_1$	
	GGT		KCPECGKSFSTSGHLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X$	
	AAT		CGKSFSRSDKLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCT		FSTSGELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_{19}$	
	GAC		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctggctgac	ACC		GHLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGHLVRHX$_{17}X_{18}X_1$	
acccggggt	CGG		KCPECGKSFSRSDKLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gct	GGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLTEHX$_{17}X_{18}X$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCT		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}$	
			FSDPGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_1$	
			GELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		STLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_1$	
	ACT		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
	GGG		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
acaactgct	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
gggcccta	CTA		FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
act	ACT		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			LDLIRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDCRDLARHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DKLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGELV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}X$	
			CGKSFSTHLDLIRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}$	
	ATT		FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	ACA		EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{1}$	
	ACT		NALQNHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctaattaca	GCT		KCPECGKSFSQNSTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{1}$	
actgctggg	GGG		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gcc	GCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{1}$	

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1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQNSTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDC		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			RDLARHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X$	
			CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ATT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{18}$	
	ACA		FSTHLDLIRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACT		EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_1$	
	GCT		ADLTRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
attacaact	GGG		KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
gctgggggcc	GCC		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cta	CTA		S			
gtgctaatt	gtg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
acaactgct	CTA		FSRSDKLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}X_{19}$	

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1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
ggg	ATT		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACA		GELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_1$	
	ACT		KCPECGKSFSTHLDLI		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X$	
	GGG		CGKSFSSPADLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}$	
			FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_1$	
			STLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gtg		FSTSGELVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}X_{19}$	
	CTA		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ggggtgcta	ATT		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_1$	
attacaact	ACA		KCPECGKSFSSPADLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gct	ACT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X$	

[1093]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GCT		CGKSFSHKNALQNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}$	
			FSQNSTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_1$	
			DELVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	ACT		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_1$	
	GCT		KCPECGKSFSQNSTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}X$	
	GCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
actgctggg	CTA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
gccctaact	ACT		FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cac	CAC		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	

[1094]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			GELVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			ADLTRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSHKNALQ		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X$	
			CGKSFSQNSTLTEHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}$	
	GGG		FSRSDELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	gtg		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDELVRHX_{17}X_{1}$	
	CTA		DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cccggggtg	ATT		KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
ctaattaca	ACA		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
act	ACT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	

[1095]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQNSTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DELVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X_1$	
			KCPECGKSFSRSDKLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	TGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$	
	CTG		FSSPADLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	ACA		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1$	
	CCC		DALTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
tggctgaca	GGG		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
cccgggtg	gtg		THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cta	CTA		S			
acacccggg	ACA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gtgctaatt	CCC		FSSPADLTRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_{18}X_{19}$	

[1096]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
aca	GGG		EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gtg		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
	CTA		KCPECGKSFSQNSTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X$	
	ACA		CGKSFSRSDELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}$	
			FSRSDKLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRHX$_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSPADLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SPADLTRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ACA		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_{19}$	
	CCC		EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgacaccc	GGG		STLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X_1$	
ggggtgcta	gtg		KCPECGKSFSRSDELV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
att	CTA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDELVRHX$_{17}X_{18}X$	

[1097]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ATT		CGKSFSRSDKLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSP		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			ADLTRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SPADLTRHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGHLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSGHLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCT		KALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_1$	
	GGG		KCPECGKSFSTHLDLI		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCC		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X$	
	CTA		CGKSFSQNSTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gctgggggcc	ACT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}$	
ctaactcac	CAC		FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cga	CGA		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	

[1098]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DKLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTSGELV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLTEHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSDPGHLVRHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ATT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}$	
	GTA		FSQSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAA		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGNLTEHX_{17}X_{1}$	
	GGC		SSLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
attgtacaa	AGG		KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSSLVRHX_{17}X_{1}$	
ggcaggcat	CAT		NHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cat	CAT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{1}$	

[1099]

1 栏 HNF4α 表达控制区中靶位点的核苷酸序列	3 栏 带空格的靶序列	2 栏 SEQ ID NO.	4 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5 栏 SEQ ID NO:	6 栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7 栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			LEPGEKPYKCPECGKS		$X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{18}X_{19}$	
			FSDPGNLVRHQRTHTG		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			EKPYKCPECGKSFSTS		$_{2}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X_{1}$	
			GNLTEHQRTHTGEKPY		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			KCPECGKSFSTSGNLT		$_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}X$	
			EHQRTHTGEKPYKCPE		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
			CGKSFSRSDHLTNHQR		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
	GTA		THTGEKPYKCPECGKS		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CAA		FSDPGHLVRHQRTHTG		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$	
	GGC		EKPYKCPECGKSFSQS		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AGG		GNLTEHQRTHTGEKPY		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{1}$	
gtacaaggc	CAT		KCPECGKSFSQSSSLV		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aggcatcat	CAT		RHQRTHTGEKPTGKKT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSSSLVRHX$_{17}X_{1}$	
gac	GAC		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
attgtcacc	ATT		LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
ccaagtcag	GTC		FSQSGDLRRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_{19}$	

[1100]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gca	ACC		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCA		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
	AGT		KCPECGKSFSHRTTLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}$X	
	GCA		CGKSFSTSHSLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$	
			FSDKKDLTRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DKKDLTRHX$_{17}X_1$	
			GALVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSHKNALQ		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGALVRHX$_{17}X_1$	
			NHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ATT		FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}$X$_{18}$X$_{19}$	
	GTC		EKPYKCPECGKSFSHR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gccattgtc	ACC		TTLTNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HRTTLTNHX$_{17}X_{18}X_1$	
accccaagt	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cag	AGT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$X	

[1101]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAG		CGKSFSDKKDLTRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}$	
			FSDPGALVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSHK		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_1$	
			NALQNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAA		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDKKDLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DKKDLTRHX_{17}X_{18}X$	
	GTC		CGKSFSDPGALVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
caagccatt	ACC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DPGALVRHX_{17}X_{18}$	
gtcacccca	CCA		FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
agt	AGT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	

[1102]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSQSGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QSGNLTEHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRNDTLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			NSLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSQNSTLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X$	
			CGKSFSERSHLREHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREHX$_{17}X_{18}$	
	ACT		FSDPGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAC		EKPYKCPECGKSFSTH		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRHX$_{17}X_{1}$	
	AGC		LDLIRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggcactgac	CTA		KCPECGKSFSDPGHLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{1}$	
agcctacct	CCT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccg	CCG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{1}$	

[1103]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQLAHLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			DTLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RNDTLTEHX_{17}X_{18}X_1$	
			KCPECGKSFSTKNSLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X$	
			CGKSFSQNSTLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	ACT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{18}$	
	GAC		FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AGC		EKPYKCPECGKSFSDP		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
	CTA		GNLVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
actgacagc	CCT		KCPECGKSFSTHLDLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}DPGNLVRHX_{17}X_1$	
ctacctccg	CCG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
aga	AGA		S			
ccaaatcat	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
tgacttcta	AAT		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	

[1104]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ccc	CAT		EKPYKCPECGKSFSQN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGA		STLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_{18}X_1$	
	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}$X	
	CCC		CGKSFSQAGHLASHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QAGHLASHX$_{17}X_{18}$	
			FSTSGNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_1$	
			GNLTVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	gag		FSTSGNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}$X$_{18}$X$_{19}$	
	ATA		EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gcagagata	AGG		KHLAEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}X_1$	
aggctgccc	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cat	CCC		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$X	

[1105]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CAT		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}$	
			FSQKSSLIAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQSGDLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	gag		GNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X_1$	
	ATA		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	AGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
	CTG		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
gagataagg	CCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
ctgccccat	CAT		FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ggc	GGC		EKPYKCPECGKSFSQK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	

[1106]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			SSLIAHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{1}$	
			RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTSGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGNLTEHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	ATA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	AGG		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
	CCC		DHLTNHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ataaggctg	CAT		KCPECGKSFSQKSSLI		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{1}$	
ccccatggc	GGC		AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cca	CCA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QKSSLIAHX_{17}X_{1}$	

[1107]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSQSGHLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSGHLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			HSLTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
			KCPECGKSFSDPGHLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}X$	
			CGKSFSTSGNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AGG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLTEHX$_{17}X_{18}$	
	CTG		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
	CAT		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aggctgccc	GGC		KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_1$	
catggccca	CCA		NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cga	CGA		S			
agagataag	AGA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gctgcccca	GAT		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_{19}$	

[1108]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
tgg	AAG		EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCT		HSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}X$	
	TGG		CGKSFSTSGELVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_{18}$	
			FSRKDNLKNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
			AHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CCC		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	ACG		FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X_{19}$	
	ATT		EKPYKCPECGKSFSTK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
cccacgatt	TAG		NSLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_1$	
tagaaacct	AAA		KCPECGKSFSQRANLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aaa	CCT		AHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRANLRAHX$_{17}X_{18}X$	

[1109]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	AAA		CGKSFSREDNLHTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}$	
			FSHKNALQNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRT		$CX_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_1$	
			DTLRDHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TKNSLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	TGG		ANLRAHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_1$	
	CCC		KCPECGKSFSREDNLH		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ACG		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X$	
	ATT		CGKSFSHKNALQNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
tggcccacg	TAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}$	
atttagaaa	AAA		FSRTDTLRDHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cct	CCT		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_1$	

[1110]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			KHLAEHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
			THQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSQRANLRAHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QRANLRAHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRE		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLHTHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{1}$	
			KCPECGKSFSHKNALQ		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X$	
			CGKSFSRTDTLRDHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CCA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{18}$	
	TGG		FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CCC		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
	ACG		DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccatggccc	ATT		KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
acgatttag	TAG		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
aaa	AAA		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{1}$	

[1111]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSREDNLHTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}REDNLHTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			NALQNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_1$	
			KCPECGKSFSRTDTLR		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			DHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CCA		FSRSDHLTTHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	CCC		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gccccatgg	ACG		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
cccacgatt	ATT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tag	TAG		S			
gataaggct	GAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
gccccatgg	AAG		FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	

[1112]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
ccc	GCT		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GCC		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}X_1$	
	CCA		KCPECGKSFSTSHSLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	TGG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_{18}$X	
	CCC		CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{18}$	
			FSTSGELVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRK		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGELVRHX$_{17}X_1$	
			DNLKNHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RKDNLKNHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	GCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GCC		FSHKNALQNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}$X$_{18}$X$_{19}$	
	CCA		EKPYKCPECGKSFSRT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gctgcccca	TGG		DTLRDHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RTDTLRDHX$_{17}X_{18}X_1$	
tggcccacg	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
att	ACG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	

[1113]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	ATT		CGKSFSRSDHLTTHQR THTGEKPYKCPECGKS FSTSHSLTEHQRTHTG EKPYKCPECGKSFSDC RDLARHQRTHTGEKPY KCPECGKSFSTSGELV RHQRTHTGEKPTGKKT S		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_1$ $_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$		
aaggctgcc ccatggccc acg	AAG GCT GCC CCA TGG CCC ACG		LEPGEKPYKCPECGKS FSRTDTLRDHQRTHTG EKPYKCPECGKSFSSK KHLAEHQRTHTGEKPY KCPECGKSFSRSDHLT THQRTHTGEKPYKCPE CGKSFSTSHSLTEHQR THTGEKPYKCPECGKS FSDCRDLARHQRTHTG EKPYKCPECGKSFSTS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$ $X_{13}X_{14}X_{15}X_{16}RTDTLRDHX_{17}X_{18}X_{19}$ $HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$ $_2X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$ $_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$ $_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$ $_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$ $X_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_{18}$ $X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$ $CX_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_1$	

[1114]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			GELVRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRKDNLK		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGELVRHX_{17}X_{1}$	
			NHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RKDNLKNHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSSKKHLAEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DHLTNHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X_{1}$	
			KCPECGKSFSSKKHLA		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X$	
			CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	AGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}$	
	AAC		FSQNSTLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	CTA		EKPYKCPECGKSFSDS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_{1}$	
	AAT		GNLRVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agaaaccta	CCC		KCPECGKSFSQLAHLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}DSGNLRVHX_{17}X_{1}$	
aatcccagg	AGG		AHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ccc	CCC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_{1}$	

[1115]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSSK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			KHLAEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}X_1$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			NHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_{18}X$	
			CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	AAC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
	CTA		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	AAT		EKPYKCPECGKSFSQN		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
	CCC		STLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
aacctaaat	AGG		KCPECGKSFSDSGNLR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QNSTLTEHX_{17}X_1$	
cccaggccc	CCC		VHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
cag	CAG		S			
ctaaatccc	CTA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aggccccag	AAT		FSRRDELNVHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}X_{19}$	

[1116]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
atg	CCC		EKPYKCPECGKSFSRA		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGG		DNLTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X_1$	
	CCC		KCPECGKSFSSKKHLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CAG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_{18}$X	
	ATG		CGKSFSRSDHLTNHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTNHX$_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			GNLTVHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSQNSTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$QNSTLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	AAT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CCC		FSTSHSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}$X$_{18}$X$_{19}$	
	AGG		EKPYKCPECGKSFSRR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
aatcccagg	CCC		DELNVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RRDELNVHX$_{17}X_{18}X_1$	
ccccagatg	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
cca	ATG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}$X	

[1117]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	CCA		CGKSFSSKKHLAEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{18}$	
			FSRSDHLTNHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTNHX_{17}X_1$	
			KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
			VHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTTGALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CAG		GNLTVHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X_1$	
	GCC		KCPECGKSFSDCRDLA		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}X$	
	GAT		CGKSFSTSGNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
caggcccca	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}$	
gatgccaat	AAT		FSTSHSLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctt	CTT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	

[1118]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSTKNSLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TKNSLTEHX$_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{18}X_{1}$	
			KCPECGKSFSRNDALT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	
			CGKSFSTTGALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}$	
	GCC		FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	AAT		EKPYKCPECGKSFSDC		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{1}$	
	CTT		RDLARHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
gatgccaat	CTG		KCPECGKSFSTSGNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_{1}$	
cttctggat	GAT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cct	CCT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_{1}$	

[1119]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTT		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GALTEHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TTGALTEHX_{17}X_{18}X_1$	
			KCPECGKSFSTTGNLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
			CGKSFSDCRDLARHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GCC		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}DCRDLARHX_{17}X_{18}$	
	CCA		FSTSGNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAT		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_1$	
	GCC		HSLTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gccccagat	AAT		KCPECGKSFSDCRDLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSHSLTEHX_{17}X_1$	
gccaatctt	CTT		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}DCRDLARHX_{17}X_1$	
ctg	CTG		S		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
ccagatgcc	CCA		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aatcttctg	GAT		FSTSGNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}TSGNLVRHX_{17}X_{18}X_{19}$	

[1120]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gat	GCC		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	CTT		KCPECGKSFSTTGALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$TTGALTEHX$_{17}X_{18}$X	
	GAT		CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$TTGNLTVHX$_{17}X_{18}$	
			FSDCRDLARHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$DCRDLARHX$_{17}X_1$	
			GNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSHSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGNLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSHSLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
	CTG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	GGA		FSQRAHLERHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}$X$_{18}$X$_{19}$	
	GCA		EKPYKCPECGKSFSTH		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
ctgggagca	GAA		LDLIRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$THLDLIRHX$_{17}X_{18}X_1$	
gaatggact	TGG		KCPECGKSFSRSDHLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gga	ACT		THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_{18}$X	

[1121]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GGA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
			FSQSGDLRRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_1$	
			AHLERHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSTHLDLIRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	CTG		KCPECGKSFSQSSNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GGA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
	GCA		CGKSFSQSGDLRRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccccctggga	GAA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}$	
gcagaatgg	TGG		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
act	ACT		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	

[1122]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSHRTTLTNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}HRTTLTNHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			AHLERHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_{1}$	
			KCPECGKSFSTHLDLI		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}THLDLIRHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	GCA		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
	TGG		GDLRRHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggagcagaa	ACT		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{1}$	
tggactgga	GGA		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
agt	AGT		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	

[1123]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSQSGDLR		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSGDLRRHX_{17}X_{18}X$	
			CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	GTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
	CCC		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	CTG		EKPYKCPECGKSFSSK		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	
	GGA		KHLAEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gttcccctg	GCA		KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_1$	
ggagcagaa	GAA		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgg	TGG		S			
ccggttccc	CCG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ctgggagca	GTT		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X_{19}$	

[1124]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
gaa	CCC		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CTG		GDLRRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSGDLRRHX$_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GCA		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X$	
	GAA		CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}$	
			FSSKKHLAEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$SKKHLAEHX$_{17}X_1$	
			GSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRNDTLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RNDTLTEHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	
tgggagcag	TGG		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
aatggactg	gag		FSQSSNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_{19}$	
gaa	CAG		EKPYKCPECGKSFSRN		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		DALTEHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X_1$	
	GGA		KCPECGKSFSQRAHLE		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$QRAHLERHX$_{17}X_{18}X$	

[1125]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
	GAA		CGKSFSTTGNLTVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}$	
			FSRADNLTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			DNLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDHLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
			THQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRNDALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSQR		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	CCC		AHLERHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}X_1$	
	TGG		KCPECGKSFSTTGNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	gag		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{18}X$	
	CAG		CGKSFSRADNLTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
ccctgggag	AAT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}$	
cagaatgga	GGA		FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
ctg	CTG		EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	

[1126]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
			DHLTTHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSSKKHLA		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{1}$	
			EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}SKKHLAEHX_{17}X_{1}$	
					${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSRADNLTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			GHLVRHQRTHTGEKPY		${}_{2}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDNLV		${}_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		${}_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X$	
			CGKSFSRSDHLTTHQR		${}_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	CTG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}$	
	GAA		FSTSGSLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GTT		EKPYKCPECGKSFSQS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{1}$	
	TGG		SNLVRHQRTHTGEKPY		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ctggaagtt	GAG		KCPECGKSFSRNDALT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
tgggagggc	GGC		EHQRTHTGEKPTGKKT		${}_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
cag	CAG		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	

[1127]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
					$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
					$X_{13}X_{14}X_{15}X_{16}HKNALQNHX_{17}X_{18}X_{19}$	
					$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
					$_2X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_{18}X_1$	
					$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
					$_{12}X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X$	
					$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
					$X_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}$	
					$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GAA		THTGEKPYKCPECGKS		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_1$	
	GTT		FSRSDHLTTHQRTHTG		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	TGG		EKPYKCPECGKSFSTS		$CX_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_1$	
	GAG		GSLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gaagtttgg	GGC		KCPECGKSFSQSSNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_1$	
gagggccag	CAG		RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
att	ATT		S		$X_{29}X_{30}$	
gtttgggag	GTT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
ggccagatt	TGG		FSSKKALTEHQRTHTG		$X_{13}X_{14}X_{15}X_{16}SKKALTEHX_{17}X_{18}X_{19}$	

[1128]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
cac	GAG		EKPYKCPECGKSFSHK		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	GGC		NALQNHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$HKNALQNHX$_{17}X_{18}X_1$	
	CAG		KCPECGKSFSRADNLT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	ATT		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RADNLTEHX$_{17}X_{18}X$	
	CAC		CGKSFSDPGHLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$DPGHLVRHX$_{17}X_{18}$	
			FSRSDNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDNLVRHX$_{17}X_1$	
			DHLTTHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTSGSLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDHLTTHX$_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	gag		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	CAG		FSTSGSLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$TSGSLVRHX$_{17}X_{18}X_{19}$	
	AAT		EKPYKCPECGKSFSQS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gagcagaat	GGA		SNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$QSSNLVRHX$_{17}X_{18}X_1$	
ggactggaa	CTG		KCPECGKSFSRNDALT		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
gtt	GAA		EHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RNDALTEHX$_{17}X_{18}X$	

[1129]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	GTT		CGKSFSQRAHLERHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{18}$	
			FSTTGNLTVHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRA		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
			DNLTEHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDNLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}RADNLTEHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDNLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AAT		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_1$	
	GGA		KCPECGKSFSTSGSLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	CTG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X$	
	GAA		CGKSFSQSSNLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
aatggactg	GTT		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}$	
gaagtttgg	TGG		FSRNDALTEHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
gag	GAG		EKPYKCPECGKSFSQR		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_1$	

[1130]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
			AHLERHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			KCPECGKSFSTTGNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	
			VHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_{1}$	
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_{1}X_{2}X_{3}X_{4}X_{5}X_{6}X_{7}X_{8}X_{9}CX_{10}X_{11}CX_{12}$	
			FSDPGHLVRHQRTHTG		$X_{13}X_{14}X_{15}X_{16}DPGHLVRHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX_{1}$	
			DNLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}RSDNLVRHX_{17}X_{18}X_{1}$	
			KCPECGKSFSRSDHLT		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}CX$	
			THQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X$	
			CGKSFSTSGSLVRHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}C$	
	GGA		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}$	
	CTG		FSQSSNLVRHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
	GAA		EKPYKCPECGKSFSRN		$CX_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{1}$	
	GTT		DALTEHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggactggaa	TGG		KCPECGKSFSQRAHLE		$CX_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{1}$	
gtttgggag	GAG		RHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{8}X_{9}CX_{10}X_{11}$	
ggc	GGC		S		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_{1}$	

[1131]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向1栏中靶位点的锌指DNA结合域多肽的氨基酸序列结构（参见上述表1B及其说明）	7栏 SEQ ID NO:
					$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
			LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
			FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	
			EKPYKCPECGKSFSTS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
			GSLVRHQRTHTGEKPY		$_{2}X_{13}X_{14}X_{15}X_{16}TSGSLVRHX_{17}X_{18}X_1$	
			KCPECGKSFSQSSNLV		$_{9}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
			RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}QSSNLVRHX_{17}X_{18}X$	
			CGKSFSRNDALTEHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
	CAG		THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RNDALTEHX_{17}X_{18}$	
	AAT		FSQRAHLERHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
	GGA		EKPYKCPECGKSFSTT		$CX_{12}X_{13}X_{14}X_{15}X_{16}QRAHLERHX_{17}X_1$	
	CTG		GNLTVHQRTHTGEKPY		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
cagaatgga	GAA		KCPECGKSFSRADNLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}TTGNLTVHX_{17}X_1$	
ctggaagtt	GTT		EHQRTHTGEKPTGKKT		$_{8}X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}X_{29}X_{30}$	
tgg	TGG		S			
cctgggagc	CCT		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
agaatggac	ggg		FSRSDHLTTHQRTHTG		$X_{13}X_{14}X_{15}X_{16}RSDHLTTHX_{17}X_{18}X_{19}$	

[1132]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
tgg	AGC		EKPYKCPECGKSFSDP		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
	AGA		GNLVRHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$DPGNLVRH$X_{17}X_{18}X_1$	
	ATG		KCPECGKSFSRRDELN		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
	GAC		VHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$RRDELNVH$X_{17}X_{18}X$	
	TGG		CGKSFSQLAHLRAHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}$QLAHLRAH$X_{17}X_{18}$	
			FSERSHLREHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSRS		$CX_{12}X_{13}X_{14}X_{15}X_{16}$ERSHLREH$X_{17}X_1$	
			DKLVRHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSTKNSLT		$CX_{12}X_{13}X_{14}X_{15}X_{16}$RSDKLVRH$X_{17}X_1$	
			EHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}$TKNSLTEH$X_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$ $X_{29}X_{30}$	
	ggg		LEPGEKPYKCPECGKS		$X_1X_2X_3X_4X_5X_6X_7X_8X_9CX_{10}X_{11}CX_{12}$	
	AGC		FSRKDNLKNHQRTHTG		$X_{13}X_{14}X_{15}X_{16}$RKDNLKNH$X_{17}X_{18}X_{19}$	
	AGA		EKPYKCPECGKSFSRS		$HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX_1$	
gggagcaga	ATG		DHLTTHQRTHTGEKPY		$_2X_{13}X_{14}X_{15}X_{16}$RSDHLTTH$X_{17}X_{18}X_1$	
atggactgg	GAC		KCPECGKSFSDPGNLV		$_9HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}CX$	
aag	TGG		RHQRTHTGEKPYKCPE		$_{12}X_{13}X_{14}X_{15}X_{16}$DPGNLVRH$X_{17}X_{18}X$	

[1133]

1栏 HNF4α 表达控制区中靶位点的核苷酸序列	3栏 带空格的靶序列	2栏 SEQ ID NO.	4栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列	5栏 SEQ ID NO:	6栏 靶向 1 栏中靶位点的锌指 DNA 结合域多肽的氨基酸序列结构（参见上述表 1B 及其说明）	7栏 SEQ ID NO:
	AAG		CGKSFSRRDELNVHQR		$_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}C$	
			THTGEKPYKCPECGKS		$X_{12}X_{13}X_{14}X_{15}X_{16}RRDELNVHX_{17}X_{18}$	
			FSQLAHLRAHQRTHTG		$X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			EKPYKCPECGKSFSER		$CX_{12}X_{13}X_{14}X_{15}X_{16}QLAHLRAHX_{17}X_1$	
			SHLREHQRTHTGEKPY		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			KCPECGKSFSRSDKLV		$CX_{12}X_{13}X_{14}X_{15}X_{16}ERSHLREHX_{17}X_1$	
			RHQRTHTGEKPTGKKT		$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_8X_9CX_{10}X_{11}$	
			S		$CX_{12}X_{13}X_{14}X_{15}X_{16}RSDKLVRHX_{17}X_1$	
					$_8X_{19}HX_{20}X_{21}X_{22}X_{23}X_{24}X_{25}X_{26}X_{27}X_{28}$	
					$X_{29}X_{30}$	

[1134] 非正式序列表

[1135] SEQ ID NO.:95

[1136] ＞dCas9-VPR Protein

MAPKKKRKVGIHGVPAADKKYSIGLAIGTNSVGWAVITDEYKVPSKKFKVLGNTDRHSIKKNLIGALLFDSGETAEATRLKRTARR
RYTRRKNRICYLQEIFSNEMAKVDDSFFHRLEESFLVEEDKKHERHPIFGNIVDEVAYHEKYPTIYHLRKKLVDSTDKADLRLIYL
ALAHMIKFRGHFLIEGDLNPDNSDVDKLFIQLVQTYNQLFEENPINASGVDAKAILSARLSKSRRLENLIAQLPGEKKNGLFGNLI
ALSLGLTPNFKSNFDLAEDAKLQLSKDTYDDDLDNLLAQIGDQYADLFLAAKNLSDAILLSDILRVNTEITKAPLSASMIKRYDEH
HQDLTLLKALVRQQLPEKYKEIFFDQSKNGYAGYIDGGASQEEFYKFIKPILEKMDGTEELLVKLNREDLLRKQRTFDNGSIPHQI
HLGELHAILRRQEDFYPFLKDNREKIEKILTFRIPYYVGPLARGNSRFAWMTRKSEETITPWNFEEVVDKGASAQSFIERMTNFDK
NLPNEKVLPKHSLLYEYFTVYNELTKVKYVTEGMRKPAFLSGEQKKAIVDLLFKTNRKVTVKQLKEDYFKKIECFDSVEISGVEDR
FNASLGTYHDLLKIIKDKDFLDNEENEDILEDIVLTLTLFEDREMIEERLKTYAHLFDDKVMKQLKRRRYTGWGRLSRKLINGIRD
KQSGKTILDFLKSDGFANRNFMQLIHDDSLTFKEDIQKAQVSGQGDSLHEHIANLAGSPAIKKGILQTVKVVDELVKVMGRHKPEN
IVIEMARENQTTQKGQKNSRERMKRIEEGIKELGSQILKEHPVENTQLQNEKLYLYYLQNGRDMYVDQELDINRLSDYDVAAIVPQ
SFLKDDSIDNKVLTRSDKARGKSDNVPSEEVVKKMKNYWRQLLNAKLITQRKFDNLTKAERGGLSELDKAGFIKRQLVETRQITKH

[1137] VAQILDSRMNTKYDENDKLIREVKVITLKSKLVSDFRKDFQFYKVREINNYHHAHDAYLNAVVGTALIKKYPKLESEFVYGDYKVY
DVRKMIAKSEQEIGKATAKYFFYSNIMNFFKTEITLANGEIRKRPLIETNGETGEIVWDKGRDFATVRKVLSMPQVNIVKKTEVQT
GGFSKESILPKRNSDKLIARKKDWDPKKYGGFDSPTVAYSVLVVAKVEKGKSKKLKSVKELLGITIMERSSFEKNPIDFLEAKGYK
EVKKDLIIKLPKYSLFELENGRKRMLASAGELQKGNELALPSKYVNFLYLASHYEKLKGSPEDNEQKQLFVEQHKHYLDEIIEQIS
EFSKRVILADANLDKVLSAYNKHRDKPIREQAENIIHLFTLTNLGAPAAFKYFDTTIDRKRYTSTKEVLDATLIHQSITGLYETRI
DLSQLGGDKRPAATKKAGQAKKKKGRADALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRK
VGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFP
SGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLG
NSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMD
FSALLGSGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRIRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQP
LDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNE
ILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA

[1138] SEQ ID NO.:96

[1139] ＞dCas9-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGACAAGAAGUACAGCAUCGGCCUGGCCAUCGGCACCAACAGCGUGGGCUGGGCCGUGAUCACCGACGAGUACAA
GGUGCCCAGCAAGAAGUUCAAGGUGCUGGGCAACACCGACCGGCACAGCAUCAAGAAGAACCUGAUCGGCGCCCUGCUGUUCGACA
GCGGCGAGACCGCCGAGGCCACCCGGCUGAAGCGGACCGCCCGGCGGCGGUACACCCGGCGGAAGAACCGGAUCUGCUACCUGCAG
GAGAUCUUCAGCAACGAGAUGGCCAAGGUGGACGACAGCUUCUUCCACCGGCUGGAGGAGAGCUUCCUGGUGGAGGAGGACAAGAA
GCACGAGCGGCACCCCAUCUUCGGCAACAUCGUGGACGAGGUGGCCUACCACGAGAAGUACCCCACCAUCUACCACCUGCGGAAGA
AGCUGGUGGACAGCACCGACAAGGCCGACCUGCGGCUGAUCUACCUGGCCCUGGCCCACAUGAUCAAGUUCCGGGGCCACUUCCUG
AUCGAGGGCGACCUGAACCCCGACAACAGCGACGUGGACAAGCUGUUCAUCCAGCUGGUGCAGACCUACAACCAGCUGUUCGAGGA
GAACCCCAUCAACGCCAGCGGCGUGGACGCCAAGGCCAUCCUGAGCGCCCGGCUGAGCAAGAGCCGGCGGCUGGAGAACCUGAUCG
CCCAGCUGCCCGGCGAGAAGAAGAACGGCCUGUUCGGCAACCUGAUCGCCCUGAGCCUGGGCCUGACCCCCAACUUCAAGAGCAAC

[1140]

UUCGACCUGGCCGAGGACGCCAAGCUGCAGCUGAGCAAGGACACCUACGACGACGACCUGGACAACCUGCUGGCCCAGAUCGGCGA

CCAGUACGCCGACCUGUUCCUGGCCGCCAAGAACCUGAGCGACGCCAUCCUGCUGAGCGACAUCCUGCGGGUGAACACCGAGAUCA

CCAAGGCCCCCCUGAGCGCCAGCAUGAUCAAGCGGUACGACGAGCACCACCAGGACCUGACCCUGCUGAAGGCCCUGGUGCGGCAG

CAGCUGCCCGAGAAGUACAAGGAGAUCUUCUUCGACCAGAGCAAGAACGGCUACGCCGGCUACAUCGACGGCGGCGCCAGCCAGGA

GGAGUUCUACAAGUUCAUCAAGCCCAUCCUGGAGAAGAUGGACGGCACCGAGGAGCUGCUGGUGAAGCUGAACCGGGAGGACCUGC

UGCGGAAGCAGCGGACCUUCGACAACGGCAGCAUCCCCCACCAGAUCCACCUGGGCGAGCUGCACGCCAUCCUGCGGCGGCAGGAG

GACUUCUACCCCUUCCUGAAGGACAACCGGGAGAAGAUCGAGAAGAUCCUGACCUUCCGGAUCCCCUACUACGUGGGCCCCCUGGC

CCGGGGCAACAGCCGGUUCGCCUGGAUGACCCGGAAAUCCGAGGAGACCAUCACCCCCUGGAACUUCGAGGAGGUGGUGGACAAGG

GCGCCAGCGCCCAGAGCUUCAUCGAGCGGAUGACCAACUUCGACAAGAACCUGCCCAACGAGAAGGUGCUGCCCAAGCACAGCCUG

CUGUACGAGUACUUCACCGUGUACAACGAGCUGACCAAGGUGAAGUACGUGACCGAGGGCAUGCGGAAGCCCGCCUUCCUGAGCGG

CGAGCAGAAGAAGGCCAUCGUGGACCUGCUGUUCAAGACCAACCGGAAGGUGACCGUGAAGCAGCUGAAGGAGGACUACUUCAAGA

AGAUCGAGUGCUUCGACAGCGUGGAGAUCAGCGGCGUGGAGGACCGGUUCAACGCCAGCCUGGGCACCUACCACGACCUGCUGAAG

AUCAUCAAGGACAAGGACUUCCUGGACAACGAGGAGAACGAGGACAUCCUGGAGGACAUCGUGCUGACCCUGACCCUGUUCGAGGA

CCGGGAGAUGAUCGAGGAGCGGCUGAAAACCUACGCCCACCUGUUCGACGACAAGGUGAUGAAGCAGCUGAAGCGGCGGCGGUACA

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[1141] CGUGGAGAACACCCAGCUGCAGAACGAGAAGCUGUACCUGUACUACCUGCAGAACGGCCGGGACAUGUACGUGGACCAGGAGCUGG

ACAUCAACCGGCUGAGCGACUACGACGUGGCCGCCAUCGUGCCCCAGAGCUUCCUGAAGGACGACAGCAUCGACAACAAGGUGCUG

ACCCGGAGCGACAAGGCCCGGGGCAAGAGCGACAACGUGCCCAGCGAGGAGGUGGUGAAGAAGAUGAAGAACUACUGGCGGCAGCU

GCUGAACGCCAAGCUGAUCACCCAGCGGAAGUUCGACAACCUGACCAAGGCCGAGCGGGGCGGCCUGAGCGAGCUGGACAAGGCCG

GCUUCAUCAAGCGGCAGCUGGUGGAGACCCGGCAGAUCACCAAGCACGUGGCCCAGAUCCUGGACAGCCGGAUGAACACCAAGUAC

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UGGAGCAGCACAAGCACUACCUGGACGAGAUCAUCGAGCAGAUCAGCGAGUUCAGCAAGCGGGUGAUCCUGGCCGACGCCAACCUG

GACAAGGUGCUGAGCGCCUACAACAAGCACCGGGACAAGCCCAUCCGGGAGCAGGCCGAGAACAUCAUCCACCUGUUCACCCUGAC

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CCACCCUGAUCCACCAGAGCAUCACCGGCCUGUACGAGACCCGGAUCGACCUGAGCCAGCUGGGCGGCGACAAGCGGCCCGCCGCC

ACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCCGGGCCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGC

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CGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCAUCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCG

GCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGCGUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCA

GCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCC

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UGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGGCAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGC

GUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCGUGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCC

CGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACG

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UGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCCCCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCAC

CUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCCUGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGA

GGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGGGGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGA

CCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGAGAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCAC

GCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGUUCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGG

CCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGG

GCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1142]

[1143] SEQ ID NO.:97

[1144] >dCas9 amino acid sequence

DKKYSIGLAIGTNSVGWAVITDEYKVPSKKFKVLGNTDRHSIKKNLIGALLFDSGETAEATRLKRTARRYTRRKNRICYLQEIFS

NEMAKVDDSFFHRLEESFLVEEDKKHERHPIFGNIVDEVAYHEKYPTIYHLRKKLVDSTDKADLRLIYLALAHMIKFRGHFLIEGD

LNPDNSDVDKLFIQLVQTYNQLFEENPINASGVDAKAILSARLSKSRRLENLIAQLPGEKKNGLFGNLIALSLGLTPNFKSNFDLA

EDAKLQLSKDTYDDDLDNLLAQIGDQYADLFLAAKNLSDAILLSDILRVNTEITKAPLSASMIKRYDEHHQDLTLLKALVRQQLPE

KYKEIFFDQSKNGYAGYIDGGASQEEFYKFIKPILEKMDGTEELLVKLNREDLLRKQRTFDNGSIPHQIHLGELHAILRRQEDFYP

FLKDNREKIEKILTFRIPYYVGPLARGNSRFAWMTRKSEETITPWNFEEVVDKGASAQSFIERMTNFDKNLPNEKVLPKHSLLYEY

FTVYNELTKVKYVTEGMRKPAFLSGEQKKAIVDLLFKTNRKVTVKQLKEDYFKKIECFDSVEISGVEDRFNASLGTYHDLLKIIKD

KDFLDNEENEDILEDIVLTLTLFEDREMIEERLKTYAHLFDDKVMKQLKRRRYTGWGRLSRKLINGIRDKQSGKTILDFLKSDGFA

NRNFMQLIHDDSLTFKEDIQKAQVSGQGDSLHEHIANLAGSPAIKKGILQTVKVVDELVKVMGRHKPENIVIEMARENQTTQKGQK

NSRERMKRIEEGIKELGSQILKEHPVENTQLQNEKLYLYYLQNGRDMYVDQELDINRLSDYDVAAIVPQSFLKDDSIDNKVLTRSD

KARGKSDNVPSEEVVKKMKNYWRQLLNAKLITQRKFDNLTKAERGGLSELDKAGFIKRQLVETRQITKHVAQILDSRMNTKYDEND

KLIREVKVITLKSKLVSDFRKDFQFYKVREINNYHHAHDAYLNAVVGTALIKKYPKLESEFVYGDYKVYDVRKMIAKSEQEIGKAT

AKYFFYSNIMNFFKTEITLANGEIRKRPLIETNGETGEIVWDKGRDFATVRKVLSMPQVNIVKKTEVQTGGFSKESILPKRNSDKL

IARKKDWDPKKYGGFDSPTVAYSVLVVAKVEKGKSKKLKSVKELLGITIMERSSFEKNPIDFLEAKGYKEVKKDLIIKLPKYSLFE

LENGRKRMLASAGELQKGNELALPSKYVNFLYLASHYEKLKGSPEDNEQKQLFVEQHKHYLDEIIEQISEFSKRVILADANLDKVL

SAYNKHRDKPIREQAENIIHLFTLTNLGAPAAFKYFDTTIDRKRYTSTKEVLDATLIHQSITGLYETRIDLSQLGGD

[1145]

[1146]

[1147] SEQ ID NO.:300

[1148] >dCas9 mRNA sequence

[1149]

GACAAGAAGUACAGCAUCGGCCUGGCCAUCGGCACCAACAGCGUGGGCUGGGCCGUGAUCACCGACGAGUACAAGGUGCCCAGCAA

GAAGUUCAAGGUGCUGGGCAACACCGACCGGCACAGCAUCAAGAAGAACCUGAUCGGCGCCCUGCUGUUCGACAGCGGCGAGACCG

CCGAGGCCACCCGGCUGAAGCGGACCGCCCGGCGGCGGUACACCCGGCGGAAGAACCGGAUCUGCUACCUGCAGGAGAUCUUCAGC

AACGAGAUGGCCAAGGUGGACGACAGCUUCUUCCACCGGCUGGAGGAGAGCUUCCUGGUGGAGGAGGACAAGAAGCACGAGCGGCA

CCCCAUCUUCGGCAACAUCGUGGACGAGGUGGCCUACCACGAGAAGUACCCCACCAUCUACCACCUGCGGAAGAAGCUGGUGGACA

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GUUCAUCAAGCCCAUCCUGGAGAAGAUGGACGGCACCGAGGAGCUGCUGGUGAAGCUGAACCGGGAGGACCUGCUGCGGAAGCAGC

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[1150]

GGAGAUCAACAACUACCACCACGCCCACGACGCCUACCUGAACGCCGUGGUGGGCACCGCCCUGAUCAAGAAGUACCCCAAGCUGG
AGAGCGAGUUCGUGUACGGCGACUACAAGGUGUACGACGUGCGGAAGAUGAUCGCCAAGAGCGAGCAGGAGAUCGGCAAGGCCACC
GCCAAGUACUUCUUCUACAGCAACAUCAUGAACUUCUUCAAGACCGAGAUCACCCUGGCCAACGGCGAGAUCCGGAAGCGGCCCCU
GAUCGAGACCAACGGCGAGACCGGCGAGAUCGUGUGGGACAAGGGCCGGGACUUCGCCACCGUGCGGAAGGUGCUGAGCAUGCCCC
AGGUGAACAUCGUGAAGAAAACCGAGGUGCAGACCGGCGGCUUCAGCAAGGAGAGCAUCCUGCCCAAGCGGAACAGCGACAAGCUG
AUCGCCCGGAAGAAGGACUGGGACCCCAAGAAGUACGGCGGCUUCGACAGCCCCACCGUGGCCUACAGCGUGCUGGUGGUGGCCAA
GGUGGAGAAGGGCAAGAGCAAGAAGCUGAAAUCCGUGAAGGAGCUGCUGGGCAUCACCAUCAUGGAGCGGAGCAGCUUCGAGAAGA
ACCCCAUCGACUUCCUGGAGGCCAAGGGCUACAAGGAGGUGAAGAAGGACCUGAUCAUCAAGCUGCCCAAGUACAGCCUGUUCGAG
CUGGAGAACGGCCGGAAGCGGAUGCUGGCCAGCGCCGGCGAGCUGCAGAAGGGCAACGAGCUGGCCCUGCCCAGCAAGUACGUGAA
CUUCCUGUACCUGGCCAGCCACUACGAGAAGCUGAAGGGCAGCCCCGAGGACAACGAGCAGAAGCAGCUGUUCGUGGAGCAGCACA
AGCACUACCUGGACGAGAUCAUCGAGCAGAUCAGCGAGUUCAGCAAGCGGGUGAUCCUGGCCGACGCCAACCUGGACAAGGUGCUG
AGCGCCUACAACAAGCACCGGGACAAGCCCAUCCGGGAGCAGGCCGAGAACAUCAUCCACCUGUUCACCCUGACCAACCUGGGCGC
CCCCGCCGCCUUCAAGUACUUCGACACCACCAUCGACCGGAAGCGGUACACCAGCACCAAGGAGGUGCUGGACGCCACCCUGAUCC
ACCAGAGCAUCACCGGCCUGUACGAGACCCGGAUCGACCUGAGCCAGCUGGGCGGCGAC

[1151] SEQ ID NO.:98

[1152] ＞dCas9-P300 protein

[1153]

MAPKKKRKVGIHGVPAADKKYSIGLAIGTNSVGWAVITDEYKVPSKKFKVLGNTDRHSIKKNLIGALLFDSGETAEATRLKRTARR
RYTRRKNRICYLQEIFSNEMAKVDDSFFHRLEESFLVEEDKKHERHPIFGNIVDEVAYHEKYPTIYHLRKKLVDSTDKADLRLIYL
ALAHMIKFRGHFLIEGDLNPDNSDVDKLFIQLVQTYNQLFEENPINASGVDAKAILSARLSKSRRLENLIAQLPGEKKNGLFGNLI
ALSLGLTPNFKSNFDLAEDAKLQLSKDTYDDDLDNLLAQIGDQYADLFLAAKNLSDAILLSDILRVNTEITKAPLSASMIKRYDEH
HQDLTLLKALVRQQLPEKYKEIFFDQSKNGYAGYIDGGASQEEFYKFIKPILEKMDGTEELLVKLNREDLLRKQRTFDNGSIPHQI
HLGELHAILRRQEDFYPFLKDNREKIEKILTFRIPYYVGPLARGNSRFAWMTRKSEETITPWNFEEVVDKGASAQSFIERMTNFDK
NLPNEKVLPKHSLLYEYFTVYNELTKVKYVTEGMRKPAFLSGEQKKAIVDLLFKTNRKVTVKQLKEDYFKKIECFDSVEISGVEDR
FNASLGTYHDLLKIIKDKDFLDNEENEDILEDIVLTLTLFEDREMIEERLKTYAHLFDDKVMKQLKRRRYTGWGRLSRKLINGIRD
KQSGKTILDFLKSDGFANRNFMQLIHDDSLTFKEDIQKAQVSGQGDSLHEHIANLAGSPAIKKGILQTVKVVDELVKVMGRHKPEN
IVIEMARENQTTQKGQKNSRERMKRIEEGIKELGSQILKEHPVENTQLQNEKLYLYYLQNGRDMYVDQELDINRLSDYDVAAIVPQ
SFLKDDSIDNKVLTRSDKARGKSDNVPSEEVVKKMKNYWRQLLNAKLITQRKFDNLTKAERGGLSELDKAGFIKRQLVETRQITKH
VAQILDSRMNTKYDENDKLIREVKVITLKSKLVSDFRKDFQFYKVREINNYHHAHDAYLNAVVGTALIKKYPKLESEFVYGDYKVY
DVRKMIAKSEQEIGKATAKYFFYSNIMNFFKTEITLANGEIRKRPLIETNGETGEIVWDKGRDFATVRKVLSMPQVNIVKKTEVQT
GGFSKESILPKRNSDKLIARKKDWDPKKYGGFDSPTVAYSVLVVAKVEKGKSKKLKSVKELLGITIMERSSFEKNPIDFLEAKGYK
EVKKDLIIKLPKYSLFELENGRKRMLASAGELQKGNELALPSKYVNFLYLASHYEKLKGSPEDNEQKQLFVEQHKHYLDEIIEQIS
EFSKRVILADANLDKVLSAYNKHRDKPIREQAENIIHLFTLTNLGAPAAFKYFDTTIDRKRYTSTKEVLDATLIHQSITGLYETRI
DLSQLGGDKRPAATKKAGQAKKKKGRAIFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKL
DTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYY
SYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKK
SARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFE
EIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHC
HPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNE
STDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCD
LMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1154]

[1155] SEQ ID NO.:99

[1156] ＞dCas9-p300 mRNA

[1157]

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

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GGUGCCCAGCAAGAAGUUCAAGGUGCUGGGCAACACCGACCGGCACAGCAUCAAGAAGAACCUGAUCGGCGCCCUGCUGUUCGACA

GCGGCGAGACCGCCGAGGCCACCCGGCUGAAGCGGACCGCCCGGCGGCGGUACACCCGGCGGAAGAACCGGAUCUGCUACCUGCAG

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AGCUGGUGGACAGCACCGACAAGGCCGACCUGCGGCUGAUCUACCUGGCCCUGGCCCACAUGAUCAAGUUCCGGGGCCACUUCCUG

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CCGGGAGAUGAUCGAGGAGCGGCUGAAAACCUACGCCCACCUGUUCGACGACAAGGUGAUGAAGCAGCUGAAGCGGCGGCGGUACA

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CGGCUGCCCAGCACCCGGCUGGGCACCUUCCUGGAGAACCGGGUGAACGACUUCCUGCGGCGGCAGAACCACCCCGAGAGCGGCGA

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ACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCU

CUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1159] AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1160] SEQ ID NO.:100

[1161] ＞ZF1-VPR protein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSSRRTCRAHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1162]

[1163] SEQ ID No.:101

[1164] ＞ZF1-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGCGUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCGGGUGAGAAGCCAUACAAGUGCCCAGAAUGCGGCAAGAGCUUUAGCCGCAGCGAUAAUCUGGUUCGUCAUCAGCGCACGCAUACGGGUGAGAAACCGUACAAAUGUCCAGAAUGCGGCAAAAGCUUUAGUCGCAGCGAUCAUCUGACGAAUCACCAGCGCACCCAUACCGGCGAAAAACCGUACAAGUGCCCGGAGUGCGGUAAAAGCUUCAGCGACCCGGGUCAUCUGGUGCGCCACCAACGCACGCACACCGGUGAGAAACCAUAUAAAUGUCCAGAGUGCGGCAAGAGUUUUAGCCAGCGUGCCCAUCUGGAACGUCAUCAGCGUACCCACACGGGUGAAAAACCAUAUAAGUGCCCGGAGUGCGGUAAGAGUUUUAGUAGCCGCCGUACGUGCCGUGCGCACCAACGCACCCACACCGGUGAAAAGCCAUACAAGUGUCCGGAAUGCGGCAAGAGCUUCAGCCGCAGCGACAAACUCACCGAACAUCAACGUACCCAUACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGUGGCAAAAGCUUCAGUCGCAACGAUACGCUGACCGAGCAUCAGCGUACGCACACCGGCGAAAAGCCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAAGGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCAUCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGCGUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGGCAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCGUGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGACUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCAUCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGGCCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCCCCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCCUGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGGGGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGAGAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGUUCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAA

[1167] SEQ ID NO.:102

[1168] >ZF1 target sequence

[1169] CCGCGGCGTGGAGGCAGGGAG

[1170] SEQ ID NO.:103

[1171] >ZF1 amino acid sequence

[1172] LEPGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSSRRTCRAHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPTGKKTS

[1173] SEQ ID NO.:211

[1174] >ZF1 mRNA sequence

[1175] CUGGAGCCGGGUGAGAAGCCAUACAAGUGCCCAGAAUGCGGCAAGAGCUUUAGCCGCAGCGAUAAUCUGGUUCGUCAUCAGCGCACGCAUACGGGUGAGAAACCGUACAAAUGUCCAGAAUGCGGCAAAAGCUUUAGUCGCAGCGAUCAUCUGACGAAUCACCAGCGCACCCAUACCGGCGAAAAACCGUACAAGUGCCCGGAGUGCGGUAAAAGCUUCAGCGACCCGGGUCAUCUGGUGCGCCACCAACGCACGCACACCGGUGAGAAACCAUAUAAAUGUCCAGAGUGCGGCAAGAGUUUUAGCCAGCGUGCCCAUCUGGAACGUCAUCAGCGUACCCACACGGGUGAAAAACCAUAUAAGUGCCCGGAGUGCGGUAAGAGUUUUAGUAGCCGCCGUACGUGCCGUGCGCACCAACGCACCCACACCGGUGAAAAGCCAUACAAGUGUCCGGAAUGCGGCAAGAGCUUCAGCCGCAGCGACAAACUCACCGAACAUCAACGUACCCAUACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGUGGCAAAAGCUUCAGUCGCAACGAUACGCUGACCGAGCAUCAGCGUACGCACACCGGCGAAAAGCCAACCGGCAAGAAAACCAGC

[1176] SEQ ID NO.:104

[1177] >ZF2-VPR protein

[1178] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSSKKALTEHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSDKKDLTRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1180] SEQ ID NO.:105

[1181] >ZF2-VPR mRNA

[1182]
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CAGUAAUCUGGUUCGUCACCAGCGCACCCACACGGGUGAAAAGCCAUACAAAUGUCCAGAGUGUGGUAAGAGUUUCAGUAGCAAAA
AGCAUCUGGCGGAACACCAACGUACGCAUACGGGUGAAAAGCCGUACAAGUGUCCGGAAUGUGGCAAGAGCUUUAGCAGCAAGAAG
GCGCUGACCGAACAUCAGCGUACCCAUACCGGUGAAAAACCAUACAAGUGCCCGGAGUGCGGCAAAAGUUUCAGCGAUUGUCGCGA
UCUGGCCCGUCAUCAACGCACCCACACCGGCGAGAAACCAUAUAAGUGUCCGGAGUGCGGUAAAAGCUUUAGCGAUCCGGGCCAUC
UGGUUCGCCACCAACGCACGCACACCGGCGAGAAACCGUAUAAGUGCCCAGAGUGCGGUAAGAGUUUUAGCCGUAACGAUGCGCUG
ACGGAGCAUCAGCGCACGCACACGGGCGAGAAACCAUAUAAAUGCCCGGAAUGUGGUAAGAGCUUCAGUGACAAAAAGGAUCUGAC
CCGCCAUCAACGUACGCAUACGGGCGAGAAGCCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA
GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA
UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC
GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
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UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC
CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA
CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA
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CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC
UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG
GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA
GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU
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UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAA

[1183] SEQ ID NO.:106

[1184] >ZF2 target sequence

[1185] ACCCTGGGCGCCCACCCCGAA

[1186] SEQ ID NO.:107

[1187] >ZF2 amino acid sequence

[1188]
LEPGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSSKKALTEHQRTH
TGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTG
EKPYKCPECGKSFSDKKDLTRHQRTHTGEKPTGKKTS

[1189] SEQ ID NO.:212

[1190] >ZF2 mRNA sequence

[1191] CUGGAACCGGGCGAGAAACCGUACAAGUGCCCAGAAUGCGGUAAAAGCUUCAGCCAGAGCAGUAAUCUGGUUCGUCACCAGCGCAC
CCACACGGGUGAAAAGCCAUACAAAUGUCCAGAGUGUGGUAAGAGUUUCAGUAGCAAAAAGCAUCUGGCGGAACACCAACGUACGC
AUACGGGUGAAAAGCCGUACAAGUGUCCGGAAUGUGGCAAGAGCUUUAGCAGCAAGAAGGCGCUGACCGAACAUCAGCGUACCCAU
ACCGGUGAAAAACCAUACAAGUGCCCGGAGUGCGGCAAAAGUUUCAGCGAUUGUCGCGAUCUGGCCCGUCAUCAACGCACCCACAC
CGGCGAGAAACCAUAUAAGUGUCCGGAGUGCGGUAAAAGCUUUAGCGAUCCGGGCCAUCUGGUUCGCCACCAACGCACGCACACCG
GCGAGAAACCGUAUAAGUGCCCAGAGUGCGGUAAGAGUUUUAGCCGUAACGAUGCGCUGACGGAGCAUCAGCGCACGCACACGGGC
GAGAAACCAUAUAAAUGCCCGGAAUGUGGUAAGAGCUUCAGUGACAAAAAGGAUCUGACCCGCCAUCAACGUACGCAUACGGGCGA
GAAGCCAACCGGCAAGAAAACCAGC

[1192] SEQ ID No.:108

[1193] ＞ZF3-VPR protein

[1194] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPY
KCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSRKDNLKNHQRTHTGEKPYKC
PECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1195] SEQ ID NO.:109

[1196] ＞ZF3-VPR mRNA

[1197] AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAGAAACCAUAUAAGUGUCCGGAAUGUGGUAAAAGUUUUAGCCGCAG
CGAUAAUCUCGUGCGUCACCAGCGUACGCAUACCGGUGAGAAGCCAUACAAGUGUCCGGAGUGUGGCAAAAGCUUCAGUCAGCUGG

[1198]

CGCAUCUGCGCGCGCAUCAGCGCACCCACACCGGUGAGAAACCGUACAAGUGUCCAGAAUGCGGCAAAAGCUUUAGCGAUCCGGGU
CAUCUGGUGCGUCAUCAACGUACGCACACGGGCGAAAAACCGUACAAAUGUCCGGAGUGCGGCAAGAGCUUCAGCCAGAGCAGCAA
UCUGGUUCGCCACCAGCGUACGCACACCGGUGAAAAGCCAUACAAGUGCCCGGAGUGCGGCAAGAGUUUCAGUCGCAAGGACAAUC
UGAAGAACCAUCAACGCACCCAUACGGGCGAGAAGCCGUACAAAUGUCCGGAAUGCGGUAAAAGUUUUAGCCAAGCCGGUCAUCUG
GCCAGCCAUCAGCGUACCCAUACGGGUGAGAAACCGUAUAAAUGUCCAGAAUGUGGUAAGAGUUUCAGCACCAGCGGUAGUCUGGU
UCGUCAUCAACGCACGCAUACGGGUGAAAAACCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA
GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA
UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC
GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG
CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC
AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG
CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG
UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC
CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA
CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA
UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG
CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC
CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC
UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG
GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA
GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1199] SEQ ID No.:110

[1200] ＞ZF3 target sequence

[1201] GTTTGAAAGGAAGGCAGAGAG

[1202] SEQ ID NO.:111

[1203] ＞ZF3 amino acid sequence

[1204] LEPGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTH
TGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSRKDNLKNHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTG
EKPYKCPECGKSFSTSGSLVRHQRTHTGEKPTGKKTS

[1205] SEQ ID NO.:213

[1206] ＞ZF3 mRNA

[1207]

CUCGAACCGGGCGAGAAACCAUAUAAGUGUCCGGAAUGUGGUAAAAGUUUUAGCCGCAGCGAUAAUCUCGUGCGUCACCAGCGUAC
GCAUACCGGUGAGAAGCCAUACAAGUGUCCGGAGUGUGGCAAAAGCUUCAGUCAGCUGGCGCAUCUGCGCGCGCAUCAGCGCACCC
ACACCGGUGAGAAACCGUACAAGUGUCCAGAAUGCGGCAAAAGCUUUAGCGAUCCGGGUCAUCUGGUGCGUCAUCAACGUACGCAC
ACGGGCGAAAAACCGUACAAAUGUCCGGAGUGCGGCAAGAGCUUCAGCCAGAGCAGCAAUCUGGUUCGCCACCAGCGUACGCACAC
CGGUGAAAAGCCAUACAAGUGCCCGGAGUGCGGCAAGAGUUUCAGUCGCAAGGACAAUCUGAAGAACCAUCAACGCACCCAUACGG
GCGAGAAGCCGUACAAAUGUCCGGAAUGCGGUAAAAGUUUUAGCCAAGCCGGUCAUCUGGCCAGCCAUCAGCGUACCCAUACGGGU
GAGAAACCGUAUAAAUGUCCAGAAUGUGGUAAGAGUUUCAGCACCAGCGGUAGUCUGGUUCGUCAUCAACGCACGCAUACGGGUGA
AAAACCAACCGGCAAGAAAACCAGC

[1208] SEQ ID NO.:112

[1209] ＞ZF4-VPR protein

[1210]

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPY
KCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTTGALTEHQRTHTGEKPYKCPECGKSFSTSGNLVRHQRTHTGEKPYKC
PECGKSFSQSGDLRRHQRTHTGEKPYKCPECGKSFSTSHSLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1211] SEQ ID NO.:113

[1212] ＞ZF4-mRNA

[1213]

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAAAAGCCGUAUAAGUGCCCGGAAUGCGGCAAGAGUUUUAGCCAGCG
CGCCCAUCUGGAACGUCACCAGCGUACCCAUACCGGUGAAAAGCCAUAUAAAUGCCCAGAAUGUGGUAAAAGCUUUAGUCAGCUGG
CCCAUCUGCGCGCCCACCAACGUACGCACACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGCGGUAAAAGCUUCAGCAGCAAAAAG
CAUCUGGCGGAACAUCAACGUACCCACACCGGCGAGAAACCAUACAAGUGCCCGGAAUGCGGUAAAAGCUUCAGCACCACCGGUGC
GCUGACGGAGCAUCAGCGCACCCACACGGGCGAAAAACCGUAUAAGUGUCCGGAGUGUGGCAAAAGUUUUAGUACCAGCGGCAAUC
UGGUGCGCCAUCAACGUACGCAUACCGGCGAGAAGCCAUAUAAAUGUCCAGAGUGUGGCAAGAGCUUUAGCCAAAGCGGUGAUCUG
CGUCGCCACCAACGCACGCACACCGGCGAAAAACCAUACAAAUGUCCGGAAUGCGGUAAGAGUUUCAGCACGAGCCAUAGUCUGAC
CGAACAUCAACGUACCCAUACGGGUGAGAAACCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA
GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA
UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC
GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

[1214] CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1215] SEQ ID NO.:114

[1216] ＞ZF4 target sequence

[1217] CCAGCAGATCTTCCCAGAGGA

[1218] SEQ ID NO.:115

[1219] ＞ZF4 amino acid sequence

LEPGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTH

[1220] TGEKPYKCPECGKSFSTTGALTEHQRTHTGEKPYKCPECGKSFSTSGNLVRHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTG

EKPYKCPECGKSFSTSHSLTEHQRTHTGEKPTGKKTS

[1221] SEQ ID NO.:214

[1222] ＞ZF4 mRNA sequence

CUCGAACCGGGCGAAAAGCCGUAUAAGUGCCCGGAAUGCGGCAAGAGUUUUAGCCAGCGCGCCCAUCUGGAACGUCACCAGCGUAC

CCAUACCGGUGAAAAGCCAUAUAAAUGCCCAGAAUGUGGUAAAAGCUUUAGUCAGCUGGCCCAUCUGCGCGCCCACCAACGUACGC

ACACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGCGGUAAAAGCUUCAGCAGCAAAAAGCAUCUGGCGGAACAUCAACGUACCCAC

ACCGGCGAGAAACCAUACAAGUGCCCGGAAUGCGGUAAAAGCUUCAGCACCACCGGUGCGCUGACGGAGCAUCAGCGCACCCACAC

[1223] GGGCGAAAAACCGUAUAAGUGUCCGGAGUGUGGCAAAAGUUUUAGUACCAGCGGCAAUCUGGUGCGCCAUCAACGUACGCAUACCG

GCGAGAAGCCAUAUAAAUGUCCAGAGUGUGGCAAGAGCUUUAGCCAAAGCGGUGAUCUGCGUCGCCACCAACGCACGCACACCGGC

GAAAAACCAUACAAAUGUCCGGAAUGCGGUAAGAGUUUCAGCACGAGCCAUAGUCUGACCGAACAUCAACGUACCCAUACGGGUGA

GAAACCAACCGGCAAGAAAACCAGC

[1224] SEQ ID NO.:116

[1225] ＞ZF5-VPR protein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1226]

[1227] SEQ ID NO.:117

[1228] ＞ZF5-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGCGUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAGAAACCAUAUAAGUGUCCAGAGUGUGGUAAGAGCUUUAGCACCAGUGGCAAUCUGACCGAGCAUCAACGCACGCAUACGGGUGAGAAACCGUACAAGUGCCCGGAAUGCGGCAAAAGUUUCAGCGAUAGCGGCAAUCUGCGUGUGCACCAGCGUACGCAUACGGGCGAAAAGCCGUAUAAGUGCCCAGAAUGCGGUAAGAGUUUUAGCCACAAAAACGCGCUGCAGAACCACCAGCGCACCCACACGGGUGAGAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCCGCAACGAUACGCUGACGGAACACCAACGUACGCAUACCGGCGAAAAGCCAUACAAGUGCCCGGAGUGCGGUAAAAGCUUUAGCCAGCGCGCGCAUCUCGAACGUCAUCAACGUACCCAUACCGGUGAAAAACCAUAUAAAUGCCCGGAAUGUGGUAAAAGUUUUAGCCGCAGCGACAAACUGGUGCGUCAUCAACGCACCCAUACCGGUGAAAAGCCAUAUAAGUGCCCGGAGUGUGGUAAAAGCUUCAGCGAUCCGGGUCAUCUGGUUCGCCAUCAACGUACGCACACCGGCGAGAAGCCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAAGGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCAUCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGCGUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGGCAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCGUGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGACUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCAUCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGGCCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCCCCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCCUGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGGGGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGAGAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGUUCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAA

[1231] SEQ ID NO.:118

[1232] >ZF5 target sequence

[1233] GGCGGGGGACCGATTAACCAT

[1234] SEQ ID NO.:119

[1235] >ZF5 amino acid sequence

[1236] LEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTS

[1237] SEQ ID NO.:215

[1238] >ZF5 mRNA sequence

[1239] CUCGAACCGGGCGAGAAACCAUAUAAGUGUCCAGAGUGUGGUAAGAGCUUUAGCACCAGUGGCAAUCUGACCGAGCAUCAACGCACGCAUACGGGUGAGAAACCGUACAAGUGCCCGGAAUGCGGCAAAAGUUUCAGCGAUAGCGGCAAUCUGCGUGUGCACCAGCGUACGCAUACGGGCGAAAAGCCGUAUAAGUGCCCAGAAUGCGGUAAGAGUUUUAGCCACAAAAACGCGCUGCAGAACCACCAGCGCACCCACACGGGUGAGAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCCGCAACGAUACGCUGACGGAACACCAACGUACGCAUACCGGCGAAAAGCCAUACAAGUGCCCGGAGUGCGGUAAAAGCUUUAGCCAGCGCGCGCAUCUCGAACGUCAUCAACGUACCCAUACCGGUGAAAAACCAUAUAAAUGCCCGGAAUGUGGUAAAAGUUUUAGCCGCAGCGACAAACUGGUGCGUCAUCAACGCACCCAUACCGGUGAAAAGCCAUAUAAGUGCCCGGAGUGUGGUAAAAGCUUCAGCGAUCCGGGUCAUCUGGUUCGCCAUCAACGUACGCACACCGGCGAGAAGCCAACCGGCAAGAAAACCAGC

[1240] SEQ ID NO.:120

[1241] >ZF6-VPR protein

[1242] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSHSLTEHQRTHTGEKPYKCPECGKSFSQRANLRAHQRTHTGEKPYKCPECGKSFSRADNLTEHQRTHTGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSDPGALVRHQRTHTGEKPYKCPECGKSFSTSGHLVRHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1243] SEQ ID NO.:121

[1244] >ZF6-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

GUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAAAAACCGUAUAAGUGUCCGGAGUGCGGCAAGAGCUUCAGCACGAG

CCAUAGUCUGACCGAACACCAGCGCACCCACACGGGCGAAAAGCCGUACAAAUGUCCAGAGUGUGGUAAGAGUUUCAGCCAGCGUG

CCAAUCUGCGCGCCCACCAACGUACCCACACCGGUGAGAAGCCGUAUAAGUGCCCAGAGUGUGGUAAAAGCUUCAGCCGCGCCGAU

AAUCUGACGGAGCACCAACGCACCCACACCGGCGAAAAGCCAUACAAGUGCCCGGAGUGUGGCAAGAGCUUUAGCGAACGCAGCCA

UCUGCGCGAACACCAACGUACGCACACGGGUGAGAAACCAUACAAAUGUCCAGAAUGUGGUAAAAGUUUUAGCGAUCCGGGCGCGC

UGGUUCGCCACCAGCGCACGCACACCGGUGAAAAGCCGUAUAAAUGUCCAGAAUGCGGCAAAAGCUUCAGUACCAGCGGUCAUCUG

GUUCGUCAUCAGCGUACCCAUACCGGCGAGAAGCCAUAUAAGUGCCCGGAGUGUGGCAAAAGUUUCAGCCGCAAUGAUACGCUGAC

CGAGCAUCAGCGUACGCAUACCGGUGAAAAACCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

[1245] CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1246] SEQ ID NO.:122

[1247] >ZF6 target sequence

[1248] CCGGGTGTCAGCCAGAAACCA

[1249] SEQ ID No.:123

[1250] >ZF6 amino acid sequence

LEPGEKPYKCPECGKSFSTSHSLTEHQRTHTGEKPYKCPECGKSFSQRANLRAHQRTHTGEKPYKCPECGKSFSRADNLTEHQRTH

[1251] TGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSDPGALVRHQRTHTGEKPYKCPECGKSFSTSGHLVRHQRTHTG

EKPYKCPECGKSFSRNDTLTEHQRTHTGEKPTGKKTS

[1252] SEQ ID NO.:216

[1253] >ZF6 mRNA sequence

[1254] CUCGAACCGGGCGAAAAACCGUAUAAGUGUCCGGAGUGCGGCAAGAGCUUCAGCACGAGCCAUAGUCUGACCGAACACCAGCGCAC
CCACACGGGCGAAAAGCCGUACAAAUGUCCAGAGUGUGGUAAGAGUUUCAGCCAGCGUGCCAAUCUGCGCGCCCACCAACGUACCC
ACACCGGUGAGAAGCCGUAUAAGUGCCCAGAGUGUGGUAAAAGCUUCAGCCGCGCCGAUAAUCUGACGGAGCACCAACGCACCCAC
ACCGGCGAAAAGCCAUACAAGUGCCCGGAGUGUGGCAAGAGCUUUAGCGAACGCAGCCAUCUGCGCGAACACCAACGUACGCACAC
GGGUGAGAAACCAUACAAAUGUCCAGAAUGUGGUAAAAGUUUUAGCGAUCCGGGCGCGCUGGUUCGCCACCAGCGCACGCACACCG
GUGAAAAGCCGUAUAAAUGUCCAGAAUGCGGCAAAAGCUUCAGUACCAGCGGUCAUCUGGUUCGUCAUCAGCGUACCCAUACCGGC
GAGAAGCCAUAUAAGUGCCCGGAGUGUGGCAAAAGUUUCAGCCGCAAUGAUACGCUGACCGAGCAUCAGCGUACGCAUACCGGUGA
AAAACCAACCGGCAAGAAAACCAGC

[1255] SEQ ID NO.:124

[1256] >ZF7-VPR protein

[1257] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPY
KCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKC
PECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1258] SEQ ID No.:125

[1259] >ZF7-VPR mRNA

[1260] AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAG
CGACCAUCUGACCAAUCACCAACGCACCCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUG
GCAGUCUGGUUCGUCAUCAGCGCACGCACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGU
CAUCUGGCGAGCCAUCAACGUACGCACACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAA
ACUGACCGAACACCAACGUACGCAUACGGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUC
UGACCGAGCAUCAACGUACCCAUACCGGUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUG
GUGCGCCAUCAGCGUACCCACACGGGUGAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAU

CCGUCAUCAGCGCACCCACACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

[1261] CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1262] SEQ ID NO.:

[1263] ＞ZF7.4-VPR mRNA sequence

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCGAAGAAAAAGAGGAAGGUCGGGAUCCACGGA

GUCCCAGCCGCAGGAAGCAGCGGAAGCCUGGAACCCGGAGAAAAACCCUACAAGUGCCCAGAAUGCGGCAAGAGCUUCAGCCGCAG

CGACCACCUGACCAACCACCAGAGAACCCACACCGGAGAAAAGCCAUACAAAUGCCCAGAGUGCGGGAAAAGCUUCAGCACAAGCG

GCAGCCUCGUCAGGCACCAGCGGACACACACCGGCGAGAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAAGCCGGA

CACCUCGCCAGCCACCAGAGGACCCACACAGGAGAGAAACCGUACAAAUGCCCGGAGUGCGGCAAGAGCUUCAGCCGGAGCGACAA

GCUGACCGAACACCAGCGAACCCACACGGGCGAAAAGCCGUACAAGUGCCCCGAGUGCGGAAAAAGCUUCAGCACGAGCGGAAACC

[1264] UCACCGAGCACCAGCGCACCCACACGGGAGAGAAGCCGUACAAGUGCCCCGAAUGCGGAAAGAGCUUCAGCCAGAGCAGCAACCUC

GUGCGCCACCAACGGACGCACACAGGGGAAAAGCCCUACAAGUGCCCGGAAUGCGGCAAAAGCUUCAGCACCCACCUGGACCUGAU

CCGGCACCAACGCACGCACACCGGGGAAAAACCGACCGGAAAAAAGACCAGCGCGAGCGGAAGCGGAGGAGGAAGCGGAGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGGAGCGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAAGCGACGCGCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUCGACGACUUCGACCUCGACAUGCUGAGCGGCGGACCCAAGAAGAAGAGAAA

GGUCGGAAGCCAGUACCUCCCGGACACCGACGACAGGCACCGCAUCGAAGAGAAGCGGAAAAGAACCUACGAAACCUUCAAGAGCA

UCAUGAAAAAGAGCCCGUUCAGCGGACCAACCGACCCCAGACCACCACCGAGAAGAAUCGCGGUCCCAAGCAGGAGCAGCGCCAGC

[1265]

GUCCCGAAGCCAGCCCCACAGCCGUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
GAGCGGCCAGAUAAGCCAGGCCAGCGCACUGGCACCAGCCCCACCGCAAGUGCUGCCCCAAGCACCCGCACCAGCACCCGCCCCCG
CGAUGGUCAGCGCCCUGGCACAAGCCCCAGCCCCAGUCCCGGUGCUCGCACCAGGACCACCCCAAGCAGUCGCACCGCCAGCCCCA
AAGCCGACCCAAGCCGGAGAAGGCACCCUCAGCGAGGCGCUCCUGCAACUCCAAUUCGACGACGAGGACCUGGGAGCCCUGCUGGG
CAACAGCACCGACCCGGCAGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAAUUCCAGCAGCUCCUGAACCAAGGAAUCCCAG
UCGCGCCACACACCACCGAGCCGAUGCUGAUGGAAUACCCAGAAGCGAUCACGAGACUGGUCACCGGGGCCCAAAGACCGCCGGAC
CCAGCGCCAGCACCACUGGGAGCCCCAGGACUGCCCAACGGACUGCUCAGCGGCGACGAGGACUUCAGCAGCAUCGCGGACAUGGA
CUUCAGCGCACUCCUCGGAAGCGGAAGCGGCAGCAGAGACAGCCGGGAAGGAAUGUUCCUCCCCAAGCCAGAAGCCGGAAGCGCAA
UCAGCGACGUGUUCGAAGGACGGGAAGUCUGCCAGCCGAAGCGCCUCAGACCGUUCCACCCACCGGGAAGCCCAUGGGCCAACAGA
CCGCUGCCAGCCAGCCUGGCACCGACCCCAACCGGACCAGUCCACGAACCAGUCGGCAGCCUGACACCAGCACCAGUGCCCCAGCC
ACUGGACCCAGCACCGGCAGUGACCCCAGAAGCCAGCCACCUCCUGGAGGACCCCGACGAAGAAACCAGCCAGGCCGUGAAGGCCC
UGAGGGAGAUGGCCGACACGGUGAUCCCACAGAAGGAAGAAGCAGCGAUCUGCGGCCAAAUGGACCUCAGCCACCCACCGCCAAGA
GGCCACCUGGACGAGCUCACCACCACCCUGGAAAGCAUGACCGAGGACCUCAACCUCGACAGCCCCCUGACACCGGAGCUCAACGA
GAUCCUGGACACCUUCCUCAACGACGAAUGCCUGCUCCACGCCAUGCACAUCAGCACCGGACUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGGGGAAAACGACCGGCAGCCACCAAAAAGGCCGGACAGGCGAAGAAGAAGAAGGGGAGCUACCCGUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1266] SEQ ID NO.:126

[1267] ＞ZF7 target sequence

[1268] ACTGAACATCGGTGAGTTAGG

[1269] SEQ ID NO.:127

[1270] ＞ZF7 amino acid sequence

[1271]

LEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTH
TGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTG
EKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTS

[1272] SEQ ID NO.:217

[1273] ＞ZF7 mRNA

[1274]

CUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAGCGACCAUCUGACCAAUCACCAACGCAC
CCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUGGCAGUCUGGUUCGUCAUCAGCGCACGC
ACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGUCAUCUGGCGAGCCAUCAACGUACGCAC
ACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAAACUGACCGAACACCAACGUACGCAUAC
GGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUCUGACCGAGCAUCAACGUACCCAUACCG
GUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUGGUGCGCCAUCAGCGUACCCACACGGGU
GAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAUCCGUCAUCAGCGCACCCACACCGGUGA
AAAACCAACCGGCAAGAAAACCAGU

[1275] SEQ ID NO.:

[1276] ＞ZF7.4mRNA sequence

[1277]

CUGGAACCCGGAGAAAAACCCUACAAGUGCCCAGAAUGCGGCAAGAGCUUCAGCCGCAGCGACCACCUGACCAACCACCAGAGAAC
CCACACCGGAGAAAAGCCAUACAAAUGCCCAGAGUGCGGGAAAAGCUUCAGCACAAGCGGCAGCCUCGUCAGGCACCAGCGGACAC
ACACCGGCGAGAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAAGCCGGACACCUCGCCAGCCACCAGAGGACCCAC
ACAGGAGAGAAACCGUACAAAUGCCCGGAGUGCGGCAAGAGCUUCAGCCGGAGCGACAAGCUGACCGAACACCAGCGAACCCACAC
GGGCGAAAAGCCGUACAAGUGCCCCGAGUGCGGAAAAAGCUUCAGCACGAGCGGAAACCUCACCGAGCACCAGCGCACCCACACGG
GAGAGAAGCCGUACAAGUGCCCCGAAUGCGGAAAGAGCUUCAGCCAGAGCAGCAACCUCGUGCGCCACCAACGGACGCACACAGGG
GAAAAGCCCUACAAGUGCCCGGAAUGCGGCAAAAGCUUCAGCACCCACCUGGACCUGAUCCGGCACCAACGCACGCACACCGGGGA
AAAACCGACCGGAAAAAAGACCAGC

[1278] SEQ ID NO.:128

[1279] ＞ZF8-VPR protein

[1280]

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTTHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTHTGEKPY
KCPECGKSFSRRDELNVHQRTHTGEKPYKCPECGKSFSSPADLTRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKC
PECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSTTGALTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1281] SEQ ID No.:129

[1282] ＞ZF8-VPR mRNA

[1283]

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAACCGGGCGAAAAGCCGUACAAGUGCCCGGAAUGUGGCAAAAGUUUUAGUCGCAG
CGAUCAUCUGACCACCCAUCAGCGUACCCAUACCGGUGAGAAGCCAUACAAAUGCCCAGAAUGUGGUAAGAGCUUUAGCACCAGCG
GCGAGCUGGUUCGUCACCAGCGUACCCACACCGGCGAGAAGCCGUAUAAGUGUCCAGAAUGCGGUAAAAGCUUUAGCCGCCGCGAC
GAGCUGAAUGUGCAUCAACGCACCCACACGGGCGAGAAGCCAUAUAAGUGCCCGGAGUGUGGUAAGAGUUUCAGUAGCCCAGCGGA
UCUGACCCGUCAUCAACGUACGCACACGGGCGAGAAACCAUACAAGUGUCCGGAGUGCGGCAAAAGUUUUAGCCGCAGUGAUGAAC
UGGUGCGCCACCAGCGCACCCAUACCGGCGAAAAACCGUAUAAGUGCCCAGAGUGCGGUAAGAGCUUCAGCCGCAGCGACAAACUG
GUGCGUCACCAGCGCACGCAUACGGGUGAGAAACCGUACAAGUGCCCGGAGUGCGGCAAAAGCUUCAGCACCACCGGCGCGCUGAC
CGAACAUCAACGUACCCAUACGGGUGAGAAACCAACGGGCAAAAAGACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA
GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

[1284] UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1285] SEQ ID NO.:130

[1286] ＞ZF8 target sequence

[1287] CTTGGGGTGACAATGGCTTGG

[1288] SEQ ID NO.:131

[1289] ＞ZF8 amino acid sequence

LEPGEKPYKCPECGKSFSRSDHLTTHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFSRRDELNVHQRTH

[1290] TGEKPYKCPECGKSFSSPADLTRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTG

EKPYKCPECGKSFSTTGALTEHQRTHTGEKPTGKKTS

[1291] SEQ ID NO.:218

[1292] ＞ZF8 mRNA sequence

CUGGAACCGGGCGAAAAGCCGUACAAGUGCCCGGAAUGUGGCAAAAGUUUUAGUCGCAGCGAUCAUCUGACCACCCAUCAGCGUAC

CCAUACCGGUGAGAAGCCAUACAAAUGCCCAGAAUGUGGUAAGAGCUUUAGCACCAGCGGCGAGCUGGUUCGUCACCAGCGUACCC

ACACCGGCGAGAAGCCGUAUAAGUGUCCAGAAUGCGGUAAAAGCUUUAGCCGCCGCGACGAGCUGAAUGUGCAUCAACGCACCCAC

[1293] ACGGGCGAGAAGCCAUAUAAGUGCCCGGAGUGUGGUAAGAGUUUCAGUAGCCCAGCGGAUCUGACCCGUCAUCAACGUACGCACAC

GGGCGAGAAACCAUACAAGUGUCCGGAGUGCGGCAAAAGUUUUAGCCGCAGUGAUGAACUGGUGCGCCACCAGCGCACCCAUACCG

GCGAAAAACCGUAUAAGUGCCCAGAGUGCGGUAAGAGCUUCAGCCGCAGCGACAAACUGGUGCGUCACCAGCGCACGCAUACGGGU

GAGAAACCGUACAAGUGCCCGGAGUGCGGCAAAAGCUUCAGCACCACCGGCGCGCUGACCGAACAUCAACGUACCCAUACGGGUGA

[1294] GAAACCAACGGGCAAAAAGACCAGC

[1295] SEQ ID NO.:132

[1296] ＞ZF9-VPR protein

[1297]

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQSGNLTEHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSQNSTLTEHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTSGNLVRHQRTHTGEKPYKCPECGKSFSQSGHLTEHQRTHTPNPHRRTDPSHKPFQYKCPECGKSFSDKKDLTRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1298] SEQ ID NO.:133

[1299] ＞ZF9-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGCGUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAAAAGCCAUACAAAUGUCCGGAGUGUGGCAAGAGUUUCAGCCAAAGCGGCAACCUCACCGAGCACCAGCGCACGCACACCGGCGAGAAGCCAUAUAAAUGUCCAGAAUGCGGCAAGAGCUUCAGCCAUAAGAAUGCGCUGCAGAACCAUCAGCGCACCCACACCGGUGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGUUUCAGCCAGAAUAGCACCCUCACGGAGCAUCAACGCACGCAUACGGGUGAAAAGCCGUACAAAUGCCCAGAAUGUGGCAAGAGCUUUAGCAGCAAGAAACAUCUGGCGGAGCAUCAGCGUACCCACACGGGCGAAAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCACGAGUGGCAAUCUGGUGCGCCAUCAACGUACGCACACGGGUGAGAAACCGUAUAAAUGCCCAGAGUGUGGUAAAAGCUUCAGUCAGAGCGGCCAUCUGACCGAACACCAGCGCACCCAUACGCCAAACCCGCAUCGCCGCACCGAUCCGAGCCACAAGCCGUUCCAGUACAAGUGUCCAGAGUGCGGUAAAAGUUUUAGCGACAAGAAGGAUCUGACCCGUCACCAACGUACCCAUACCGGUGAAAAACCAACGGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGA

[1300]

CAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAAGGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCAUCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGCGUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGGCAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCGUGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGACUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCAUCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCCACCCCCCCGGCAGCCCCUGGGCCAACCGGCCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCCCCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCCUGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGGGGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGAGAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGUUCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAA

[1302] SEQ ID NO.:134

[1303] ＞ZF9 target

[1304] ACCTCCGAGATCCCCTAATTCAA

[1305] SEQ ID NO.:135

[1306] ＞ZF9 amino acid sequence

[1307] LEPGEKPYKCPECGKSFSQSGNLTEHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSQNSTLTEHQRTH TGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTSGNLVRHQRTHTGEKPYKCPECGKSFSQSGHLTEHQRTHTP NPHRRTDPSHKPFQYKCPECGKSFSDKKDLTRHQRTHTGEKPTGKKTS

[1308] SEQ ID NO.:219

[1309] ＞ZF9 mRNA sequnce

[1310] CUCGAACCGGGCGAAAAGCCAUACAAAUGUCCGGAGUGUGGCAAGAGUUUCAGCCAAAGCGGCAACCUCACCGAGCACCAGCGCAC GCACACCGGCGAGAAGCCAUAUAAAUGUCCAGAAUGCGGCAAGAGCUUCAGCCAUAAGAAUGCGCUGCAGAACCAUCAGCGCACCC ACACCGGUGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGUUUCAGCCAGAAUAGCACCCUCACGGAGCAUCAACGCACGCAU ACGGGUGAAAAGCCGUACAAAUGCCCAGAAUGUGGCAAGAGCUUUAGCAGCAAGAAACAUCUGGCGGAGCAUCAGCGUACCCACAC GGGCGAAAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCACGAGUGGCAAUCUGGUGCGCCAUCAACGUACGCACACGG GUGAGAAACCGUAUAAAUGCCCAGAGUGUGGUAAAAGCUUCAGUCAGAGCGGCCAUCUGACCGAACACCAGCGCACCCAUACGCCA AACCCGCAUCGCCGCACCGAUCCGAGCCACAAGCCGUUCCAGUACAAGUGUCCAGAGUGCGGUAAAAGUUUUAGCGACAAGAAGGA UCUGACCCGUCACCAACGUACCCAUACCGGUGAAAAACCAACGGGCAAGAAAACCAGC

[1311] SEQ ID NO.:136

[1312] ＞ZF10-VPR protein

[1313] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQNSTLTEHQRTHTGEKPYKCPECGKSFSERSHLREHQRTHTGEKPY KCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKC PECGKSFSQSGDLRRHQRTHTGEKPYKCPECGKSFSTKNSLTEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA KKKKGSYPYDVPDYA*

[1314]

[1315] SEQ ID NO.:137

[1316] ＞ZF10-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAGAAGCCCUACAAAUGUCCCGAGUGUGGCAAGUCCUUCUCCCAGAA

UAGCACACUGACAGAACACCAGAGGACACACACCGGCGAGAAACCUUAUAAGUGCCCCGAAUGCGGCAAAAGCUUUUCCGAGAGGA

GCCACCUGAGGGAACACCAGAGAACACACACCGGAGAAAAACCUUACAAAUGCCCCGAGUGCGGAAAGUCCUUCAGCAGCAAGAAG

CACCUGGCUGAACACCAGAGAACCCACACCGGCGAGAAGCCUUACAAGUGCCCCGAAUGUGGCAAAAGCUUCUCUAGAAACGACAC

ACUCACCGAGCACCAGAGAACCCACACCGGCGAAAAGCCUUAUAAGUGUCCCGAGUGUGGCAAGAGCUUCAGCGAUUGUAGAGAUC

UGGCCAGACACCAAAGGACCCACACCGGAGAAAAACCUUACAAGUGCCCCGAGUGUGGAAAGAGCUUUAGCCAAAGCGGCGAUCUG

AGGAGACACCAGAGAACACACACCGGCGAAAAACCCUAUAAGUGUCCCGAAUGCGGAAAAUCCUUCAGCACCAAAAACUCUCUGAC

CGAGCACCAAAGAACCCACACCGGCGAAAAGCCUACCGGCAAAAAGACAAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

[1317] CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1318] SEQ ID NO.:138

[1319] >ZF10 target sequence

[1320] CCTGCAGCCCCGCCCAGCCTA

[1321] SEQ ID NO.:139

[1322] >ZF10 amino acid sequence

LEPGEKPYKCPECGKSFSQNSTLTEHQRTHTGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTH

[1323] TGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTG

EKPYKCPECGKSFSTKNSLTEHQRTHTGEKPTGKKTS

[1324] SEQ ID NO.:220

[1325] >ZF10 mRNA sequence

[1326] CUGGAGCCCGGCGAGAAGCCCUACAAAUGUCCCGAGUGUGGCAAGUCCUUCUCCCAGAAUAGCACACUGACAGAACACCAGAGGAC
ACACACCGGCGAGAAACCUUAUAAGUGCCCCGAAUGCGGCAAAAGCUUUUCCGAGAGGAGCCACCUGAGGGAACACCAGAGAACAC
ACACCGGAGAAAAACCUUACAAAUGCCCCGAGUGCGGAAAGUCCUUCAGCAGCAAGAAGCACCUGGCUGAACACCAGAGAACCCAC
ACCGGCGAGAAGCCUUACAAGUGCCCCGAAUGUGGCAAAAGCUUCUCUAGAAACGACACACUCACCGAGCACCAGAGAACCCACAC
CGGCGAAAAGCCUUAUAAGUGUCCCGAGUGUGGCAAGAGCUUCAGCGAUUGUAGAGAUCUGGCCAGACACCAAAGGACCCACACCG
GAGAAAAACCUUACAAGUGCCCCGAGUGUGGAAAGAGCUUUAGCCAAAGCGGCGAUCUGAGGAGACACCAGAGAACACACACCGGC
GAAAAACCCUAUAAGUGUCCCGAAUGCGGAAAAUCCUUCAGCACCAAAAACUCUCUGACCGAGCACCAAAGAACCCACACCGGCGA
AAAGCCUACCGGCAAAAAGACAAGC

[1327] SEQ ID NO.:140

[1328] ＞ZF11-VPR protein

[1329] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSRADNLTEHQRTHTGEKPY
KCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTKNSLTEHQRTHTGEKPYKC
PECGKSFSDKKDLTRHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1330] SEQ ID NO.:141

[1331] ＞ZF11-VPR mRNA

[1332] AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAGAAACCCUACAAGUGUCCCGAGUGUGGCAAGAGCUUUUCCGAGAG
AAGCCACCUGAGGGAACACCAGAGAACCCACACCGGCGAGAAGCCUUACAAAUGCCCCGAAUGUGGAAAGAGCUUUUCUAGAGCCG
ACAAUCUGACCGAACACCAAAGAACCCACACCGGCGAAAAACCCUAUAAGUGUCCCGAGUGUGGAAAAAGCUUCUCUAGAAGCGAC
AAACUCACAGAGCACCAGAGGACACACACCGGCGAGAAGCCCUACAAAUGUCCCGAGUGCGGCAAAAGCUUCAGCAGCAAGAAGCA
CCUGGCCGAGCACCAAAGAACACACACCGGCGAAAAACCUUAUAAAUGCCCCGAGUGCGGCAAGUCCUUUUCCACCAAGAACUCUC

UGACAGAACACCAAAGGACACACACCGGAGAAAAACCCUACAAAUGUCCCGAAUGUGGCAAAUCCUUCAGCGAUAAGAAGGACCUC

ACCAGACACCAGAGGACACACACCGGCGAAAAACCUUAUAAAUGUCCCGAGUGCGGAAAGUCCUUCUCCAGCAAAAAGCACCUCGC

UGAGCACCAAAGGACCCACACCGGCGAGAAGCCCACCGGAAAAAAGACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

[1333] UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1334] SEQ ID NO.:142

[1335] ＞ZF11 target sequence

[1336] CCCACCCCTCCCCGGCAGAGC

[1337] SEQ ID NO.:143

[1338] ＞ZF11 amino acid sequence

LEPGEKPYKCPECGKSFSERSHLREHQRTHTGEKPYKCPECGKSFSRADNLTEHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTH

[1339] TGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTKNSLTEHQRTHTGEKPYKCPECGKSFSDKKDLTRHQRTHTG

EKPYKCPECGKSFSSKKHLAEHQRTHTGEKPTGKKTS

[1340] SEQ ID NO.:221

[1341] ＞ZF11 mRNA sequence

[1342] CUGGAGCCCGGCGAGAAACCCUACAAGUGUCCCGAGUGUGGCAAGAGCUUUUCCGAGAGAAGCCACCUGAGGGAACACCAGAGAAC

CCACACCGGCGAGAAGCCUUACAAAUGCCCCGAAUGUGGAAAGAGCUUUUCUAGAGCCGACAAUCUGACCGAACACCAAAGAACCC

ACACCGGCGAAAAACCCUAUAAGUGUCCCGAGUGUGGAAAAAGCUUCUCUAGAAGCGACAAACUCACAGAGCACCAGAGGACACAC

ACCGGCGAGAAGCCCUACAAAUGUCCCGAGUGCGGCAAAAGCUUCAGCAGCAAGAAGCACCUGGCCGAGCACCAAAGAACACACAC

[1343] CGGCGAAAAACCUUAUAAAUGCCCCGAGUGCGGCAAGUCCUUUUCCACCAAGAACUCUCUGACAGAACACCAAAGGACACACACCG

GAGAAAAACCCUACAAAUGUCCCGAAUGUGGCAAAUCCUUCAGCGAUAAGAAGGACCUCACCAGACACCAGAGGACACACACCGGC

GAAAAACCUUAUAAAUGUCCCGAGUGCGGAAAGUCCUUCUCCAGCAAAAAGCACCUCGCUGAGCACCAAAGGACCCACACCGGCGA

GAAGCCCACCGGAAAAAAGACCAGC

[1344] SEQ ID NO.:144

[1345] ＞ZF12-VPR protein

[1346]
MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPYKCPECGKSFSRKDNLKNHQRTHTGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSREDNLHTHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1347] SEQ ID NO.:145

[1348] ＞ZF12-VPR mRNA

[1349]
AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGCGUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAAAAGCCCUACAAAUGUCCCGAAUGUGGCAAGAGCUUCAGCAGCAAAAAGCACCUGGCUGAACACCAGAGGACCCACACCGGAGAGAAACCCUAUAAAUGUCCCGAGUGUGGAAAAAGCUUCAGCACCCACCUCGACCUCAUUAGGCACCAAAGAACCCACACCGGCGAAAAACCCUAUAAGUGUCCCGAGUGUGGAAAAUCCUUUUCUAGAAAGGACAAUCUCAAGAAUCACCAAAGAACACACACCGGCGAGAAACCUUACAAGUGUCCCGAGUGCGGAAAGUCCUUCUCCGACUGUAGAGAUCUGGCUAGACACCAGAGAACCCACACCGGCGAGAAGCCCUAUAAGUGCCCCGAGUGCGGCAAGUCCUUCUCUAGAGAGGACAAUCUGCACACACACCAGAGGACCCACACCGGCGAAAAACCUUACAAAUGCCCCGAGUGUGGCAAGAGCUUUAGCGAUCCCGGACACCUGGUGAGACACCAAAGAACCCACACCGGCGAGAAGCCUUACAAGUGUCCCGAAUGUGGAAAAUCCUUUAGCCAGCUGGCCCACCUGAG

GGCCCACCAAAGGACACACACCGGCGAAAAACCCACCGGCAAAAAGACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAAGGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCAUCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGCGUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

[1350] CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG
UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC
CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA
CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA
UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG
CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC
CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC
UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG
GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA
GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1351] SEQ ID NO.:146

[1352] ＞ZF12 target sequence

[1353] AGAGGCTAGGCCAAGACTCCC

[1354] SEQ ID NO.:147

[1355] ＞ZF12 amino acid sequence

[1356] LEPGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPYKCPECGKSFSRKDNLKNHQRTH
TGEKPYKCPECGKSFSDCRDLARHQRTHTGEKPYKCPECGKSFSREDNLHTHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTG
EKPYKCPECGKSFSQLAHLRAHQRTHTGEKPTGKKTS

[1357] SEQ ID NO.:222

[1358] ＞ZF12mRNA sequence

[1359] CUGGAGCCCGGCGAAAAGCCCUACAAAUGUCCCGAAUGUGGCAAGAGCUUCAGCAGCAAAAAGCACCUGGCUGAACACCAGAGGAC
CCACACCGGAGAGAAACCCUAUAAAUGUCCCGAGUGUGGAAAAAGCUUCAGCACCCACCUCGACCUCAUUAGGCACCAAAGAACCC
ACACCGGCGAAAAACCCUAUAAGUGUCCCGAGUGUGGAAAAUCCUUUUCUAGAAAGGACAAUCUCAAGAAUCACCAAAGAACACAC
ACCGGCGAGAAACCUUACAAGUGUCCCGAGUGCGGAAAGUCCUUCUCCGACUGUAGAGAUCUGGCUAGACACCAGAGAACCCACAC
CGGCGAGAAGCCCUAUAAGUGCCCCGAGUGCGGCAAGUCCUUCUCUAGAGAGGACAAUCUGCACACACACCAGAGGACCCACACCG
GCGAAAAACCUUACAAAUGCCCCGAGUGUGGCAAGAGCUUUAGCGAUCCCGGACACCUGGUGAGACACCAAAGAACCCACACCGGC
GAGAAGCCUUACAAGUGUCCCGAAUGUGGAAAAUCCUUUAGCCAGCUGGCCCACCUGAGGGCCCACCAAAGGACACACACCGGCGA
AAAACCCACCGGCAAAAAGACCAGC

[1360] SEQ ID NO.:148

[1361] ＞ZF13-VPR protein

[1362] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTGEKPY
KCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKC

[1363]

PECGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1364] SEQ ID NO.:149

[1365] ＞ZF13-VPR mRNA

[1366]

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAAAAGCCCUAUAAGUGCCCCGAGUGCGGCAAGAGCUUCUCUAGAAG
CGACAAACUCGUGAGACACCAGAGAACACACACCGGAGAGAAACCUUACAAGUGCCCCGAGUGUGGCAAGUCCUUCUCCCAAUCCG
GCGAUCUGAGGAGACACCAGAGAACCCACACCGGCGAAAAACCCUACAAAUGCCCCGAGUGCGGAAAGUCCUUUUCCACCUCCGGC
GAGCUCGUGAGACACCAAAGGACCCACACCGGCGAGAAGCCUUACAAGUGCCCCGAGUGCGGCAAAUCCUUCUCCAGAUCCGACAA
GCUCGUGAGGCACCAGAGGACACACACCGGAGAGAAACCUUAUAAGUGUCCCGAAUGUGGAAAGUCCUUCAGCGACCCCGGACACC
UGGUGAGACACCAGAGGACCCACACCGGCGAAAAGCCUUAUAAAUGUCCCGAGUGCGGAAAAAGCUUUUCUAGAAACGAUGCUCUG
ACAGAGCACCAAAGAACCCACACCGGCGAAAAACCCUACAAGUGUCCCGAGUGCGGAAAGAGCUUCAGCAGAAGCGACCACCUGAC
CAACCACCAGAGAACACACACCGGAGAAAAACCCACCGGCAAAAAGACCUCCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA
GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA
UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC
GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG
CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC
AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG
CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG
UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC
CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA
CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA
UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG
CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC
CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC
UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG
GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA
GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1368] SEQ ID NO.:150

[1369] ＞ZF13 target sequence

[1370] AGGCTGGGCGGGGCTGCAGGG

[1371] SEQ ID NO.:151

[1372] ＞ZF13 amino acid sequence

[1373] LEPGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPTGKKTS

[1374] SEQ ID NO.:223

[1375] ＞ZF13 mRNA sequence

[1376] CUGGAGCCCGGCGAAAAGCCCUAUAAGUGCCCCGAGUGCGGCAAGAGCUUCUCUAGAAGCGACAAACUCGUGAGACACCAGAGAACACACACCGGAGAGAAACCUUACAAGUGCCCCGAGUGUGGCAAGUCCUUCUCCCAAUCCGGCGAUCUGAGGAGACACCAGAGAACCCACACCGGCGAAAAACCCUACAAAUGCCCCGAGUGCGGAAAGUCCUUUUCCACCUCCGGCGAGCUCGUGAGACACCAAAGGACCCACACCGGCGAGAAGCCUUACAAGUGCCCCGAGUGCGGCAAAUCCUUCUCCAGAUCCGACAAGCUCGUGAGGCACCAGAGGACACACACCGGAGAGAAACCUUAUAAGUGUCCCGAAUGUGGAAAGUCCUUCAGCGACCCCGGACACCUGGUGAGACACCAGAGGACCCACACCGGCGAAAAGCCUUAUAAAUGUCCCGAGUGCGGAAAAAGCUUUUCUAGAAACGAUGCUCUGACAGAGCACCAAAGAACCCACACCGGCGAAAAACCCUACAAGUGUCCCGAGUGCGGAAAGAGCUUCAGCAGAAGCGACCACCUGACCAACCACCAGAGAACACACACCGGAGAAAACCCACCGGCAAAAAGACCUCC

[1377] SEQ ID NO.:152

[1378] ＞ZF14-VPR protein

[1379] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGHLVRHQRTHTGEKPYKCPECGKSFSTTGNLTVHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1380] SEQ ID NO.:153

[1381] ＞ZF14-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAAAAGCCCUACAAAUGUCCCGAAUGCGGCAAAUCCUUCUCCACCUC

CGGCCACCUCGUGAGACACCAGAGGACACACACCGGCGAGAAGCCUUAUAAGUGCCCCGAAUGCGGCAAAAGCUUCUCCACCACCG

GCAAUCUGACCGUCCACCAGAGAACACACACCGGCGAAAAACCUUAUAAGUGUCCCGAGUGUGGCAAAUCCUUUUCCACCAGCGGA

UCUCUGGUGAGACACCAAAGGACACACACCGGCGAAAAACCCUACAAAUGCCCCGAGUGUGGAAAAUCCUUCUCUAGAAGCGACAA

GCUGGUGAGACACCAGAGGACCCACACCGGCGAGAAACCCUACAAGUGCCCCGAAUGUGGCAAGAGCUUCUCUAGAUCCGACGAGC

UCGUGAGACACCAAAGAACCCACACCGGCGAAAAGCCUUACAAAUGUCCCGAGUGCGGAAAGAGCUUUAGCAGAAGCGAUAAGCUG

GUCAGACACCAAAGAACACACACCGGAGAAAAACCCUAUAAGUGCCCCGAGUGUGGCAAGUCCUUUAGCCAGAGAGCCCACCUGGA

GAGACACCAAAGAACCCACACCGGCGAAAAACCCACCGGAAAAAAGACAAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

[1382] CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1383] SEQ ID NO.:154

[1384] ＞ZF14 target sequence

[1385] GGAGGGGTGGGGGTTAATGGT

[1386] SEQ ID NO.:155

[1387] ＞ZF14 amino acid sequence

[1388] LEPGEKPYKCPECGKSFSTSGHLVRHQRTHTGEKPYKCPECGKSFSTTGNLTVHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTH

[1389] TGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTG
EKPYKCPECGKSFSQRAHLERHQRTHTGEKPTGKKTS

[1390] SEQ ID NO.:224

[1391] ＞ZF14 mRNA sequence

[1392] CUGGAGCCCGGCGAAAAGCCCUACAAAUGUCCCGAAUGCGGCAAAUCCUUCUCCACCUCCGGCCACCUCGUGAGACACCAGAGGAC
ACACACCGGCGAGAAGCCUUAUAAGUGCCCCGAAUGCGGCAAAAGCUUCUCCACCACCGGCAAUCUGACCGUCCACCAGAGAACAC
ACACCGGCGAAAAACCUUAUAAGUGUCCCGAGUGUGGCAAAUCCUUUUCCACCAGCGGAUCUCUGGUGAGACACCAAAGGACACAC
ACCGGCGAAAAACCCUACAAAUGCCCCGAGUGUGGAAAAUCCUUCUCUAGAAGCGACAAGCUGGUGAGACACCAGAGGACCCACAC
CGGCGAGAAACCCUACAAGUGCCCCGAAUGUGGCAAGAGCUUCUCUAGAUCCGACGAGCUCGUGAGACACCAAAGAACCCACACCG
GCGAAAAGCCUUACAAAUGUCCCGAGUGCGGAAAGAGCUUUAGCAGAAGCGAUAAGCUGGUCAGACACCAAAGAACACACACCGGA
GAAAAACCCUAUAAGUGCCCCGAGUGUGGCAAGUCCUUUAGCCAGAGAGCCCACCUGGAGAGACACCAAAGAACCCACACCGGCGA
AAAACCCACCGGAAAAAAGACAAGC

[1393] SEQ ID NO.:156

[1394] ＞ZF15-VPR protein

[1395] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTGEKPY
KCPECGKSFSTSGELVRHQRTHTGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKC
PECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP
PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL
APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA
ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL
RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA
ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA
KKKKGSYPYDVPDYA*

[1396] SEQ ID NO.:157

[1397] ＞ZF15-VPR mRNA

[1398] AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAGCCCGGCGAGAAGCCCUACAAAUGUCCCGAAUGUGGCAAGAGCUUCUCUAGAAA
CGACACACUGACCGAACACCAGAGAACACACACCGGCGAAAAACCUUAUAAAUGUCCCGAGUGUGGAAAAUCCUUCUCUAGAAAUG
ACGCUCUCACCGAGCACCAAAGAACACACACCGGCGAAAAGCCUUACAAAUGCCCCGAAUGUGGAAAGUCCUUCUCCACCUCCGGA
GAGCUGGUGAGACACCAGAGAACCCACACCGGCGAAAAACCCUACAAGUGCCCCGAGUGCGGAAAAAGCUUCUCUAGAAGCGAUAA
UCUGGUGAGACACCAAAGGACACACACCGGCGAGAAGCCCUAUAAGUGUCCCGAAUGCGGCAAGUCCUUUUCCAGAAGCGACGAAC
UGGUGAGACACCAGAGAACCCACACCGGAGAGAAGCCUUAUAAGUGUCCCGAGUGCGGAAAGAGCUUUUCUAGAUCCGACAAGCUC
GUGAGACACCAAAGGACCCACACCGGCGAGAAACCCUAUAAAUGUCCCGAGUGUGGCAAAUCCUUUUCCCAGAGCAGCAACCUCGU
GAGGCACCAGAGGACCCACACCGGCGAGAAACCCACCGGCAAAAAGACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

[1399] GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA
UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC
GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG
CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC
AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG
CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG
UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC
CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA
CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA
UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG
CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC
CCUGGACCCCGCCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC
UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG
GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA
GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1400] SEQ ID NO.:158

[1401] ＞ZF15 target sequence

[1402] GAAGGGGTGGAGGCTCTGCCG

[1403] SEQ ID NO.:159

[1404] ＞ZF15 emino acid sequence

[1405] LEPGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSRNDALTEHQRTHTGEKPYKCPECGKSFSTSGELVRHQRTH
TGEKPYKCPECGKSFSRSDNLVRHQRTHTGEKPYKCPECGKSFSRSDELVRHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTG
EKPYKCPECGKSFSQSSNLVRHQRTHTGEKPTGKKTS

[1406] SEQ ID NO.:225

[1407] ＞ZF15 mRNA sequence

[1408] CUGGAGCCCGGCGAGAAGCCCUACAAAUGUCCCGAAUGUGGCAAGAGCUUCUCUAGAAACGACACACUGACCGAACACCAGAGAAC
ACACACCGGCGAAAAACCUUAUAAAUGUCCCGAGUGUGGAAAAUCCUUCUCUAGAAAUGACGCUCUCACCGAGCACCAAAGAACAC
ACACCGGCGAAAAGCCUUACAAAUGCCCCGAAUGUGGAAAGUCCUUCUCCACCUCCGGAGAGCUGGUGAGACACCAGAGAACCCAC
ACCGGCGAAAAACCCUACAAGUGCCCCGAGUGCGGAAAAAGCUUCUCUAGAAGCGAUAAUCUGGUGAGACACCAAAGGACACACAC
CGGCGAGAAGCCCUAUAAGUGUCCCGAAUGCGGCAAGUCCUUUUCCAGAAGCGACGAACUGGUGAGACACCAGAGAACCCACACCG
GAGAGAAGCCUUAUAAGUGUCCCGAGUGCGGAAAGAGCUUUUCUAGAUCCGACAAGCUCGUGAGACACCAAAGGACCCACACCGGC
GAGAAACCCUAUAAAUGUCCCGAGUGUGGCAAAUCCUUUUCCCAGAGCAGCAACCUCGUGAGGCACCAGAGGACCCACACCGGCGA
GAAACCCACCGGCAAAAAGACCAGC

[1409]

[1410] SEQ ID NO.:160

[1411] ＞ZF5.1-VPR mRNA(ZF5-VPR ATUM Opt_1)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCGAAGAAAAAGCGCAAAGUCGGAAUCCAUGGU

GUCCCUGCGGCUGGAAGUUCCGGCUCCUUGGAACCGGGAGAGAAGCCUUAUAAGUGUCCGGAGUGUGGGAAGUCGUUCUCCACCUC

GGGCAACCUCACCGAACAUCAGCGCACACAUACGGGGGAGAAACCUUACAAAUGCCCGGAAUGUGGAAAGAGCUUCUCCGAUUCGG

GAAAUCUCAGAGUGCACCAACGCACCCACACAGGAGAAAAACCGUAUAAGUGCCCCGAAUGCGGGAAAUCGUUCUCCCACAAGAAU

GCGCUGCAGAACCACCAGAGGACACAUACUGGGGAGAAGCCCUACAAGUGUCCUGAAUGCGGAAAGUCCUUCUCGCGCAACGAUAC

UUUGACCGAGCACCAGCGCACUCACACCGGCGAAAAGCCGUACAAGUGCCCAGAGUGCGGUAAAAGCUUCUCGCAACGGGCCCAUC

UGGAACGGCACCAGCGGACUCACACUGGAGAAAAGCCCUACAAGUGUCCCGAGUGCGGGAAGUCCUUUUCCCGGUCCGAUAAGCUC

GUGCGCCACCAGAGAACCCAUACUGGAGAGAAACCGUACAAAUGUCCAGAAUGCGGCAAAUCCUUCUCGGACCCGGGACACCUCGU

GCGGCAUCAACGGACCCAUACCGGGGAAAAGCCCACCGGAAAGAAAACUAGCGCGUCAGGCUCUGGUGGAGGAUCGGGGGGAGAUG

CUCUGGACGACUUUGACCUUGACAUGCUUGGCUCCGACGCCCUUGACGACUUCGACCUCGAUAUGCUGGGAUCGGACGCCCUGGAU

GACUUCGAUCUGGACAUGUUGGGCUCGGACGCGCUAGACGAUUUUGACCUGGAUAUGCUGUCCGGAGGUCCCAAGAAGAAGCGGAA

GGUCGGCAGCCAGUAUCUGCCGGAUACUGAUGACCGGCACAGAAUCGAGGAGAAGCGAAAGCGGACCUACGAAACUUUCAAGAGCA

UUAUGAAGAAGUCCCCGUUCUCGGGUCCAACCGACCCCAGACCUCCUCCGCGGAGAAUUGCCGUGCCAAGCCGCUCAAGCGCCAGC

GUGCCCAAGCCAGCACCACAGCCCUACCCGUUCACCUCCUCCCUUUCGACCAUCAACUACGACGAAUUCCCAACCAUGGUGUUCCC

UAGCGGACAAAUCAGCCAGGCUUCCGCUCUGGCACCAGCCCCACCUCAAGUGCUCCCGCAAGCGCCUGCUCCAGCACCGGCUCCUG

[1412] CCAUGGUUUCAGCGCUGGCCCAAGCACCCGCUCCUGUGCCUGUGCUGGCCCCUGGACCACCACAAGCAGUAGCCCCGCCUGCACCU

AAGCCAACUCAGGCCGGCGAAGGAACCCUGAGCGAAGCGUUGCUGCAGCUUCAGUUCGACGACGAGGACCUGGGUGCCCUGUUGGG

CAACUCAACUGACCCUGCCGUGUUCACCGACCUGGCAUCCGUCGAUAACUCCGAGUUCCAGCAGUUGCUGAACCAGGGAAUCCCAG

UCGCCCCCCAUACCACCGAACCGAUGCUCAUGGAGUACCCCGAAGCCAUCACCAGACUGGUCACCGGCGCACAAAGGCCCCCUGAU

CCUGCUCCCGCACCUCUCGGUGCCCCUGGACUGCCAAACGGCCUUCUGUCCGGCGACGAGGACUUCUCGUCCAUCGCCGAUAUGGA

UUUCUCCGCCCUGCUCGGAUCCGGCAGCGGAUCACGCGACUCGCGCGAAGGGAUGUUCCUGCCGAAGCCUGAGGCUGGUUCCGCCA

UUAGCGACGUGUUCGAGGGGCGCGAAGUCUGCCAACCCAAGAGACUGCGCCCGUUUCAUCCCCCGGGAAGCCCUUGGGCCAACAGA

CCUCUGCCAGCCUCCCUGGCACCCACUCCGACUGGGCCUGUGCACGAACCCGUGGGCUCCCUGACUCCGGCACCAGUGCCACAGCC

CCUGGAUCCAGCCCCUGCUGUGACCCCGGAGGCCUCACACCUUCUGGAAGAUCCGGACGAGGAAACGUCCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCGGACACUGUGAUCCCUCAGAAAGAAGAGGCGGCCAUUUGCGGCCAGAUGGACCUCUCCCAUCCGCCUCCGAGA

GGACACCUGGAUGAACUCACGACCACCCUCGAGUCCAUGACCGAGGACCUGAACCUGGACUCCCCCCCUGACACCCGAACUCAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUCCACGCCAUGCACAUCUCAACCGGGCUGUCGAUCUUCGACACUAGCUUGU

UCUCUGGAGGAAAGAGGCCGGCCGCUACUAAGAAGGCCGGACAAGCGAAGAAGAAGAAGGGAUCGUACCCUUACGACGUGCCCGAC

UACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1413] SEQ ID NO.:226

[1414] ＞ZF5.1mRNA sequence

[1415] UUGGAACCGGGAGAGAAGCCUUAUAAGUGUCCGGAGUGUGGGAAGUCGUUCUCCACCUCGGGCAACCUCACCGAACAUCAGCGCAC

ACAUACGGGGGAGAAACCUUACAAAUGCCCGGAAUGUGGAAAGAGCUUCUCCGAUUCGGGAAAUCUCAGAGUGCACCAACGCACCC

ACACAGGAGAAAAACCGUAUAAGUGCCCCGAAUGCGGGAAAUCGUUCUCCCACAAGAAUGCGCUGCAGAACCACCAGAGGACACAU

ACUGGGGAGAAGCCCUACAAGUGUCCUGAAUGCGGAAAGUCCUUCUCGCGCAACGAUACUUUGACCGAGCACCAGCGCACUCACAC

[1416] CGGCGAAAAGCCGUACAAGUGCCCAGAGUGCGGUAAAAGCUUCUCGCAACGGGCCCAUCUGGAACGGCACCAGCGGACUCACACUG

GAGAAAAGCCCUACAAGUGUCCCGAGUGCGGGAAGUCCUUUUCCCGGUCCGAUAAGCUCGUGCGCCACCAGAGAACCCAUACUGGA

GAGAAACCGUACAAAUGUCCAGAAUGCGGCAAAUCCUUCUCGGACCCGGGACACCUCGUGCGGCAUCAACGGACCCAUACCGGGGA

AAAGCCCACCGGAAAGAAAACUAGC

[1417] SEQ ID NO.161

[1418] ＞zF5.2-VPR mRNA(zF5-VPR ATUM Opt_2)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCGAAGAAGAAGCGGAAGGUCGGCAUCCACGGA
GUGCCGGCAGCAGGGUCAUCAGGCUCCCUCGAACCCGGGGAAAAGCCGUACAAGUGUCCGGAGUGUGGGAAGUCAUUCUCCACUUC
CGGGAAUCUGACCGAGCAUCAACGCACCCACACUGGCGAGAAGCCCUACAAAUGCCCGGAGUGCGGAAAAUCGUUCUCGGACUCCG
GGAACCUUCGGGUCCACCAAAGGACUCAUACCGGGGAGAAACCGUACAAAUGUCCCGAAUGCGGGAAGUCGUUCAGCCAUAAGAAC
GCGCUGCAGAACCAUCAGAGGACCCAUACUGGAGAAAAGCCCUAUAAGUGUCCGGAAUGCGGAAAGUCGUUCUCACGCAACGACAC
CCUCACCGAACACCAGCGCACUCACACCGGAGAGAAGCCUUACAAGUGCCCGGAAUGUGGAAAGAGCUUCAGCCAGCGGGCACAUC
UGGAAAGACACCAGCGAACCCACACCGGGGAAAAACCGUAUAAGUGCCCCGAGUGUGGAAAGUCCUUUUCACGGUCCGAUAAGCUC
GUGCGCCACCAGAGAACUCACACUGGGGAGAAGCCGUACAAGUGUCCCGAGUGCGGCAAGAGCUUCUCAGAUCCGGGACACCUUGU
GCGACAUCAACGGACCCAUACCGGAGAAAAACCGACCGGGAAAAAGACCUCAGCAUCAGGCUCAGGAGGCGGAUCAGGAGGCGACG
CGCUCGAUGACUUCGAUCUGGACAUGUUGGGGUCCGACGCGCUUGACGACUUCGACCUUGAUAUGCUCGGAUCCGACGCCCUCGAC
GAUUUUGAUCUCGACAUGCUUGGGUCAGACGCCCUGGACGAUUUCGACCUGGACAUGCUGUCCGGUGGACCGAAAAAGAAGAGGAA
GGUCGGGUCCCAGUACCUCCCGGACACCGAUGACCGACACCGGAUUGAAGAGAAGCGCAAGAGAACCUACGAAACCUUCAAGUCGA
UUAUGAAGAAGUCGCCGUUCUCGGGACCGACUGAUCCCAGACCGCCGCCCAGAAGGAUUGCCGUGCCGUCGAGGUCAAGCGCCUCA
GUGCCGAAACCCGCUCCGCAACCGUACCCCUUCACCUCAUCACUUUCCACCAUCAACUACGAUGAGUUCCCCACCAUGGUGUUCCC
[1419] GUCCGGCCAGAUCUCACAGGCCUCAGCCCUUGCACCGGCACCGCCCCAAGUCCUUCCGCAAGCACCCGCACCCGCUCCCGCUCCGG
CAAUGGUGUCCGCGCUCGCACAAGCACCGGCUCCGGUGCCGGUCUUGGCUCCGGGACCGCCGCAAGCAGUGGCACCACCCGCUCCG
AAACCGACUCAGGCUGGGGAGGGAACCCUGUCCGAAGCCCUGCUGCAACUUCAAUUCGACGAUGAAGAUCUGGGCGCACUGUUGGG
AAACUCCACUGAUCCGGCAGUGUUCACCGAUCUGGCCUCGGUGGACAACUCCGAGUUCCAGCAGCUGCUCAACCAAGGGAUUCCGG
UCGCCCCGCAUACUACCGAGCCCAUGCUGAUGGAAUACCCGGAAGCAAUCACCCGGCUGGUCACUGGUGCACAAAGACCCCCCGAU
CCUGCUCCGGCACCGUUGGGAGCACCGGGGUUGCCCAAUGGGCUGCUUUCGGGGGACGAGGAUUUCUCGUCAAUUGCCGACAUGGA
CUUCUCGGCCCUGUUGGGAUCCGGAAGCGGAAGCAGGGACUCACGAGAGGGAAUGUUCCUACCGAAGCCCGAAGCGGGAUCAGCAA
UCUCAGACGUGUUUGAAGGCCGCGAAGUCUGCCAGCCGAAGCGCCUUCGCCCGUUCCAUCCGCCGGGAUCACCCUGGGCCAACAGA
CCCCUGCCGGCAUCACUGGCCCCGACUCCGACUGGUCCGGUGCACGAACCGGUCGGGAGCCUGACUCCGGCACCCGUGCCCCAACC
GUUGGAUCCGGCACCGGCAGUGACUCCGGAAGCUUCCCACCUCCUGGAGGAUCCGGACGAAGAGACUUCGCAGGCAGUGAAGGCCC
UGCGCGAAAUGGCGGACACCGUGAUUCCCCAGAAGGAAGAGGCAGCGAUCUGCGGGCAGAUGGACCUGUCACAUCCGCCCCCGAGA
GGACACCUGGACGAGCUGACCACUACCCUGGAAUCGAUGACUGAAGAUCUGAACCUGGACUCACCGCUGACUCCCGAGCUGAACGA
AAUCCUGGACACCUUCCUGAACGACGAGUGCCUUCUCCACGCCAUGCAUAUCUCCACCGGGCUGAGCAUCUUCGACACCUCGCUGU
UCUCGGGAGGAAAACGCCCGGCCGCAACUAAGAAGGCCGGACAGGCCAAGAAGAAGAAGGGGUCAUACCCGUACGACGUGCCCGAC
UAUGCGUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
[1420] UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1421] SEQ ID NO.:227

[1422] ＞ZF5.2mRNA sequence

CUCGAACCCGGGGAAAAGCCGUACAAGUGUCCGGAGUGUGGGAAGUCAUUCUCCACUUCCGGGAAUCUGACCGAGCAUCAACGCAC
CCACACUGGCGAGAAGCCCUACAAAUGCCCGGAGUGCGGAAAAUCGUUCUCGGACUCCGGGAACCUUCGGGUCCACCAAAGGACUC
AUACCGGGGAGAAACCGUACAAAUGUCCCGAAUGCGGGAAGUCGUUCAGCCAUAAGAACGCGCUGCAGAACCAUCAGAGGACCCAU
ACUGGAGAAAAGCCCUAUAAGUGUCCGGAAUGCGGAAAGUCGUUCUCACGCAACGACACCCUCACCGAACACCAGCGCACUCACAC
[1423] CGGAGAGAAGCCUUACAAGUGCCCGGAAUGUGGAAAGAGCUUCAGCCAGCGGGCACAUCUGGAAAGACACCAGCGAACCCACACCG
GGGAAAAACCGUAUAAGUGCCCCGAGUGUGGAAAGUCCUUUUCACGGUCCGAUAAGCUCGUGCGCCACCAGAGAACUCACACUGGG
GAGAAGCCGUACAAGUGUCCCGAGUGCGGCAAGAGCUUCUCAGAUCCGGGACACCUUGUGCGACAUCAACGGACCCAUACCGGAGA
AAAACCGACCGGGAAAAAGACCUCA

[1424] SEQ ID NO.:162

[1425] ＞zF5.3-VPR mRNA(zF5-VPR ATUM Opt_3)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGCAAGGUCGGGAUCCACGGA

GUCCCGGCAGCAGGAUCCUCAGGCUCACUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUUCUCGACCUC

CGGGAACCUGACCGAGCACCAGCGCACCCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCUCAGACUCGG

GAAACCUCAGGGUGCACCAGCGGACCCACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCCCACAAGAAC

GCGCUGCAGAACCACCAAAGAACCCACACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCGCAACGACAC

CCUCACCGAACACCAACGCACCCACACCGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAGAGGGCCCACC

UGGAAAGACACCAGAGAACCCACACCGGCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCAGACAAGCUG

GUCCGCCACCAAAGGACCCACACAGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGGACACCUGGU

CCGGCACCAGAGGACCCACACCGGGGAGAAGCCGACCGGCAAAAAGACCUCAGCGAGCGGAUCCGGAGGAGGAUCAGGGGGGGACG

CACUGGACGACUUCGACCUGGACAUGCUGGGAUCCGACGCACUGGACGACUUCGACCUAGACAUGCUCGGAUCGGACGCACUCGAC

GACUUCGACCUCGACAUGCUAGGAUCAGACGCACUAGACGACUUCGACCUCGACAUGCUGUCGGGAGGACCGAAGAAAAAGCGGAA

[1426] GGUCGGAUCACAGUACCUCCCGGACACCGACGACAGGCACAGAAUCGAAGAAAAACGCAAGCGCACCUACGAAACCUUCAAGAGCA

UCAUGAAAAAGUCGCCGUUCUCAGGACCGACCGACCCCAGACCGCCACCGAGGAGAAUAGCCGUCCCGAGCCGAUCCUCCGCAUCC

GUGCCGAAACCGGCACCGCAACCCUACCCGUUCACCUCGUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CUCCGGGCAGAUCUCACAGGCCUCGGCACUGGCACCCGCACCACCGCAAGUGCUGCCCCAAGCACCGGCACCCGCACCGGCGCCCG

CAAUGGUGUCAGCGCUGGCACAGGCACCAGCACCGGUGCCAGUCCUCGCACCGGGACCGCCGCAAGCAGUGGCACCGCCGGCACCG

AAACCGACCCAGGCCGGAGAAGGGACCCUGUCCGAGGCGCUGCUGCAACUCCAGUUCGACGACGAGGACCUGGGAGCACUCCUGGG

AAACUCCACCGACCCGGCAGUGUUCACCGACCUCGCAUCGGUGGACAACUCCGAGUUCCAACAGCUCCUGAACCAGGGGAUACCGG

UGGCACCGCACACCACCGAACCGAUGCUGAUGGAAUACCCGGAAGCCAUCACCCGGCUCGUGACCGGAGCGCAAAGACCGCCCGAC

CCCGCGCCCGCACCGCUGGGAGCACCGGGACUACCGAACGGGCUGCUCUCAGGGGACGAGGACUUCUCCAGCAUCGCAGACAUGGA

CUUCUCCGCCCUGCUGGGAUCAGGAUCCGGAUCACGCGACUCCCGGGAAGGAAUGUUCCUGCCGAAGCCGGAAGCAGGCAGCGCAA

UCUCCGACGUGUUCGAAGGCCGCGAGGUCUGCCAGCCCAAGCGCCUGCGACCGUUCCACCCGCCGGGAUCACCGUGGGCAAACCGC

CCGCUACCGGCAUCACUGGCACCGACACCCACCGGACCGGUGCACGAACCGGUCGGGUCACUGACCCCCGCACCGGUCCCGCAACC

GCUAGACCCGGCACCGGCAGUGACCCCGGAAGCAUCGCACCUCCUGGAGGACCCGGACGAGGAAACCUCACAGGCAGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUACCGCAGAAGGAGGAGGCCGCCAUCUGCGGACAAAUGGACCUGUCACACCCGCCCCCGAGA

GGACACCUGGACGAACUCACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACUCACCGCUGACCCCGGAGCUGAACGA

[1427] AAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCAAUGCACAUCAGCACCGGGCUGUCGAUCUUCGACACCAGCCUGU

UCUCCGGAGGGAAAAGACCCGCCGCCACCAAGAAAGCGGGCCAAGCAAAGAAAAAGAAGGGAUCGUACCCCUACGACGUGCCGGAC

UACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1428] SEQ ID NO.:228

[1429] ＞ZF5.3 mRNA

CUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUUCUCGACCUCCGGGAACCUGACCGAGCACCAGCGCAC

CCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCUCAGACUCGGGAAACCUCAGGGUGCACCAGCGGACCC

ACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCCCACAAGAACGCGCUGCAGAACCACCAAAGAACCCAC

[1430] ACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCGCAACGACACCCUCACCGAACACCAACGCACCCACAC

CGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAGAGGGCCCACCUGGAAAGACACCAGAGAACCCACACCG

GCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCAGACAAGCUGGUCCGCCACCAAAGGACCCACACAGGA

GAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGGACACCUGGUCCGGCACCAGAGGACCCACACCGGGGA

GAAGCCGACCGGCAAAAAGACCUCA

[1431] SEQ ID NO.:163

[1432] ＞zF5.4-VPR mRNA(ZF5-VPR ATUM Opt_4)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCGAAGAAAAAGAGGAAGGUCGGGAUCCACGGA
GUCCCAGCCGCAGGAAGCAGCGGAAGCCUGGAACCCGGAGAAAAACCCUACAAGUGCCCAGAAUGCGGCAAGAGCUUCAGCACCAG
CGGAAACCUGACCGAACACCAGCGGACGCACACAGGGGAGAAACCGUACAAAUGCCCGGAGUGCGGAAAGAGCUUCAGCGACAGCG
GCAACCUCCGCGUGCACCAGAGAACCCACACGGGAGAGAAGCCGUACAAGUGCCCGGAAUGCGGAAAAAGCUUCAGCCACAAGAAC
GCGCUGCAGAACCACCAGAGGACACACACGGGCGAGAAGCCCUACAAAUGCCCCGAAUGCGGGAAAAGCUUCAGCCGGAACGACAC
CCUCACCGAGCACCAGCGAACCCACACCGGAGAAAAGCCGUACAAGUGCCCGGAAUGCGGAAAAAGCUUCAGCCAACGGGCCCACC
UGGAACGCCACCAAAGGACCCACACAGGAGAAAAGCCCUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGGAGCGACAAGCUG
GUCCGGCACCAGCGCACACACACCGGCGAAAAGCCAUACAAGUGCCCCGAGUGCGGAAAGAGCUUCAGCGACCCAGGACACCUCGU
[1433] GCGGCACCAACGCACGCACACCGGGGAAAAACCGACCGGAAAAAAGACCAGCGCGAGCGGAAGCGGAGGAGGAAGCGGAGGCGACG
CCCUGGACGACUUCGACCUGGACAUGCUGGGGAGCGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAAGCGACGCGCUGGAC
GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUCGACGACUUCGACCUCGACAUGCUGAGCGGCGGACCCAAGAAGAAGAGAAA
GGUCGGAAGCCAGUACCUCCCGGACACCGACGACAGGCACCGCAUCGAAGAGAAGCGGAAAAGAACCUACGAAACCUUCAAGAGCA
UCAUGAAAAAGAGCCCGUUCAGCGGACCAACCGACCCCAGACCACCACCGAGAAGAAUCGCGGUCCCAAGCAGGAGCAGCGCCAGC
GUCCCGAAGCCAGCCCCACAGCCGUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC
GAGCGGCCAGAUAAGCCAGGCCAGCGCACUGGCACCAGCCCCACCGCAAGUGCUGCCCCAAGCACCCGCACCAGCACCCGCCCCCG
CGAUGGUCAGCGCCCUGGCACAAGCCCCAGCCCCAGUCCCGGUGCUCGCACCAGGACCACCCCAAGCAGUCGCACCGCCAGCCCCA
AAGCCGACCCAAGCCGGAGAAGGCACCCUCAGCGAGGCGCUCCUGCAACUCCAAUUCGACGACGAGGACCUGGGAGCCCUGCUGGG
CAACAGCACCGACCCGGCAGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAAUUCCAGCAGCUCCUGAACCAAGGAAUCCCAG
UCGCGCCACACACCACCGAGCCGAUGCUGAUGGAAUACCCAGAAGCGAUCACGAGACUGGUCACCGGGGCCCAAAGACCGCCGGAC
CCAGCGCCAGCACCACUGGGAGCCCCAGGACUGCCCAACGGACUGCUCAGCGGCGACGAGGACUUCAGCAGCAUCGCGGACAUGGA
CUUCAGCGCACUCCUCGGAAGCGGAAGCGGCAGCAGAGACAGCCGGGAAGGAAUGUUCCUCCCCAAGCCAGAAGCCGGAAGCGCAA
UCAGCGACGUGUUCGAAGGACGGGAAGUCUGCCAGCCGAAGCGCCUCAGACCGUUCCACCCACCGGGAAGCCCAUGGGCCAACAGA
CCGCUGCCAGCCAGCCUGGCACCGACCCCAACCGGACCAGUCCACGAACCAGUCGGCAGCCUGACACCAGCACCAGUGCCCCAGCC
ACUGGACCCAGCACCGGCAGUGACCCCAGAAGCCAGCCACCUCCUGGAGGACCCCGACGAAGAAACCAGCCAGGCCGUGAAGGCCC
[1434] UGAGGGAGAUGGCCGACACGGUGAUCCCACAGAAGGAAGAAGCAGCGAUCUGCGGCCAAAUGGACCUCAGCCACCCACCGCCAAGA
GGCCACCUGGACGAGCUCACCACCACCCUGGAAAGCAUGACCGAGGACCUCAACCUCGACAGCCCCCUGACACCGGAGCUCAACGA
GAUCCUGGACACCUUCCUCAACGACGAAUGCCUGCUCCACGCCAUGCACAUCAGCACCGGACUGAGCAUCUUCGACACCAGCCUGU
UCAGCGGGGGAAAACGACCGGCAGCCACCAAAAAGGCCGGACAGGCGAAGAAGAAGAAGGGGAGCUACCCGUACGACGUGCCCGAC
UACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC
UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1435] SEQ ID NO.:229

[1436] ＞ZF5.4mRNA sequence

CUGGAACCCGGAGAAAAACCCUACAAGUGCCCAGAAUGCGGCAAGAGCUUCAGCACCAGCGGAAACCUGACCGAACACCAGCGGAC
GCACACAGGGGAGAAACCGUACAAAUGCCCGGAGUGCGGAAAGAGCUUCAGCGACAGCGGCAACCUCCGCGUGCACCAGAGAACCC
ACACGGGAGAGAAGCCGUACAAGUGCCCGGAAUGCGGAAAAAGCUUCAGCCACAAGAACGCGCUGCAGAACCACCAGAGGACACAC
ACGGGCGAGAAGCCCUACAAAUGCCCCGAAUGCGGGAAAAGCUUCAGCCGGAACGACACCCUCACCGAGCACCAGCGAACCCACAC
[1437] CGGAGAAAAGCCGUACAAGUGCCCGGAAUGCGGAAAAAGCUUCAGCCAACGGGCCCACCUGGAACGCCACCAAAGGACCCACACAG
GAGAAAAGCCCUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGGAGCGACAAGCUGGUCCGGCACCAGCGCACACACACCGGC
GAAAAGCCAUACAAGUGCCCCGAGUGCGGAAAGAGCUUCAGCGACCCAGGACACCUCGUGCGGCACCAACGCACGCACACCGGGGA
AAAACCGACCGGAAAAAAGACCAGC

[1438] SEQ ID NO.:164

[1439] ＞ZF5.5-VPR(ZF5-VPR ATUM Opt_5)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCGAAGAAGAAGCGCAAGGUCGGCAUACACGGA

GUCCCAGCCGCUGGAUCCUCCGGAUCCCUGGAACCUGGGGAGAAACCCUAUAAGUGCCCGGAGUGCGGAAAGUCAUUCUCAACUAG

CGGAAACCUGACAGAGCACCAGAGGACCCAUACUGGCGAAAAGCCAUACAAAUGCCCCGAAUGCGGGAAAAGCUUCAGCGACAGCG

GGAACCUGAGAGUGCACCAGCGGACUCAUACCGGGGAGAAGCCUUACAAGUGCCCCGAGUGUGGAAAGUCCUUCUCCCAUAAGAAC

GCGCUCCAGAACCACCAGAGAACCCACACCGGAGAAAAGCCGUACAAGUGCCCGGAAUGCGGCAAAUCCUUUUCACGGAACGACAC

[1440] UCUCACCGAGCACCAACGGACGCACACCGGAGAGAAGCCGUACAAGUGCCCUGAAUGCGGAAAGAGCUUUAGCCAGAGGGCCCACC

UGGAACGGCAUCAGCGCACUCACACCGGGGAAAAGCCCUACAAGUGCCCAGAGUGCGGCAAGAGCUUCUCCCGGUCUGACAAGCUU

GUGCGCCAUCAGCGGACCCACACUGGAGAAAAACCGUACAAGUGUCCGGAGUGUGGCAAAUCGUUCUCAGACCCGGGACACCUGGU

CCGACACCAACGCACACACACCGGCGAAAAGCCGACCGGCAAAAAGACCUCGGCCUCGGGAUCUGGAGGAGGAAGCGGCGGAGAUG

CCCUGGACGACUUCGACCUGGACAUGUUGGGCAGCGACGCACUGGAUGACUUCGACCUGGAUAUGCUGGGAUCCGACGCCCUCGAC

GAUUUCGACCUCGAUAUGCUUGGCUCCGAUGCGCUCGAUGAUUUCGAUUUGGACAUGCUGUCCGGCGGACCUAAGAAGAAGAGAAA

GGUCGGCAGCCAAUACCUCCCGGACACUGAUGACCGGCACCGGAUCGAAGAGAAGCGGAAGCGCACUUACGAGACUUUCAAGUCGA

UCAUGAAGAAGUCACCCUUCUCGGGACCUACUGAUCCUCGGCCGCCACCUAGACGGAUCGCGGUGCCAUCCAGGUCAUCCGCUUCC

GUCCCCAAGCCUGCGCCUCAACCGUACCCUUUCACUUCCUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CUCCGGACAGAUUUCCCAAGCCUCGGCGCUAGCACCAGCCCCUCCACAAGUGCUUCCGCAAGCUCCAGCUCCGGCACCAGCACCAG

CCAUGGUGUCCGCUCUGGCCCAAGCUCCUGCUCCGGUGCCUGUGCUGGCUCCUGGACCGCCUCAGGCAGUGGCACCACCCGCACCA

AAGCCGACCCAAGCGGGAGAGGGAACUCUGUCCGAAGCGCUGCUGCAGCUCCAGUUCGACGACGAGGACCUGGGUGCCCUGCUCGG

AAAUUCGACCGAUCCGGCCGUGUUUACCGACUUGGCCAGUGUGGACAACUCCGAGUUCCAACAGCUGCUGAACCAGGGGAUUCCAG

UGGCCCCCCACACUACUGAACCGAUGCUGAUGGAAUACCCCGAGGCCAUUACCAGACUGGUCACUGGAGCCCAGAGGCCUCCAGAC

CCUGCCCCUGCUCCACUGGGUGCCCCAGGACUGCCCAAUGGGCUUCUGUCGGGCGAUGAGGAUUUCAGCUCAAUCGCGGAUAUGGA

CUUCUCCGCCCUUCUGGGUUCCGGAUCCGGUUCACGGGAUUCCAGAGAGGGCAUGUUCCUACCCAAGCCCGAAGCCGGAAGCGCGA

[1441] UCAGCGACGUGUUCGAGGGUCGCGAAGUCUGUCAGCCAAAGAGACUCCGGCCGUUUCAUCCACCCGGAUCACCCUGGGCCAAUCGC

CCACUCCCUGCCUCAUUGGCCCCGACCCCUACUGGUCCGGUGCACGAGCCUGUCGGGUCGCUCACUCCGGCACCUGUGCCACAACC

GCUGGACCCUGCACCAGCCGUGACCCCAGAGGCGUCCCACCUCCUCGAAGAUCCCGAUGAAGAAACAAGCCAGGCCGUGAAGGCCC

UGCGCGAAAUGGCCGACACCGUGAUCCCGCAGAAAGAGGAAGCCGCCAUCUGCGGUCAGAUGGACCUGAGCCAUCCCCCUCCGAGA

GGACACCUGGACGAACUGACCACUACACUGGAGAGCAUGACCGAGGACCUGAACCUGGACUCCCCCCCUUACCCCGGAACUGAACGA

GAUUCUCGACACUUUCCUGAACGACGAGUGUCUGCUCCACGCGAUGCACAUCUCGACCGGACUGUCGAUCUUUGACACCUCGCUGU

UCUCCGGUGGCAAAAGGCCUGCCGCCACCAAGAAGGCCGGACAGGCCAAGAAAAAGAAGGGCUCCUACCCGUACGAUGUGCCCGAC

UACGCUUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1442] SEQ ID NO.:230

[1443] ＞ZF5.5 mRNA

CUGGAACCUGGGGAGAAACCCUAUAAGUGCCCGGAGUGCGGAAAGUCAUUCUCAACUAGCGGAAACCUGACAGAGCACCAGAGGAC

CCAUACUGGCGAAAAGCCAUACAAAUGCCCCGAAUGCGGGAAAAGCUUCAGCGACAGCGGGAACCUGAGAGUGCACCAGCGGACUC

AUACCGGGGAGAAGCCUUACAAGUGCCCCGAGUGUGGAAAGUCCUUCUCCCAUAAGAACGCGCUCCAGAACCACCAGAGAACCCAC

[1444] ACCGGAGAAAAGCCGUACAAGUGCCCGGAAUGCGGCAAAUCCUUUUCACGGAACGACACUCUCACCGAGCACCAACGGACGCACAC

CGGAGAGAAGCCGUACAAGUGCCCUGAAUGCGGAAAGAGCUUUAGCCAGAGGGCCCACCUGGAACGGCAUCAGCGCACUCACACCG

GGGAAAAGCCCUACAAGUGCCCAGAGUGCGGCAAGAGCUUCUCCCGGUCUGACAAGCUUGUGCGCCAUCAGCGGACCCACACUGGA

GAAAAACCGUACAAGUGUCCGGAGUGUGGCAAAUCGUUCUCAGACCCGGGACACCUGGUCCGACACCAACGCACACACACCGGCGA

AAAGCCGACCGGCAAAAAGACCUCG

[1445] SEQ ID NO.:165

[1446] ＞ZF5.6-VPR mRNA(ZF5-VPR ATUM Opt_6)

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAAAAGCGCAAAGUGGGCAUCCACGGC

GUGCCAGCAGCAGGAAGCAGCGGAAGCCUGGAACCCGGGGAGAAGCCGUACAAGUGCCCAGAAUGCGGAAAGAGCUUCAGCACCAG

[1447] CGGCAACCUCACCGAGCACCAGAGAACCCACACCGGGGAGAAACCGUACAAAUGCCCGGAAUGCGGCAAGAGCUUCAGCGACAGCG

GAAACCUGAGAGUGCACCAACGCACCCACACGGGAGAAAAACCCUACAAAUGCCCCGAGUGCGGGAAAAGCUUCAGCCACAAGAAC

GCGCUGCAGAACCACCAAAGAACGCACACCGGAGAAAAGCCGUACAAGUGCCCAGAAUGCGGAAAGAGCUUCAGCAGAAACGACAC

CCUGACCGAACACCAGCGGACGCACACAGGCGAAAAACCAUACAAGUGCCCGGAGUGCGGCAAAAGCUUCAGCCAGAGAGCGCACC

UGGAAAGGCACCAGCGCACACACACCGGCGAAAAGCCAUACAAAUGCCCAGAGUGCGGAAAAAGCUUCAGCCGGAGCGACAAGCUG

GUCCGCCACCAACGGACCCACACAGGGGAAAAGCCCUACAAGUGCCCCGAAUGCGGCAAGAGCUUCAGCGACCCGGGACACCUCGU

GCGGCACCAGAGGACCCACACCGGAGAAAAGCCGACCGGGAAAAAGACCAGCGCAAGCGGGAGCGGAGGAGGAAGCGGAGGCGACG

CACUCGACGACUUCGACCUGGACAUGCUGGGGAGCGACGCACUGGACGACUUCGACCUCGACAUGCUCGGAAGCGACGCCCUCGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCGCUGGACGACUUCGACCUCGACAUGCUCAGCGGGGGACCAAAAAAGAAAAGGAA

GGUCGGAAGCCAGUACCUCCCGGACACCGACGACAGGCACCGGAUCGAGGAAAAGCGGAAGCGCACCUACGAAACCUUCAAGAGCA

UCAUGAAAAAGAGCCCCUUCAGCGGACCGACAGACCCGAGGCCACCACCACGGAGAAUCGCCGUGCCAAGCAGGAGCAGCGCCAGC

GUGCCCAAACCGGCCCCACAACCCUACCCGUUCACCAGCAGCCUCAGCACCAUCAACUACGACGAGUUCCCAACCAUGGUGUUCCC

CAGCGGACAGAUCAGCCAAGCCAGCGCACUGGCACCAGCCCCCCCGCAAGUGCUGCCACAAGCGCCGGCACCAGCGCCAGCACCAG

CCAUGGUCAGCGCGCUGGCACAAGCCCCCGCACCAGUGCCAGUGCUCGCACCAGGACCACCCCAGGCAGUAGCACCGCCAGCCCCG

AAGCCAACCCAGGCAGGAGAAGGCACCCUCAGCGAGGCGCUGCUGCAGCUCCAGUUCGACGACGAGGACCUCGGAGCCCUGCUGGG

AAACAGCACCGACCCAGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAAUUCCAGCAGCUGCUCAACCAAGGAAUCCCGG

[1448] UGGCCCCACACACCACCGAACCCAUGCUGAUGGAGUACCCGGAGGCCAUCACCAGACUCGUGACAGGAGCCCAGAGGCCACCAGAC

CCAGCCCCAGCACCACUGGGAGCCCCAGGACUCCCCAACGGACUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCACUCCUCGGGAGCGGAAGCGGAAGCAGAGACAGCAGGGAAGGAAUGUUCCUGCCCAAGCCGGAAGCGGGAAGCGCAA

UCAGCGACGUGUUCGAAGGAAGAGAAGUCUGCCAGCCCAAGAGGCUGCGCCCGUUCCACCCACCAGGAAGCCCGUGGGCCAACAGA

CCACUGCCAGCAAGCCUCGCCCCGACACCAACCGGACCGGUGCACGAACCCGUGGGCAGCCUGACCCCAGCACCGGUCCCACAGCC

ACUGGACCCAGCACCCGCAGUGACCCCAGAAGCCAGCCACCUCCUGGAGGACCCGGACGAAGAAACCAGCCAGGCCGUCAAGGCCC

UGCGCGAGAUGGCCGACACCGUCAUCCCCCAAAAGGAAGAGGCGGCCAUCUGCGGACAGAUGGACCUGAGCCACCCACCGCCAAGA

GGCCACCUCGACGAGCUGACCACCACCCUGGAAAGCAUGACGGAGGACCUGAACCUCGACAGCCCGCUAACGCCCGAGCUGAACGA

AAUCCUGGACACCUUCCUCAACGACGAAUGCCUGCUGCACGCCAUGCACAUCAGCACCGGACUGAGCAUCUUCGACACGAGCCUGU

UCAGCGGAGGAAAACGGCCAGCCGCAACCAAGAAGGCCGGACAAGCCAAGAAGAAGAAGGGGAGCUACCCGUACGACGUGCCAGAC

UACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACC

UCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1449] SEQ ID NO.:231

[1450] ＞ZF5.6 mRNA

CUGGAACCCGGGGAGAAGCCGUACAAGUGCCCAGAAUGCGGAAAGAGCUUCAGCACCAGCGGCAACCUCACCGAGCACCAGAGAAC

CCACACCGGGGAGAAACCGUACAAAUGCCCGGAAUGCGGCAAGAGCUUCAGCGACAGCGGAAACCUGAGAGUGCACCAACGCACCC

ACACGGGAGAAAAACCCUACAAAUGCCCCGAGUGCGGGAAAAGCUUCAGCCACAAGAACGCGCUGCAGAACCACCAAAGAACGCAC

[1451] ACCGGAGAAAAGCCGUACAAGUGCCCAGAAUGCGGAAAGAGCUUCAGCAGAAACGACACCCUGACCGAACACCAGCGGACGCACAC

AGGCGAAAAACCAUACAAGUGCCCGGAGUGCGGCAAAAGCUUCAGCCAGAGAGCGCACCUGGAAAGGCACCAGCGCACACACACCG

GCGAAAAGCCAUACAAAUGCCCAGAGUGCGGAAAAAGCUUCAGCCGGAGCGACAAGCUGGUCCGCCACCAACGGACCCACACAGGG

GAAAAGCCCUACAAGUGCCCCGAAUGCGGCAAGAGCUUCAGCGACCCGGGACACCUCGUGCGGCACCAGAGGACCCACACCGGAGA

AAAGCCGACCGGGAAAAAGACCAGC

[1452] SEQ ID NO.:166

[1453] ＞ZF5-P300 protein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSQLAHLRAHQRTHTGEKPYKCPECGKSFSSKKHLAEHQRTHTGEKPYKCPECGKSFSTTGALTEHQRTHTGEKPYKCPECGKSFSTSGNLVRHQRTHTGEKPYKCPECGKSFSQSGDLRRHQRTHTGEKPYKCPECGKSFSTSHSLTEHQRTHTGEKPTGKKTSASGSGGGSGGIFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1454]

[1455] SEQ ID NO.:167

[1456] ＞ZF5-P300 mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGCGUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAAAAGCCGUAUAAGUGCCCGGAAUGCGGCAAGAGUUUUAGCCAGCGCGCCCAUCUGGAACGUCACCAGCGUACCCAUACCGGUGAAAAGCCAUAUAAAUGCCCAGAAUGUGGUAAAAGCUUUAGUCAGCUGGCCCAUCUGCGCGCCCACCAACGUACGCACACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGCGGUAAAAGCUUCAGCAGCAAAAAGCAUCUGGCGGAACAUCAACGUACCCACACCGGCGAGAAACCAUACAAGUGCCCGGAAUGCGGUAAAAGCUUCAGCACCACCGGUGCGCUGACGGAGCAUCAGCGCACCCACACGGGCGAAAAACCGUAUAAGUGUCCGGAGUGUGGCAAAAGUUUUAGUACCAGCGGCAAUCUGGUGCGCCAUCAACGUACGCAUACCGGCGAGAAGCCAUAUAAAUGUCCAGAGUGUGGCAAGAGCUUUAGCCAAAGCGGUGAUCUGCGUCGCCACCAACGCACGCACACCGGCGAAAAACCAUACAAAUGUCCGGAAUGCGGUAAGAGUUUCAGCACGAGCCAUAGUCUGACCGAACAUCAACGUACCCAUACGGGUGAGAAACCAACCGGCAAGAAAACCAGCGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCAUCUUCAAGCCCGAGGAGCUGCGGCAGGCCCUGAUGCCCACCCUGGAGGCCCUGUACCGGCAGGACCCCGAGAGCCUGCCCUUCCGGCAGCCCGUGGACCCCCAGCUGCUGGGCAUCCCCGACUACUUCGACAUCGUGAAAUCCCCCAUGGACCUGAGCACCAUCAAGCGGAAGCUGGACACCGGCCAGUACCAGGAGCCCUGGCAGUACGUGGACGACAUCUGGCUGAUGUUCAACAACGCCUGGCUGUACAACCGGAAAACCAGCCGGGUGUACAAGUACUGCAGCAAGCUGAGCGAGGUGUUCGAGCAGGAGAUCGACCCCGUGAUGCAGAGCCUGGGCUACUGCUGCGGCCGGAAGCUGGAGUUCAGCCCCCAGACCCUGUGCUGCUACGGCAAGCAGCUGUGCACCAUCCCCCGGGACGCCACCUACUACAGCUACCAGAACCGGUACCACUUCUGCGAGAAGUGCUUCAACGAGAUCCAGGGCGAGAGCGUGAGCCUGGGCGACGACCCCAGCCAGCCCCAGACCACCAUCAACAAGGAGCAGUUCAGCAAGCGGAAGAACGACACCCUGGACCCCGAGCUGUUCGUGGAGUGCACCGAGUGCGGCCGGAAGAUGCACCAGAUCUGCGUGCUGCACCACGAGAUCAUCUGGCCCGCCGGCUUCGUGUGCGACGGCUGCCUGAAGAAAUCCGCCCGGACCCGGAAGGAGAACAAGUUCAGCGCCAAGCGGCUGCCCAGCACCCGGCUGGGCACCUUCCUGGAGAACCGGGUGAACGACUUCCUGCGGCGGCAGAACCACCCCGAGAGCGGCGAGGUGACCGUGCGGGUGGUGCACGCCAGCGACAAGACCGUGGAGGUGAAGCCCGGCAUGAAGGCCCGGUUCGUGGACAGCGGCGAGAUGGCCGAGAGCUUCCCCUACCGGACCAAGGCCCUGUUCGCCUUCGAGGAGAUCGACGGCGUGGACCUGUGCUUCUUCGGCAUGCACGUGCAGGAGUACGGCAGCGACUGCCCCCCCCCCAACCAGCGGCGGGUGUACAUCAGCUACCUGGACAGCGUGCACUUCUUCCGGCCCAAGUGCCUGCGGACCGCCGUGUACCACGAGAUCCUGAUCGGCUACCUGGAGUACGUGAAGAAGCUGGGCUACACCACCGGCCACAUCUGGGCCUGCCCCCCCAGCGAGGGCGACGACUACAUCUUCCACUGCCACCCCCCCGACCAGAAGAUCCCCAAGCCCAAGCGGCUGCAGGAGUGGUACAAGAAGAUGCUGGACAAGGCCGUGAGCGAGCGGA

[1457]

UCGUGCACGACUACAAGGACAUCUUCAAGCAGGCCACCGAGGACCGGCUGACCAGCGCCAAGGAGCUGCCCUACUUCGAGGGCGAC

UUCUGGCCCAACGUGCUGGAGGAGAGCAUCAAGGAGCUGGAGCAGGAGGAGGAGGAGCGGAAGCGGGAGGAGAACACCAGCAACGA

GAGCACCGACGUGACCAAGGGCGACAGCAAGAACGCCAAGAAGAAGAACAACAAGAAAACCAGCAAGAACAAGAGCAGCCUGAGCC

GGGGCAACAAGAAGAAGCCCGGCAUGCCCAACGUGAGCAACGACCUGAGCCAGAAGCUGUACGCCACCAUGGAGAAGCACAAGGAG

GUGUUCUUCGUGAUCCGGCUGAUCGCCGGCCCCGCCGCCAACAGCCUGCCCCCCAUCGUGGACCCCGACCCCCUGAUCCCCUGCGA

CCUGAUGGACGGCCGGGACGCCUUCCUGACCCUGGCCCGGGACAAGCACCUGGAGUUCAGCAGCCUGCGGCGGGCCCAGUGGAGCA

CCAUGUGCAUGCUGGUGGAGCUGCACACCCAGAGCCAGGACAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCC

AAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCC

UUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAA

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[1458]

[1459] SEQ ID NO.:232

[1460] ＞Nucleotide Seqeunce of DNA binding domain of ZF5-P300

CUCGAACCGGGCGAAAAGCCGUAUAAGUGCCCGGAAUGCGGCAAGAGUUUUAGCCAGCGCGCCCAUCUGGAACGUCACCAGCGUAC

CCAUACCGGUGAAAAGCCAUAUAAAUGCCCAGAAUGUGGUAAAAGCUUUAGUCAGCUGGCCCAUCUGCGCGCCCACCAACGUACGC

ACACGGGCGAGAAGCCGUACAAAUGCCCAGAAUGCGGUAAAAGCUUCAGCAGCAAAAAGCAUCUGGCGGAACAUCAACGUACCCAC

ACCGGCGAGAAACCAUACAAGUGCCCGGAAUGCGGUAAAAGCUUCAGCACCACCGGUGCGCUGACGGAGCAUCAGCGCACCCACAC

GGGCGAAAAACCGUAUAAGUGUCCGGAGUGUGGCAAAAGUUUUAGUACCAGCGGCAAUCUGGUGCGCCAUCAACGUACGCAUACCG

GCGAGAAGCCAUAUAAAUGUCCAGAGUGUGGCAAGAGCUUUAGCCAAAGCGGUGAUCUGCGUCGCCACCAACGCACGCACACCGGC

GAAAAACCAUACAAAUGUCCGGAAUGCGGUAAGAGUUUCAGCACGAGCCAUAGUCUGACCGAACAUCAACGUACCCAUACGGGUGA

GAAACCAACCGGCAAGAAAACCAGC

[1461]

[1462] SEQ ID NO.:168

[1463] ＞ZF7-p300 protein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPY

KCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKC

PECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGIFKPEELRQALMPTLEA

LYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFE

QEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKN

DTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVT

VRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKC

LRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDR

LTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDL

SQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSG

GKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1464]

[1465] SEQ ID NO.:169

[1466] ＞ZF7-p300 mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

[1467]

GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAG

CGACCAUCUGACCAAUCACCAACGCACCCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUG

GCAGUCUGGUUCGUCAUCAGCGCACGCACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGU

CAUCUGGCGAGCCAUCAACGUACGCACACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAA

ACUGACCGAACACCAACGUACGCAUACGGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUC

UGACCGAGCAUCAACGUACCCAUACCGGUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUG

GUGCGCCAUCAGCGUACCCACACGGGUGAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAU

CCGUCAUCAGCGCACCCACACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCAUCU

UCAAGCCCGAGGAGCUGCGGCAGGCCCUGAUGCCCACCCUGGAGGCCCUGUACCGGCAGGACCCCGAGAGCCUGCCCUUCCGGCAG

CCCGUGGACCCCCAGCUGCUGGGCAUCCCCGACUACUUCGACAUCGUGAAAUCCCCCAUGGACCUGAGCACCAUCAAGCGGAAGCU

GGACACCGGCCAGUACCAGGAGCCCUGGCAGUACGUGGACGACAUCUGGCUGAUGUUCAACAACGCCUGGCUGUACAACCGGAAAA

CCAGCCGGGUGUACAAGUACUGCAGCAAGCUGAGCGAGGUGUUCGAGCAGGAGAUCGACCCCGUGAUGCAGAGCCUGGGCUACUGC

UGCGGCCGGAAGCUGGAGUUCAGCCCCCAGACCCUGUGCUGCUACGGCAAGCAGCUGUGCACCAUCCCCCGGGACGCCACCUACUA

CAGCUACCAGAACCGGUACCACUUCUGCGAGAAGUGCUUCAACGAGAUCCAGGGCGAGAGCGUGAGCCUGGGCGACGACCCCAGCC

AGCCCCAGACCACCAUCAACAAGGAGCAGUUCAGCAAGCGGAAGAACGACACCCUGGACCCCGAGCUGUUCGUGGAGUGCACCGAG

UGCGGCCGGAAGAUGCACCAGAUCUGCGUGCUGCACCACGAGAUCAUCUGGCCCGCCGGCUUCGUGUGCGACGGCUGCCUGAAGAA

AUCCGCCCGGACCCGGAAGGAGAACAAGUUCAGCGCCAAGCGGCUGCCCAGCACCCGGCUGGGCACCUUCCUGGAGAACCGGGUGA

ACGACUUCCUGCGGCGGCAGAACCACCCCGAGAGCGGCGAGGUGACCGUGCGGGUGGUGCACGCCAGCGACAAGACCGUGGAGGUG

AAGCCCGGCAUGAAGGCCCGGUUCGUGGACAGCGGCGAGAUGGCCGAGAGCUUCCCCUACCGGACCAAGGCCCUGUUCGCCUUCGA

GGAGAUCGACGGCGUGGACCUGUGCUUCUUCGGCAUGCACGUGCAGGAGUACGGCAGCGACUGCCCCCCCCCCAACCAGCGGCGGG

UGUACAUCAGCUACCUGGACAGCGUGCACUUCUUCCGGCCCAAGUGCCUGCGGACCGCCGUGUACCACGAGAUCCUGAUCGGCUAC

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CCACCCCCCCGACCAGAAGAUCCCCAAGCCCAAGCGGCUGCAGGAGUGGUACAAGAAGAUGCUGGACAAGGCCGUGAGCGAGCGGA

UCGUGCACGACUACAAGGACAUCUUCAAGCAGGCCACCGAGGACCGGCUGACCAGCGCCAAGGAGCUGCCCUACUUCGAGGGCGAC

UUCUGGCCCAACGUGCUGGAGGAGAGCAUCAAGGAGCUGGAGCAGGAGGAGGAGGAGCGGAAGCGGGAGGAGAACACCAGCAACGA

GAGCACCGACGUGACCAAGGGCGACAGCAAGAACGCCAAGAAGAAGAACAACAAGAAAACCAGCAAGAACAAGAGCAGCCUGAGCC

GGGGCAACAAGAAGAAGCCCGGCAUGCCCAACGUGAGCAACGACCUGAGCCAGAAGCUGUACGCCACCAUGGAGAAGCACAAGGAG

GUGUUCUUCGUGAUCCGGCUGAUCGCCGGCCCCGCCGCCAACAGCCUGCCCCCCAUCGUGGACCCCGACCCCCUGAUCCCCUGCGA

CCUGAUGGACGGCCGGGACGCCUUCCUGACCCUGGCCCGGGACAAGCACCUGGAGUUCAGCAGCCUGCGGCGGGCCCAGUGGAGCA

CCAUGUGCAUGCUGGUGGAGCUGCACACCCAGAGCCAGGACAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCC

AAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCC

UUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAA

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[1468]

[1469] SEQ ID NO.:233

[1470] >Nucleotide Seqeunce of DNA binding domein of ZF7-P300

CUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAGCGACCAUCUGACCAAUCACCAACGCAC

CCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUGGCAGUCUGGUUCGUCAUCAGCGCACGC

ACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGUCAUCUGGCGAGCCAUCAACGUACGCAC

ACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAAACUGACCGAACACCAACGUACGCAUAC

GGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUCUGACCGAGCAUCAACGUACCCAUACCG

GUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUGGUGCGCCAUCAGCGUACCCACACGGGU

GAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAUCCGUCAUCAGCGCACCCACACCGGUGA

AAAACCAACCGGCAAGAAAACCAGU

[1471]

[1472]

[1473] SEQ ID NO.:1 70

[1474] ＞ZF5.3-VPR3 protein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPY
KCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKC
PECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSGSGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAV
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GAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRIRPFHPP
GSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMD
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PQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRL
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[1475]

[1476] SEQ ID NO.:1 71

[1477] ＞ZF5.3-VPR3 mRNA

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[1481] SEQ ID NO.:234

[1482] ＞Nucleotide Seqeunce of DNA binding domein of ZF5.3-VPR3

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[1484] SEQ ID NO.:172

[1485] ＞dCas9-VPR3 pretein

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FNASLGTYHDLLKIIKDKDFLDNEENEDILEDIVLTLTLFEDREMIEERLKTYAHLFDDKVMKQLKRRRYTGWGRLSRKLINGIRD
KQSGKTILDFLKSDGFANRNFMQLIHDDSLTFKEDIQKAQVSGQGDSLHEHIANLAGSPAIKKGILQTVKVVDELVKVMGRHKPEN
IVIEMARENQTTQKGQKNSRERMKRIEEGIKELGSQILKEHPVENTQLQNEKLYLYYLQNGRDMYVDQELDINRLSDYDVAAIVPQ
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DVRKMIAKSEQEIGKATAKYFFYSNIMNFFKTEITLANGEIRKRPLIETNGETGEIVWDKGRDFATVRKVLSMPQVNIVKKTEVQT
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[1488] SEQ ID NO.173

[1489] >dCas9-VPR3 mRNA

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CCUUCGAAAAGAACCCCAUCGACUUUUUGGAAGCAAAGGGAUACAAGGAAGUCAAGAAGGACCUCAUCAUCAAGCUGCCGAAGUAU

AGCCUCUUCGAACUGGAGAACGGUCGGAAGAGAAUGCUGGCUUCAGCGGGAGAGCUGCAAAAGGGAAACGAGCUGGCCCUUCCGAG

CAAAUACGUCAACUUUCUGUACCUGGCCUCGCACUACGAAAAGCUCAAGGGAUCACCCGAGGACAACGAACAGAAGCAACUGUUCG

UGGAACAGCAUAAGCAUUACCUGGAUGAGAUUAUCGAACAGAUUUCCGAAUUCUCCAAGCGCGUGAUUCUGGCCGACGCCAACCUG

GACAAGGUCCUUUCAGCCUACAACAAGCACCGGGAUAAGCCGAUCCGGGAACAGGCGGAAAACAUCAUCCAUCUGUUCACGUUGAC

UAAUCUUGGAGCACCAGCCGCGUUUAAGUACUUUGACACCACCAUUGACAGGAAACGGUACACAUCCACGAAGGAAGUGUUGGAUG

CGACGCUGAUUCAUCAGAGUAUCACCGGACUCUACGAAACGCGGAUUGACCUCAGCCAGUUGGGAGGGGACUCCGGAGGAAAGAGG

CCAGCCGCCACUAAGAAGGCUGGGCAGGCCAAGAAGAAAAAGUCCGGUGGAGGAGGCUCAGACGCCCUCGACGACUUCGAUCUGGA

CAUGCUGGGUAGCGACGCCCUGGAUGACUUCGACCUCGAUAUGCUGGGAUCCGACGCACUUGACGAUUUUGACUUGGACAUGCUCG

GCUCCGACGCUCUGGACGAUUUCGACCUUGACAUGCUUGGCUCCGGCUCAGGAUCCCAGUACCUCCCCGAUACCGACGACAGACAC

CGGAUCGAAGAAAAGCGCAAGCGCACCUACGAAACCUUCAAGUCGAUUAUGAAGAAGUCGCCUUUCUCCGGGCCGACUGAUCCUAG

ACCUCCACCAAGAAGAAUCGCGGUGCCGUCCAGAUCGUCCGCGUCAGUGCCGAAACCAGCACCGCAGCCGUAUCCGUUCACUUCCU

CCCUUUCCACCAUUAACUACGACGAAUUCCCCACGAUGGUGUUCCCUAGCGGACAGAUUUCGCAAGCCAGCGCUCUUGCUCCUGCG

CCUCCUCAAGUGCUGCCUCAGGCCCCUGCUCCUGCUCCUGCACCCGCCAUGGUGUCCGCCCUGGCUCAAGCUCCAGCCCCUGUGCC

UGUCCUGGCCCCUGGACCACCUCAGGCAGUAGCACCUCCCGCUCCCAAGCCCACCCAAGCGGGAGAGGGCACUCUUUCCGAGGCCC

UGCUGCAACUGCAGUUCGACGACGAGGACCUGGGGGCACUUCUGGGAAAUAGCACCGAUCCGGCCGUGUUCACCGACCUGGCCAGC

GUCGACAACUCAGAGUUCCAGCAGCUCCUCAACCAAGGGAUUCCGGUGGCCCCUCACACGACCGAGCCGAUGUUGAUGGAAUACCC

GGAAGCCAUCACCCGCCUAGUGACCGGAGCGCAAAGACCGCCUGACCCAGCUCCUGCCCCUUUGGGAGCCCCUGGAUUGCCCAACG

GACUCCUGUCCGGCGACGAGGAUUUCUCGUCCAUCGCCGAUAUGGACUUCUCGGCCCUGUUGGGUAGCGGUUCGGGUAGUCGCGAU

AGCCGGGAAGGAAUGUUCCUGCCGAAGCCUGAGGCCGGGUCUGCCAUUAGCGAUGUGUUUGAAGGACGGGAAGUCUGUCAGCCCAA

GCGGAUUCGCCCAUUCCACCCCCCUGGAUCGCCUUGGGCCAACAGGCCACUCCCCGCUUCGCUUGCGCCGACUCCUACCGGGCCAG

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AGCCGCGAUUUGCGGCCAGAUGGACCUGUCGCAUCCUCCACCACGCGGUCACCUCGAUGAACUGACAACUACCCUGGAGUCGAUGA

CCGAGGACCUGAACCUGGACUCCCCGCUGACUCCUGAGCUCAACGAAAUCCUGGACACUUUCCUGAACGAUGAGUGCCUGCUGCAC

GCCAUGCACAUCUCCACUGGGCUGUCAAUCUUCGACACCAGCCUGUUCGGCUCCGGAUCCGGUUCCGACGCACUGGACGAUUUUGA

CCUGGAUAUGUUGGGGAGCGACGCACUGGACGAUUUUGAUCUGGAUAUGCUGGGAUCCGACGCGCUCGACGAUUUCGACCUGGACA

UGCUCGGAUCGGACGCCCUGGACGACUUCGACCUCGAUAUGCUUGGAUCAGGGUCCGGCUCACAAUAUCUGCCGGACACUGAUGAC

CGGCAUAGAAUCGAAGAAAAGCGCAAGCGGACCUACGAAACUUUCAAGAGCAUCAUGAAGAAAUCGCCGUUCUCUGGGCCGACUGA

UCCUAGGCCGCCUCCGAGAAGGAUCGCCGUGCCCUCAAGAUCCUCCGCCUCUGUGCCCAAGCCGGCUCCACAGCCUUACCCCUUCA

CUUCGUCGCUGAGCACCAUCAACUACGACGAAUUCCCGACCAUGGUCUUUCCGAGCGGCCAGAUUUCCCAGGCGUCCGCCUUGGCU

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UGUGCCAGUGCUCGCACCUGGUCCUCCGCAAGCUGUGGCACCUCCUGCGCCUAAGCCGACUCAGGCCGGAGAAGGGACCCUGUCAG

AGGCCCUGCUGCAACUGCAGUUUGACGAUGAGGAUCUGGGAGCCCUUCUGGGCAACUCGACUGACCCCGCCGUGUUCACCGACCUG

GCGUCCGUGGAUAACUCCGAGUUCCAGCAGCUCCUCAACCAAGGGAUUCCUGUCGCCCCGCACACUACCGAGCCGAUGCUGAUGGA

GUACCCGGAGGCCAUCACCCGGCUUGUGACGGGUGCUCAGAGGCCUCCAGAUCCGGCUCCAGCACCGUUAGGAGCCCCCGGACUUC

CUAACGGACUGCUGUCCGGCGACGAGGACUUCUCCAGCAUCGCCGACAUGGAUUUUUCCGCGCUGUUGGGAUCGGGUUCCGGCUCA

AGAGACAGCCGCGAGGGAAUGUUCCUCCCGAAACCAGAGGCCGGCUCAGCCAUCAGCGACGUGUUCGAAGGGCGCGAAGUCUGCCA

GCCCAAGCGGAUCCGCCCGUUUCAUCCGCCUGGAUCACCGUGGGCCAACAGACCCCUACCCGCAAGCUUAGCCCCUACCCCCACUG

GCCCUGUCCACGAACCUGUGGGCUCCCUGACACCCGCUCCUGUGCCACAACCUCUGGACCCCGCACCAGCAGUCACACCCGAAGCC

AGCCACCUCCUUGAGGAUCCGGACGAGGAGACUAGCCAGGCCGUGAAGGCGCUCCGCGAAAUGGCCGACACUGUGAUCCCUCAAAA

GGAAGAGGCGGCCAUUUGUGGACAGAUGGACUUGUCCCACCCGCCUCCAAGAGGUCACCUGGACGAACUUACCACCACGCUCGAAU
CCAUGACUGAGGAUCUGAACCUGGAUUCCCCGCUCACUCCCGAGCUCAACGAAAUCCUUGAUACCUUCCUUAACGACGAGUGUCUC
CUGCAUGCCAUGCACAUCUCCACCGGACUGAGCAUUUUCGACACCUCGCUGUUCGGUUCCGGAAGCGGCUCAGACGCGCUGGAUGA
CUUCGAUUUGGACAUGCUUGGCAGCGAUGCCCUGGAUGAUUUCGACCUGGACAUGCUCGGGUCGGAUGCGCUGGACGACUUCGAUC
UCGAUAUGUUGGGCUCCGAUGCCCUCGACGACUUUGACCUCGACAUGCUGGGCUCGGGCUCAGGAUCCCAAUACCUCCCGGAUACC
GACGACAGGCAUCGCAUUGAGGAAAAGCGGAAGCGCACCUAUGAAACCUUCAAGUCCAUUAUGAAGAAGUCGCCCUUUUCCGGACC
GACUGACCCUCGGCCUCCUCCUCGACGAAUUGCCGUCCCAUCUCGGUCAUCCGCCUCGGUCCCCAAGCCAGCACCGCAGCCUUAUC
CGUUCACCUCCUCUCUGUCCACCAUUAACUACGAUGAAUUCCCCACCAUGGUGUUCCCGUCGGGACAGAUCUCCCAAGCCUCAGCC
CUUGCUCCUGCCCCUCCACAAGUCCUGCCCCAAGCACCAGCGCCUGCUCCUGCACCCGCGAUGGUGUCCGCACUGGCGCAAGCUCC
UGCCCCUGUGCCUGUGCUGGCUCCUGGACCACCCCAGGCAGUAGCACCUCCAGCCCCGAAGCCCACUCAGGCUGGAGAGGGAACCC
UGAGCGAAGCGCUGCUGCAGCUCCAGUUCGACGACGAAGAUCUGGGUGCCCUGCUGGGAAAUUCCACCGAUCCGGCGGUGUUCACA
GACCUGGCCUCCGUGGACAACUCCGAAUUCCAGCAGUUGUUGAACCAGGGCAUUCCUGUGGCCCCCCACACCACUGAGCCAAUGCU
[1493] CAUGGAAUACCCCGAGGCCAUUACCAGACUCGUGACCGGAGCCCAAAGGCCUCCGGAUCCAGCGCCAGCUCCGUUGGGAGCUCCGG
GAUUGCCGAACGGGCUGCUGUCGGGAGAUGAAGAUUUCUCCUCAAUCGCCGAUAUGGACUUCUCCGCGCUGCUGGGUUCGGGUUCG
GGAUCGCGCGAUAGCCGGGAGGGCAUGUUCCUACCGAAGCCUGAGGCCGGAAGCGCCAUCUCCGAUGUGUUCGAGGGCAGAGAAGU
CUGUCAGCCUAAGCGCAUUCGCCCGUUCCACCCUCCUGGAUCGCCCUGGGCCAAUCGGCCACUGCCUGCGUCCCUCGCUCCAACGC
CGACCGGACCUGUGCACGAACCGGUCGGCUCACUGACUCCAGCUCCCGUCCCACAACCGCUCGACCCUGCUCCCGCUGUUACCCCC
GAAGCCUCCCAUUUGCUGGAAGAUCCCGAUGAGGAAACUUCCCAGGCCGUCAAGGCCCUGCGGGAGAUGGCAGACACCGUGAUACC
CCAGAAGGAAGAAGCUGCCAUCUGCGGGCAGAUGGACCUGUCCCAUCCUCCUCCACGCGGACACUUGGACGAGCUGACCACUACUC
UGGAGUCCAUGACCGAGGACCUGAACCUUGACUCGCCUUUGACCCCUGAACUGAACGAAAUUCUGGACACCUUCCUGAAUGACGAG
UGCCUCCUGCACGCGAUGCACAUCAGCACCGGACUGUCCAUCUUCGACACUUCCCUCUUUGGGAGCGGGUCCGGAUCAGGCGGUGG
UGGUAGCGGGAAACGGCCAGCAGCGACCAAGAAGGCCGGACAGGCCAAGAAGAAGAAAGGCUCAUACCCCUACGACGUGCCGGACU
ACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCCUUGCACCUGUACCU
CUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1494] SEQ ID NO.:174

[1495] >ZF5 protein-no effector

[1496] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASSGGKRPAATKKAGQAKKKKGSYPYDVPDYA

[1497] SEQ ID NO.:235

[1498] >Nucleotide Seqeunce of DNA binding domain of ZF5 protein-no effector

[1499] CUCGAACCGGGCGAGAAACCAUAUAAGUGUCCAGAGUGUGGUAAGAGCUUUAGCACCAGUGGCAAUCUGACCGAGCAUCAACGCAC
GCAUACGGGUGAGAAACCGUACAAGUGCCCGGAAUGCGGCAAAAGUUUCAGCGAUAGCGGCAAUCUGCGUGUGCACCAGCGUACGC
AUACGGGCGAAAAGCCGUAUAAGUGCCCAGAAUGCGGUAAGAGUUUUAGCCACAAAAACGCGCUGCAGAACCACCAGCGCACCCAC
ACGGGUGAGAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCCGCAACGAUACGCUGACGGAACACCAACGUACGCAUAC
CGGCGAAAAGCCAUACAAGUGCCCGGAGUGCGGUAAAAGCUUUAGCCAGCGCGCGCAUCUCGAACGUCAUCAACGUACCCAUACCG

[1500] GUGAAAAACCAUAUAAAUGCCCGGAAUGUGGUAAAAGUUUUAGCCGCAGCGACAAACUGGUGCGUCAUCAACGCACCCAUACCGGU
GAAAAGCCAUAUAAGUGCCCGGAGUGUGGUAAAAGCUUCAGCGAUCCGGGUCAUCUGGUUCGCCAUCAACGUACGCACACCGGCGA
GAAGCCAACCGGCAAGAAAACCAGC

[1501] SEQ ID NO.:175

[1502] ＞ZF5 mRNA-no effector

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUCGAACCGGGCGAGAAACCAUAUAAGUGUCCAGAGUGUGGUAAGAGCUUUAGCACCAG
UGGCAAUCUGACCGAGCAUCAACGCACGCAUACGGGUGAGAAACCGUACAAGUGCCCGGAAUGCGGCAAAAGUUUCAGCGAUAGCG
GCAAUCUGCGUGUGCACCAGCGUACGCAUACGGGCGAAAAGCCGUAUAAGUGCCCAGAAUGCGGUAAGAGUUUUAGCCACAAAAAC
GCGCUGCAGAACCACCAGCGCACCCACACGGGUGAGAAGCCAUACAAAUGUCCGGAAUGCGGCAAAAGCUUCAGCCGCAACGAUAC
GCUGACGGAACACCAACGUACGCAUACCGGCGAAAAGCCAUACAAGUGCCCGGAGUGCGGUAAAAGCUUUAGCCAGCGCGCGCAUC
[1503] UCGAACGUCAUCAACGUACCCAUACCGGUGAAAAACCAUAUAAAUGCCCGGAAUGUGGUAAAAGUUUUAGCCGCAGCGACAAACUG
GUGCGUCAUCAACGCACCCAUACCGGUGAAAAGCCAUAUAAGUGCCCGGAGUGUGGUAAAAGCUUCAGCGAUCCGGGUCAUCUGGU
UCGCCAUCAACGUACGCACACCGGCGAGAAGCCAACCGGCAAGAAAACCAGCGCUAGCAGCGGCGGCAAGCGGCCCGCCGCCACCA
AGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGC
CUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGA
AGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
A

[1504] SEQ ID NO.:176

[1505] ＞ZF5.3-VPR-tPT2a-ZF7-VPR protein

MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGE
KPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKP
YKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSD
ALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDP
RPPPRRIAVPSRSSASVPKPAPQPYPPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPV
PVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEY
PEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQP
KRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKE
EAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKA
GQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPEC
GKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGK
SFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSF
STHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSG
GPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPPFTSSLSTINYDE
FPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDE
DLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDF
SSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLT

[1507] PAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSP
LTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1508] SEQ ID NO.:177

[1509] ＞ZF5.3-VPR-tPT2a-ZF7-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

GUGCCCGCCGCCGGCAGCAGCGGAUCAUCAGGCUCACUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUU

CUCGACCUCCGGGAACCUGACCGAGCACCAGCGCACCCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCU

CAGACUCGGGAAACCUCAGGGUGCACCAGCGGACCCACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCC

CACAAGAACGCGCUGCAGAACCACCAAAGAACCCACACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCG

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GGGCCCACCUGGAAAGACACCAGAGAACCCACACCGGCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCA

GACAAGCUGGUCCGCCACCAAAGGACCCACACAGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGG

ACACCUGGUCCGGCACCAGAGGACCCACACCGGGGAGAAGCCGACCGGCAAAAAGACCUCAGCGAGCGGAUCAGGAGGAGGAUCAG

GGGGGGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAUCAGACGCACUGGACGACUUCGACCUAGACAUGCUCGGAUCGGAC

GCACUCGACGACUUCGACCUCGACAUGCUAGGAUCAGACGCACUAGACGACUUCGACCUCGACAUGCUGUCGGGAGGACCGAAGAA

AAAGCGGAAGGUCGGAUCACAGUACCUCCCGGACACCGACGACAGGCACAGAAUCGAAGAAAAACGCAAGCGCACCUACGAAACCU

UCAAGAGCAUCAUGAAAAAGUCGCCGUUCUCAGGACCGACCGACCCCAGACCGCCACCGAGGAGAAUAGCCGUCCCGAGCCGAUCC

UCCGCAUCCGUGCCGAAACCGGCACCGCAACCCUACCCGUUCACCUCGUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAU

GGUGUUCCCCUCCGGGCAGAUCUCACAGGCCUCGGCACUGGCACCCGCACCACCGCAAGUGCUGCCCCAAGCACCGGCACCCGCAC

CGGCGCCCGCAAUGGUGUCAGCGCUGGCACAGGCACCAGCACCGGUGCCAGUCCUCGCACCGGGACCGCCGCAAGCAGUGGCACCG

[1510] CCGGCACCGAAACCGACCCAGGCCGGAGAAGGGACCCUGUCCGAGGCGCUGCUGCAACUCCAGUUCGACGACGAGGACCUGGGAGC

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CCCCCGAGAGGACACCUGGACGAACUCACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACUCACCGCUGACCCCGGA

GCUGAACGAAAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCAAUGCACAUCAGCACCGGGCUGUCGAUCUUCGACA

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ACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCUGGACGACUUCGACCU

GGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGC

UGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAAGGUGGGCAGCCAGUACCUG

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[1511] GUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCGUGGCCCCCCACACCACCGA

GCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCUGG

GCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGACUUCAGCGCCCUGCUGGGC

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GUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCCUGCGGGAGAUGGCCGACAC

CGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGGGGCCACCUGGACGAGCUGA

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AAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAG

CCUGAGUAGGAAGUCUAGAAAA

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CCATACCGGTGAGAAGCCGTACAAATGCCCAGAGTGCGGTAAGAGCTTTAGTACCAGTGGCAGTCTGGTTCGTCATCAGCGCACGC

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[1517] ACCGGCGAGAAGCCGTATAAATGTCCGGAGTGCGGTAAGAGCTTTAGCCGTAGCGATAAACTGACCGAACACCAACGTACGCATAC

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GTGAAAAGCCATATAAATGTCCAGAATGCGGTAAGAGTTTTAGTCAGAGCAGTAATCTGGTGCGCCATCAGCGTACCCACACGGGT

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AAAACCAACCGGCAAGAAAACCAGT

[1518] SEQ ID NO.:178

[1519] ＞ZF7-VPR-tPT2a-ZF5.3-VPR pretein

MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPY

KCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKC

PECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALD

DFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPP

PRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVL

APGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEA

ITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRL

RPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAA

ICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQA

[1520] KKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSLEPGEKPYKCPECGKSFS

TSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRN

DTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGH

LVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKK

RKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSSLSTINYDEFPTMV

FPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGAL

LGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIAD

MDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVP

QPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPEL

NEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA

[1521] SEQ ID NO.:179

[1522] ＞ZF7-VPR-tPT2a-ZF5.3-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC

[1523] GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAG

CGACCAUCUGACCAAUCACCAACGCACCCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUG

GCAGUCUGGUUCGUCAUCAGCGCACGCACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGU

CAUCUGGCGAGCCAUCAACGUACGCACACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAA

ACUGACCGAACACCAACGUACGCAUACGGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUC

UGACCGAGCAUCAACGUACCCAUACCGGUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUG

GUGCGCCAUCAGCGUACCCACACGGGUGAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAU

CCGUCAUCAGCGCACCCACACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCGACG

CCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGAC

GACUUCGACCUGGACAUGCUGGGCAGCGACGCCCUGGACGACUUCGACCUGGACAUGCUGAGCGGCGGCCCCAAGAAGAAGCGGAA

GGUGGGCAGCCAGUACCUGCCCGACACCGACGACCGGCACCGGAUCGAGGAGAAGCGGAAGCGGACCUACGAGACCUUCAAGAGCA

UCAUGAAGAAAUCCCCCUUCAGCGGCCCCACCGACCCCCGGCCCCCCCCCCCGGCGGAUCGCCGUGCCCAGCCGGAGCAGCGCCAGC

GUGCCCAAGCCCGCCCCCCAGCCCUACCCCUUCACCAGCAGCCUGAGCACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCC

CAGCGGCCAGAUCAGCCAGGCCAGCGCCCUGGCCCCCGCCCCCCCCCAGGUGCUGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCG

CCAUGGUGAGCGCCCUGGCCCAGGCCCCCGCCCCCGUGCCCGUGCUGGCCCCCGGCCCCCCCCAGGCCGUGGCCCCCCCCGCCCCC

AAGCCCACCCAGGCCGGCGAGGGCACCCUGAGCGAGGCCCUGCUGCAGCUGCAGUUCGACGACGAGGACCUGGGCGCCCUGCUGGG

CAACAGCACCGACCCCGCCGUGUUCACCGACCUGGCCAGCGUGGACAACAGCGAGUUCCAGCAGCUGCUGAACCAGGGCAUCCCCG

UGGCCCCCCACACCACCGAGCCCAUGCUGAUGGAGUACCCCGAGGCCAUCACCCGGCUGGUGACCGGCGCCCAGCGGCCCCCCGAC

CCCGCCCCCGCCCCCCUGGGCGCCCCCGGCCUGCCCAACGGCCUGCUGAGCGGCGACGAGGACUUCAGCAGCAUCGCCGACAUGGA

CUUCAGCGCCCUGCUGGGCAGCGGCAGCGGCAGCCGGGACAGCCGGGAGGGCAUGUUCCUGCCCAAGCCCGAGGCCGGCAGCGCCA

UCAGCGACGUGUUCGAGGGCCGGGAGGUGUGCCAGCCCAAGCGGCUCCGGCCCUUCCACCCCCCCGGCAGCCCCUGGGCCAACCGG

CCCCUGCCCGCCAGCCUGGCCCCCACCCCCACCGGCCCCGUGCACGAGCCCGUGGGCAGCCUGACCCCCGCCCCCGUGCCCCAGCC

[1524] CCUGGACCCCGCCCCCGCCGUGACCCCCGAGGCCAGCCACCUGCUGGAGGACCCCGACGAGGAGACCAGCCAGGCCGUGAAGGCCC

UGCGGGAGAUGGCCGACACCGUGAUCCCCCAGAAGGAGGAGGCCGCCAUCUGCGGCCAGAUGGACCUGAGCCACCCCCCCCCCCGG

GGCCACCUGGACGAGCUGACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACAGCCCCCUGACCCCCGAGCUGAACGA

GAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCCAUGCACAUCAGCACCGGCCUGAGCAUCUUCGACACCAGCCUGU

UCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGAC

UACGCCGCCACCAACUUUUCUCUGCUGAAGCAAGCCGGAGAUGUGGAGGAGAAUCCCGGCCCUACCUCCGCCGGAAAACUGGGCUC

CGGCGAAGGCAGAGGAAGCCUCCUCACAUGCGGCGACGUGGAGGAGAACCCCGGCCCUCUGGAGGGAUCCUCAGGCUCACUGGAAC

CGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUUCUCGACCUCCGGGAACCUGACCGAGCACCAGCGCACCCACACC

GGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCUCAGACUCGGGAAACCUCAGGGUGCACCAGCGGACCCACACGGG

GGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCCCACAAGAACGCGCUGCAGAACCACCAAAGAACCCACACCGGCG

AAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCGCAACGACACCCUCACCGAACACCAACGCACCCACACCGGAGAA

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GCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCAGACAAGCUGGUCCGCCACCAAAGGACCCACACAGGAGAAAAGC

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ACCGGCAAAAAGACCUCAGCGAGCGGAUCAGGAGGAGGAUCAGGGGGGGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAUC

AGACGCACUGGACGACUUCGACCUAGACAUGCUCGGAUCGGACGCACUCGACGACUUCGACCUCGACAUGCUAGGAUCAGACGCAC

UAGACGACUUCGACCUCGACAUGCUGUCGGGAGGACCGAAGAAAAAGCGGAAGGUCGGAUCACAGUACCUCCCGGACACCGACGAC

AGGCACAGAAUCGAAGAAAAACGCAAGCGCACCUACGAAACCUUCAAGAGCAUCAUGAAAAAGUCGCCGUUCUCAGGACCGACCGA

CCCCAGACCGCCACCGAGGAGAAUAGCCGUCCCGAGCCGAUCCUCCGCAUCCGUGCCGAAACCGGCACCGCAACCCUACCCGUUCA

CCUCGUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAUGGUGUUCCCCUCCGGGCAGAUCUCACAGGCCUCGGCACUGGCA

[1525]
CCCGCACCACCGCAAGUGCUGCCCCAAGCACCGGCACCCGCACCGGCGCCCGCAAUGGUGUCAGCGCUGGCACAGGCACCAGCACC
GGUGCCAGUCCUCGCACCGGGACCGCCGCAAGCAGUGGCACCGCCGGCACCGAAACCGACCCAGGCCGGAGAAGGGACCCUGUCCG
AGGCGCUGCUGCAACUCCAGUUCGACGACGAGGACCUGGGAGCACUCCUGGGAAACUCCACCGACCCGGCAGUGUUCACCGACCUC
GCAUCGGUGGACAACUCCGAGUUCCAACAGCUCCUGAACCAGGGGAUACCGGUGGCACCGCACACCACCGAACCGAUGCUGAUGGA
AUACCCGGAAGCCAUCACCCGGCUCGUGACCGGAGCGCAAAGACCGCCCGACCCCGCGCCCGCACCGCUGGGAGCACCGGGACUAC
CGAACGGGCUGCUCUCAGGGGACGAGGACUUCUCCAGCAUCGCAGACAUGGACUUCUCCGCCCUGCUGGGAUCAGGAUCAGGAUCA
CGCGACUCCCGGGAAGGAAUGUUCCUGCCGAAGCCGGAAGCAGGCAGCGCAAUCUCCGACGUGUUCGAAGGCCGCGAGGUCUGCCA
GCCCAAGCGCCUGCGACCGUUCCACCCGCCGGGAUCACCGUGGGCAAACCGCCCGCUACCGGCAUCACUGGCACCGACACCCACCG
GACCGGUGCACGAACCGGUCGGGUCACUGACCCCCGCACCGGUCCCGCAACCGCUAGACCCGGCACCGGCAGUGACCCCGGAAGCA
UCGCACCUCCUGGAGGACCCGGACGAGGAAACCUCACAGGCAGUGAAGGCCCUGCGGGAGAUGGCCGACACCGUGAUACCGCAGAA
GGAGGAGGCCGCCAUCUGCGGACAAAUGGACCUGUCACACCCGCCCCCGAGAGGACACCUGGACGAACUCACCACCACCCUGGAGA
GCAUGACCGAGGACCUGAACCUGGACUCACCGCUGACCCCGGAGCUGAACGAAAUCCUGGACACCUUCCUGAACGACGAGUGCCUG
CUGCACGCAAUGCACAUCAGCACCGGGCUGUCGAUCUUCGACACCAGCCUGUUCUCCGGAGGGAAAAGACCCGCCGCCACCAAGAA
AGCGGGCCAAGCAAAGAAAAAGAAGGGAUCGUACCCCUACGACGUGCCGGACUACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUC
UGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUC
UAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1526] SEQ ID NO.:238

[1527] ＞Nucleotide Seqeunce of DNA binding domain of ZF7-VPR-tPT2a-ZF5.3-VPR;1

[1528]
CUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAGCGACCAUCUGACCAAUCACCAACGCAC
CCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUGGCAGUCUGGUUCGUCAUCAGCGCACGC
ACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGUCAUCUGGCGAGCCAUCAACGUACGCAC
ACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAAACUGACCGAACACCAACGUACGCAUAC
GGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUCUGACCGAGCAUCAACGUACCCAUACCG
GUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUGGUGCGCCAUCAGCGUACCCACACGGGU
GAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAUCCGUCAUCAGCGCACCCACACCGGUGA
AAAACCAACCGGCAAGAAAACCAGU

[1529] SEQ ID NO.:239

[1530] ＞Nucleotide Seqeunce of DNA binding domain of ZF7-VPR-tPT2a-ZF5.3-VPR;2

[1531]
CTGGAACCGGGGGAAAAACCCTACAAGTGCCCGGAATGCGGCAAGAGCTTCTCGACCTCCGGGAACCTGACCGAGCACCAGCGCAC
CCACACCGGAGAGAAACCGTACAAGTGCCCCGAATGCGGGAAATCGTTCTCAGACTCGGGAAACCTCAGGGTGCACCAGCGGACCC
ACACGGGGGAAAAGCCGTACAAATGCCCGGAGTGCGGGAAGTCATTCTCCCACAAGAACGCGCTGCAGAACCACCAAAGAACCCAC
ACCGGCGAAAAACCGTACAAGTGCCCCGAGTGCGGAAAGTCCTTCTCCCGCAACGACACCCTCACCGAACACCAACGCACCCACAC
CGGAGAAAAGCCCTACAAGTGCCCGGAATGCGGAAAGAGCTTCAGCCAGAGGGCCCACCTGGAAAGACACCAGAGAACCCACACCG
GCGAAAAGCCGTACAAATGCCCGGAGTGCGGGAAGTCCTTCAGCCGGTCAGACAAGCTGGTCCGCCACCAAAGGACCCACACAGGA
GAAAAGCCCTACAAGTGCCCGGAATGCGGAAAATCGTTCAGCGACCCCGGACACCTGGTCCGGCACCAGAGGACCCACACCGGGGA
GAAGCCGACCGGCAAAAAGACCTCA

[1532] SEQ ID NO.:180

[1533] ＞ZF5.3-VPR-tPT2a-ZF7-p300 protein

MAPKKKRKVGIHGVPAAGSSGSSGSLEPGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGE
KPYKCPECGKSFSHKNALQNHQRTHTGEKPYKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKP
YKCPECGKSFSRSDKLVRHQRTHTGEKPYKCPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSD
ALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDP
RPPPRRIAVPSRSSASVPKPAPQPYPPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPV
PVLAPGPPQAVAPPAPKPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEY
PEAITRLVTGAQRPPDPAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQP
KRLRPFHPPGSPWANRPLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKE
EAAICGQMDLSHPPPRGHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKA
GQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSGSLEPGEKPYKCPEC
GKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPYKCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGK
SFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSF
STHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGIFKPEELRQALMPTLEALYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDL
STIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFEQEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTI
PRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKNDTLDPELFVECTECGRKMHQICVLHHEIIWPAGFV
CDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVTVRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRT
KALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKCLRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEG
DDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDRLTSAKELPYFEGDFWPNVLEESIKELEQEEEERKR
EENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDLSQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDP
DPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1534]

[1535] SEQ ID NO.:181

[1536] >ZF5.3-VPR-tPT2a-ZF7-p300 mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCAUCAGGCUCACUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUU
CUCGACCUCCGGGAACCUGACCGAGCACCAGCGCACCCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCU
CAGACUCGGGAAACCUCAGGGUGCACCAGCGGACCCACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCC
CACAAGAACGCGCUGCAGAACCACCAAAGAACCCACACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCG
CAACGACACCCUCACCGAACACCAACGCACCCACACCGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAGA
GGGCCCACCUGGAAAGACACCAGAGAACCCACACCGGCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCA
GACAAGCUGGUCCGCCACCAAAGGACCCACACAGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGG
ACACCUGGUCCGGCACCAGAGGACCCACACCGGGGAGAAGCCGACCGGCAAAAAGACCUCAGCGAGCGGAUCAGGAGGAGGAUCAG
GGGGGGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAUCAGACGCACUGGACGACUUCGACCUAGACAUGCUCGGAUCGGAC
GCACUCGACGACUUCGACCUCGACAUGCUAGGAUCAGACGCACUAGACGACUUCGACCUCGACAUGCUGUCGGGAGGACCGAAGAA
AAAGCGGAAGGUCGGAUCACAGUACCUCCCGGACACCGACGACAGGCACAGAAUCGAAGAAAAACGCAAGCGCACCUACGAAACCU
UCAAGAGCAUCAUGAAAAAGUCGCCGUUCUCAGGACCGACCGACCCCAGACCGCCACCGAGGAGAAUAGCCGUCCCGAGCCGAUCC
UCCGCAUCCGUGCCGAAACCGGCACCGCAACCCUACCCGUUCACCUCGUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAU

[1537]

GGUGUUCCCCUCCGGGCAGAUCUCACAGGCCUCGGCACUGGCACCCGCACCACCGCAAGUGCUGCCCCAAGCACCGGCACCCGCAC

CGGCGCCCGCAAUGGUGUCAGCGCUGGCACAGGCACCAGCACCGGUGCCAGUCCUCGCACCGGGACCGCCGCAAGCAGUGGCACCG

CCGGCACCGAAACCGACCCAGGCCGGAGAAGGGACCCUGUCCGAGGCGCUGCUGCAACUCCAGUUCGACGACGAGGACCUGGGAGC

ACUCCUGGGAAACUCCACCGACCCGGCAGUGUUCACCGACCUCGCAUCGGUGGACAACUCCGAGUUCCAACAGCUCCUGAACCAGG

GGAUACCGGUGGCACCGCACACCACCGAACCGAUGCUGAUGGAAUACCCGGAAGCCAUCACCCGGCUCGUGACCGGAGCGCAAAGA

CCGCCCGACCCCGCGCCCGCACCGCUGGGAGCACCGGGACUACCGAACGGGCUGCUCUCAGGGGACGAGGACUUCUCCAGCAUCGC

AGACAUGGACUUCUCCGCCCUGCUGGGAUCAGGAUCAGGAUCACGCGACUCCCGGGAAGGAAUGUUCCUGCCGAAGCCGGAAGCAG

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CCCGCAACCGCUAGACCCGGCACCGGCAGUGACCCCGGAAGCAUCGCACCUCCUGGAGGACCCGGACGAGGAAACCUCACAGGCAG

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CCCCCGAGAGGACACCUGGACGAACUCACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACUCACCGCUGACCCCGGA

GCUGAACGAAAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCAAUGCACAUCAGCACCGGGCUGUCGAUCUUCGACA

CCAGCCUGUUCUCCGGAGGGAAAAGACCCGCCGCCACCAAGAAAGCGGGCCAAGCAAAGAAAAAGAAGGGAUCGUACCCCUACGAC

GUGCCGGACUACGCAGCCACCAACUUUUCUCUGCUGAAGCAAGCCGGAGAUGUGGAGGAGAAUCCCGGCCCUACCUCCGCCGGAAA

ACUGGGCUCCGGCGAAGGCAGAGGAAGCCUCCUCACAUGCGGCGACGUGGAGGAGAACCCCGGCCCUCUGGAGGGAUCCUCAGGCU

CAGGAUCCCUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAGCGACCAUCUGACCAAUCAC

CAACGCACCCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUGGCAGUCUGGUUCGUCAUCA

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[1538] GUACGCACACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAAACUGACCGAACACCAACGU

ACGCAUACGGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUCUGACCGAGCAUCAACGUAC

CCAUACCGGUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUGGUGCGCCAUCAGCGUACCC

ACACGGGUGAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAUCCGUCAUCAGCGCACCCAC

ACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCAUCUUCAAGCCCGAGGAGCUGCG

GCAGGCCCUGAUGCCCACCCUGGAGGCCCUGUACCGGCAGGACCCCGAGAGCCUGCCCUUCCGGCAGCCCGUGGACCCCCAGCUGC

UGGGCAUCCCCGACUACUUCGACAUCGUGAAAUCCCCCAUGGACCUGAGCACCAUCAAGCGGAAGCUGGACACCGGCCAGUACCAG

GAGCCCUGGCAGUACGUGGACGACAUCUGGCUGAUGUUCAACAACGCCUGGCUGUACAACCGGAAAACCAGCCGGGUGUACAAGUA

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UCAGCCCCCAGACCCUGUGCUGCUACGGCAAGCAGCUGUGCACCAUCCCCCGGGACGCCACCUACUACAGCUACCAGAACCGGUAC

CACUUCUGCGAGAAGUGCUUCAACGAGAUCCAGGGCGAGAGCGUGAGCCUGGGCGACGACCCCAGCCAGCCCCAGACCACCAUCAA

CAAGGAGCAGUUCAGCAAGCGGAAGAACGACACCCUGGACCCCGAGCUGUUCGUGGAGUGCACCGAGUGCGGCCGGAAGAUGCACC

AGAUCUGCGUGCUGCACCACGAGAUCAUCUGGCCCGCCGGCUUCGUGUGCGACGGCUGCCUGAAGAAAUCCGCCCGGACCCGGAAG

GAGAACAAGUUCAGCGCCAAGCGGCUGCCCAGCACCCGGCUGGGCACCUUCCUGGAGAACCGGGUGAACGACUUCCUGCGGCGGCA

GAACCACCCCGAGAGCGGCGAGGUGACCGUGCGGGUGGUGCACGCCAGCGACAAGACCGUGGAGGUGAAGCCCGGCAUGAAGGCCC

GGUUCGUGGACAGCGGCGAGAUGGCCGAGAGCUUCCCCUACCGGACCAAGGCCCUGUUCGCCUUCGAGGAGAUCGACGGCGUGGAC

CUGUGCUUCUUCGGCAUGCACGUGCAGGAGUACGGCAGCGACUGCCCCCCCCCCCAACCAGCGGCGGGUGUACAUCAGCUACCUGGA

CAGCGUGCACUUCUUCCGGCCCAAGUGCCUGCGGACCGCCGUGUACCACGAGAUCCUGAUCGGCUACCUGGAGUACGUGAAGAAGC

UGGGCUACACCACCGGCCACAUCUGGGCCUGCCCCCCCAGCGAGGGCGACGACUACAUCUUCCACUGCCACCCCCCCGACCAGAAG

AUCCCCAAGCCCAAGCGGCUGCAGGAGUGGUACAAGAAGAUGCUGGACAAGGCCGUGAGCGAGCGGAUCGUGCACGACUACAAGGA

[1539] CAUCUUCAAGCAGGCCACCGAGGACCGGCUGACCAGCGCCAAGGAGCUGCCCUACUUCGAGGGCGACUUCUGGCCCAACGUGCUGG AGGAGAGCAUCAAGGAGCUGGAGCAGGAGGAGGAGGAGCGGAAGCGGGAGGAGAACACCAGCAACGAGAGCACCGACGUGACCAAG GGCGACAGCAAGAACGCCAAGAAGAAGAACAACAAGAAAACCAGCAAGAACAAGAGCAGCCUGAGCCGGGGCAACAAGAAGAAGCC CGGCAUGCCCAACGUGAGCAACGACCUGAGCCAGAAGCUGUACGCCACCAUGGAGAAGCACAAGGAGGUGUUCUUCGUGAUCCGGC UGAUCGCCGGCCCCGCCGCCAACAGCCUGCCCCCCAUCGUGGACCCCGACCCCCUGAUCCCCUGCGACCUGAUGGACGGCCGGGAC GCCUUCCUGACCCUGGCCCGGGACAAGCACCUGGAGUUCAGCAGCCUGCGGCGGGCCCAGUGGAGCACCAUGUGCAUGCUGGUGGA GCUGCACACCCAGAGCCAGGACAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCCAAGAAGAAGAAGGGCAGCU ACCCCUACGACGUGCCCGACUACGCCUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUU CUCUCCCUUGCACCUGUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAA AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1540] SEQ ID NO.:240

[1541] >Nucleotide Seqeunce of DNA binding domain of ZF5.3-VPR-tPT2a-ZF7-p300;1

[1542] CUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUUCUCGACCUCCGGGAACCUGACCGAGCACCAGCGCAC CCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCUCAGACUCGGGAAACCUCAGGGUGCACCAGCGGACCC ACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCCCACAAGAACGCGCUGCAGAACCACCAAAGAACCCAC ACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCGCAACGACACCCUCACCGAACACCAACGCACCCACAC CGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAGAGGGCCCACCUGGAAAGACACCAGAGAACCCACACCG GCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCAGACAAGCUGGUCCGCCACCAAAGGACCCACACAGGA GAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGGACACCUGGUCCGGCACCAGAGGACCCACACCGGGGA GAAGCCGACCGGCAAAAAGACCUCA

[1543] SEQ ID NO.:241

[1544] >Nucleotide Seqeunce of DNA binding domein of ZF5.3-VPR-tPT2a-ZF7-p300;2

[1545] CTGGAACCGGGCGAGAAGCCATACAAGTGCCCAGAGTGCGGCAAAAGCTTCAGCCGCAGCGACCATCTGACCAATCACCAACGCAC CCATACCGGTGAGAAGCCGTACAAATGCCCAGAGTGCGGTAAGAGCTTTAGTACCAGTGGCAGTCTGGTTCGTCATCAGCGCACGC ACACGGGCGAAAAACCATACAAATGCCCGGAGTGCGGCAAAAGCTTTAGCCAAGCCGGTCATCTGGCGAGCCATCAACGTACGCAC ACCGGCGAGAAGCCGTATAAATGTCCGGAGTGCGGTAAGAGCTTTAGCCGTAGCGATAAACTGACCGAACACCAACGTACGCATAC GGGCGAGAAACCATATAAATGTCCAGAGTGTGGCAAGAGTTTCAGCACCAGCGGCAATCTGACCGAGCATCAACGTACCCATACCG GTGAAAAGCCATATAAATGTCCAGAATGCGGTAAGAGTTTTAGTCAGAGCAGTAATCTGGTGCGCCATCAGCGTACCCACACGGGT GAGAAACCATATAAGTGTCCGGAATGCGGCAAGAGTTTTAGCACCCATCTGGATCTGATCCGTCATCAGCGCACCCACACCGGTGA AAAACCAACCGGCAAGAAAACCAGT

[1546] SEQ ID NO.:182

[1547] >ZF7-p300-tPT2a-ZF5.3-VPR protein

[1548] MAPKKKRKVGIHGVPAAGSSGSLEPGEKPYKCPECGKSFSRSDHLTNHQRTHTGEKPYKCPECGKSFSTSGSLVRHQRTHTGEKPY KCPECGKSFSQAGHLASHQRTHTGEKPYKCPECGKSFSRSDKLTEHQRTHTGEKPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKC PECGKSFSQSSNLVRHQRTHTGEKPYKCPECGKSFSTHLDLIRHQRTHTGEKPTGKKTSASGSGGGSGGIFKPEELRQALMPTLEA LYRQDPESLPFRQPVDPQLLGIPDYFDIVKSPMDLSTIKRKLDTGQYQEPWQYVDDIWLMFNNAWLYNRKTSRVYKYCSKLSEVFE

QEIDPVMQSLGYCCGRKLEFSPQTLCCYGKQLCTIPRDATYYSYQNRYHFCEKCFNEIQGESVSLGDDPSQPQTTINKEQFSKRKN
DTLDPELFVECTECGRKMHQICVLHHEIIWPAGFVCDGCLKKSARTRKENKFSAKRLPSTRLGTFLENRVNDFLRRQNHPESGEVT
VRVVHASDKTVEVKPGMKARFVDSGEMAESFPYRTKALFAFEEIDGVDLCFFGMHVQEYGSDCPPPNQRRVYISYLDSVHFFRPKC
LRTAVYHEILIGYLEYVKKLGYTTGHIWACPPSEGDDYIFHCHPPDQKIPKPKRLQEWYKKMLDKAVSERIVHDYKDIFKQATEDR
LTSAKELPYFEGDFWPNVLEESIKELEQEEEERKREENTSNESTDVTKGDSKNAKKKNNKKTSKNKSSLSRGNKKKPGMPNVSNDL
SQKLYATMEKHKEVFFVIRLIAGPAANSLPPIVDPDPLIPCDLMDGRDAFLTLARDKHLEFSSLRRAQWSTMCMLVELHTQSQDSG
GKRPAATKKAGQAKKKKGSYPYDVPDYAATNFSLLKQAGDVEENPGPTSAGKLGSGEGRGSLLTCGDVEENPGPLEGSSGSLEPGE
KPYKCPECGKSFSTSGNLTEHQRTHTGEKPYKCPECGKSFSDSGNLRVHQRTHTGEKPYKCPECGKSFSHKNALQNHQRTHTGEKP
YKCPECGKSFSRNDTLTEHQRTHTGEKPYKCPECGKSFSQRAHLERHQRTHTGEKPYKCPECGKSFSRSDKLVRHQRTHTGEKPYK
CPECGKSFSDPGHLVRHQRTHTGEKPTGKKTSASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALDDFDLDMLGSDALDD
FDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSASVPKPAPQPYPFTSS
LSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAPKPTQAGEGTLSEAL
LQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPDPAPAPLGAPGLPNG
LLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANRPLPASLAPTPTGPV
HEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPRGHLDELTTTLESMT
EDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPDYA*

[1549]

[1550] SEQ ID NO.:183

[1551] >>ZF7-p300-tPT2a-ZF5.3-VPR mRNA

AGGAAAUAAGAGAGAAAAGAAGAGUAAGAAGAAAUAUAAGAGCCACCAUGGCCCCCAAGAAGAAGCGGAAGGUGGGCAUCCACGGC
GUGCCCGCCGCCGGCAGCAGCGGAUCCCUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAG
CGACCAUCUGACCAAUCACCAACGCACCCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUG
GCAGUCUGGUUCGUCAUCAGCGCACGCACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGU
CAUCUGGCGAGCCAUCAACGUACGCACACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAA
ACUGACCGAACACCAACGUACGCAUACGGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUC
UGACCGAGCAUCAACGUACCCAUACCGGUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUG
GUGCGCCAUCAGCGUACCCACACGGGUGAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAU
CCGUCAUCAGCGCACCCACACCGGUGAAAAACCAACCGGCAAGAAAACCAGUGCUAGCGGCAGCGGCGGCGGCAGCGGCGGCAUCU
UCAAGCCCGAGGAGCUGCGGCAGGCCCUGAUGCCCACCCUGGAGGCCCUGUACCGGCAGGACCCCGAGAGCCUGCCCUUCCGGCAG
CCCGUGGACCCCCAGCUGCUGGGCAUCCCCGACUACUUCGACAUCGUGAAAUCCCCCAUGGACCUGAGCACCAUCAAGCGGAAGCU
GGACACCGGCCAGUACCAGGAGCCCUGGCAGUACGUGGACGACAUCUGGCUGAUGUUCAACAACGCCUGGCUGUACAACCGGAAAA
CCAGCCGGGUGUACAAGUACUGCAGCAAGCUGAGCGAGGUGUUCGAGCAGGAGAUCGACCCCGUGAUGCAGAGCCUGGGCUACUGC
UGCGGCCGGAAGCUGGAGUUCAGCCCCCAGACCCUGUGCUGCUACGGCAAGCAGCUGUGCACCAUCCCCCGGGACGCCACCUACUA
CAGCUACCAGAACCGGUACCACUUCUGCGAGAAGUGCUUCAACGAGAUCCAGGGCGAGAGCGUGAGCCUGGGCGACGACCCCAGCC
AGCCCCAGACCACCAUCAACAAGGAGCAGUUCAGCAAGCGGAAGAACGACACCCUGGACCCCGAGCUGUUCGUGGAGUGCACCGAG
UGCGGCCGGAAGAUGCACCAGAUCUGCGUGCUGCACCACGAGAUCAUCUGGCCCGCCGGCUUCGUGUGCGACGGCUGCCUGAAGAA
AUCCGCCCGGACCCGGAAGGAGAACAAGUUCAGCGCCAAGCGGCUGCCCAGCACCCGGCUGGGCACCUUCCUGGAGAACCGGGUGA
ACGACUUCCUGCGGCGGCAGAACCACCCCGAGAGCGGCGAGGUGACCGUGCGGGUGGUGCACGCCAGCGACAAGACCGUGGAGGUG
AAGCCCGGCAUGAAGGCCCGGUUCGUGGACAGCGGCGAGAUGGCCGAGAGCUUCCCCUACCGGACCAAGGCCCUGUUCGCCUUCGA

[1552]

GGAGAUCGACGGCGUGGACCUGUGCUUCUUCGGCAUGCACGUGCAGGAGUACGGCAGCGACUGCCCCCCCCCCCAACCAGCGGCGGG

UGUACAUCAGCUACCUGGACAGCGUGCACUUCUUCCGGCCCAAGUGCCUGCGGACCGCCGUGUACCACGAGAUCCUGAUCGGCUAC

CUGGAGUACGUGAAGAAGCUGGGCUACACCACCGGCCACAUCUGGGCCUGCCCCCCCAGCGAGGGCGACGACUACAUCUUCCACUG

CCACCCCCCCGACCAGAAGAUCCCCAAGCCCAAGCGGCUGCAGGAGUGGUACAAGAAGAUGCUGGACAAGGCCGUGAGCGAGCGGA

UCGUGCACGACUACAAGGACAUCUUCAAGCAGGCCACCGAGGACCGGCUGACCAGCGCCAAGGAGCUGCCCUACUUCGAGGGCGAC

UUCUGGCCCAACGUGCUGGAGGAGAGCAUCAAGGAGCUGGAGCAGGAGGAGGAGGAGCGGAAGCGGGAGGAGAACACCAGCAACGA

GAGCACCGACGUGACCAAGGGCGACAGCAAGAACGCCAAGAAGAAGAACAACAAGAAAACCAGCAAGAACAAGAGCAGCCUGAGCC

GGGGCAACAAGAAGAAGCCCGGCAUGCCCAACGUGAGCAACGACCUGAGCCAGAAGCUGUACGCCACCAUGGAGAAGCACAAGGAG

GUGUUCUUCGUGAUCCGGCUGAUCGCCGGCCCCGCCGCCAACAGCCUGCCCCCCAUCGUGGACCCCGACCCCCUGAUCCCCUGCGA

CCUGAUGGACGGCCGGGACGCCUUCCUGACCCUGGCCCGGGACAAGCACCUGGAGUUCAGCAGCCUGCGGCGGGCCCAGUGGAGCA

CCAUGUGCAUGCUGGUGGAGCUGCACACCCAGAGCCAGGACAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCGGCCAGGCC

AAGAAGAAGAAGGGCAGCUACCCCUACGACGUGCCCGACUACGCCGCCACCAACUUUUCUCUGCUGAAGCAAGCCGGAGAUGUGGA

GGAGAAUCCCGGCCCUACCUCCGCCGGAAAACUGGGCUCCGGCGAAGGCAGAGGAAGCCUCCUCACAUGCGGCGACGUGGAGGAGA

ACCCCGGCCCUCUGGAGGGAUCCUCAGGCUCACUGGAACCGGGGGAAAAACCCUACAAGUGCCCGGAAUGCGGCAAGAGCUUCUCG

ACCUCCGGGAACCUGACCGAGCACCAGCGCACCCACACCGGAGAGAAACCGUACAAGUGCCCCGAAUGCGGGAAAUCGUUCUCAGA

CUCGGGAAACCUCAGGGUGCACCAGCGGACCCACACGGGGGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCAUUCUCCCACA

AGAACGCGCUGCAGAACCACCAAAGAACCCACACCGGCGAAAAACCGUACAAGUGCCCCGAGUGCGGAAAGUCCUUCUCCCGCAAC

GACACCCUCACCGAACACCAACGCACCCACACCGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAGAGCUUCAGCCAGAGGGC

CCACCUGGAAAGACACCAGAGAACCCACACCGGCGAAAAGCCGUACAAAUGCCCGGAGUGCGGGAAGUCCUUCAGCCGGUCAGACA

[1553] AGCUGGUCCGCCACCAAAGGACCCACACAGGAGAAAAGCCCUACAAGUGCCCGGAAUGCGGAAAAUCGUUCAGCGACCCCGGACAC

CUGGUCCGGCACCAGAGGACCCACACCGGGGAGAAGCCGACCGGCAAAAAGACCUCAGCGAGCGGAUCAGGAGGAGGAUCAGGGGG

GGACGCACUGGACGACUUCGACCUGGACAUGCUGGGAUCAGACGCACUGGACGACUUCGACCUAGACAUGCUCGGAUCGGACGCAC

UCGACGACUUCGACCUCGACAUGCUAGGAUCAGACGCACUAGACGACUUCGACCUCGACAUGCUGUCGGGAGGACCGAAGAAAAAG

CGGAAGGUCGGAUCACAGUACCUCCCGGACACCGACGACAGGCACAGAAUCGAAGAAAAACGCAAGCGCACCUACGAAACCUUCAA

GAGCAUCAUGAAAAAGUCGCCGUUCUCAGGACCGACCGACCCCAGACCGCCACCGAGGAGAAUAGCCGUCCCGAGCCGAUCCUCCG

CAUCCGUGCCGAAACCGGCACCGCAACCCUACCCGUUCACCUCGUCCCUGUCGACCAUCAACUACGACGAGUUCCCCACCAUGGUG

UUCCCCUCCGGGCAGAUCUCACAGGCCUCGGCACUGGCACCCGCACCACCGCAAGUGCUGCCCCAAGCACCGGCACCCGCACCGGC

GCCCGCAAUGGUGUCAGCGCUGGCACAGGCACCAGCACCGGUGCCAGUCCUCGCACCGGGACCGCCGCAAGCAGUGGCACCGCCGG

CACCGAAACCGACCCAGGCCGGAGAAGGGACCCUGUCCGAGGCGCUGCUGCAACUCCAGUUCGACGACGAGGACCUGGGAGCACUC

CUGGGAAACUCCACCGACCCGGCAGUGUUCACCGACCUCGCAUCGGUGGACAACUCCGAGUUCCAACAGCUCCUGAACCAGGGGAU

ACCGGUGGCACCGCACACCACCGAACCGAUGCUGAUGGAAUACCCGGAAGCCAUCACCCGGCUCGUGACCGGAGCGCAAAGACCGC

CCGACCCCGCGCCCGCACCGCUGGGAGCACCGGGACUACCGAACGGGCUGCUCUCAGGGGACGAGGACUUCUCCAGCAUCGCAGAC

AUGGACUUCUCCGCCCUGCUGGGAUCAGGAUCAGGAUCACGCGACUCCCGGGAAGGAAUGUUCCUGCCGAAGCCGGAAGCAGGCAG

CGCAAUCUCCGACGUGUUCGAAGGCCGCGAGGUCUGCCAGCCCAAGCGCCUGCGACCGUUCCACCCGCCGGGAUCACCGUGGGCAA

ACCGCCCGCUACCGGCAUCACUGGCACCGACACCCACCGGACCGGUGCACGAACCGGUCGGGUCACUGACCCCCGCACCGGUCCCG

CAACCGCUAGACCCGGCACCGGCAGUGACCCCGGAAGCAUCGCACCUCCUGGAGGACCCGGACGAGGAAACCUCACAGGCAGUGAA

GGCCCUGCGGGAGAUGGCCGACACCGUGAUACCGCAGAAGGAGGAGGCCGCCAUCUGCGGACAAAUGGACCUGUCACACCCGCCCC

CGAGAGGACACCUGGACGAACUCACCACCACCCUGGAGAGCAUGACCGAGGACCUGAACCUGGACUCACCGCUGACCCCGGAGCUG

AACGAAAUCCUGGACACCUUCCUGAACGACGAGUGCCUGCUGCACGCAAUGCACAUCAGCACCGGGCUGUCGAUCUUCGACACCAG

CCUGUUCUCCGGAGGGAAAAGACCCGCCGCCACCAAGAAAGCGGGCCAAGCAAAGAAAAAGAAGGGAUCGUACCCCUACGACGUGC

CGGACUACGCAUGAGCGGCCGCUUAAUUAAGCUGCCUUCUGCGGGGCUUGCCUUCUGGCCAUGCCCUUCUUCUCUCCCUUGCACCU

[1554] GUACCUCUUGGUCUUUGAAUAAAGCCUGAGUAGGAAGUCUAGAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1555] SEQ ID NO.:242

[1556] >Nucleotide Seqeunce of DNA binding domein of ZF7-p300-tPT2a-ZF5.3-VPR

[1557]
CUGGAACCGGGCGAGAAGCCAUACAAGUGCCCAGAGUGCGGCAAAAGCUUCAGCCGCAGCGACCAUCUGACCAAUCACCAACGCAC
CCAUACCGGUGAGAAGCCGUACAAAUGCCCAGAGUGCGGUAAGAGCUUUAGUACCAGUGGCAGUCUGGUUCGUCAUCAGCGCACGC
ACACGGGCGAAAAACCAUACAAAUGCCCGGAGUGCGGCAAAAGCUUUAGCCAAGCCGGUCAUCUGGCGAGCCAUCAACGUACGCAC
ACCGGCGAGAAGCCGUAUAAAUGUCCGGAGUGCGGUAAGAGCUUUAGCCGUAGCGAUAAACUGACCGAACACCAACGUACGCAUAC
GGGCGAGAAACCAUAUAAAUGUCCAGAGUGUGGCAAGAGUUUCAGCACCAGCGGCAAUCUGACCGAGCAUCAACGUACCCAUACCG
GUGAAAAGCCAUAUAAAUGUCCAGAAUGCGGUAAGAGUUUUAGUCAGAGCAGUAAUCUGGUGCGCCAUCAGCGUACCCACACGGGU
GAGAAACCAUAUAAGUGUCCGGAAUGCGGCAAGAGUUUUAGCACCCAUCUGGAUCUGAUCCGUCAUCAGCGCACCCACACCGGUGA
AAAACCAACCGGCAAGAAAACCAGU

[1558] SEQ ID NO.:243

[1559] >Nucleotide Seqeunce of DNA binding domain of ZF7-p300-tPT2a-ZF5.3-VPR

[1560]
CTGGAACCGGGGGAAAAACCCTACAAGTGCCCGGAATGCGGCAAGAGCTTCTCGACCTCCGGGAACCTGACCGAGCACCAGCGCAC
CCACACCGGAGAGAAACCGTACAAGTGCCCCGAATGCGGGAAATCGTTCTCAGACTCGGGAAACCTCAGGGTGCACCAGCGGACCC
ACACGGGGGAAAAGCCGTACAAATGCCCGGAGTGCGGGAAGTCATTCTCCCACAAGAACGCGCTGCAGAACCACCAAAGAACCCAC
ACCGGCGAAAAACCGTACAAGTGCCCCGAGTGCGGAAAGTCCTTCTCCCGCAACGACACCCTCACCGAACACCAACGCACCCACAC
CGGAGAAAAGCCCTACAAGTGCCCGGAATGCGGAAAGAGCTTCAGCCAGAGGGCCCACCTGGAAAGACACCAGAGAACCCACACCG
GCGAAAAGCCGTACAAATGCCCGGAGTGCGGGAAGTCCTTCAGCCGGTCAGACAAGCTGGTCCGCCACCAAAGGACCCACACAGGA
GAAAAGCCCTACAAGTGCCCGGAATGCGGAAAATCGTTCAGCGACCCCGGACACCTGGTCCGGCACCAGAGGACCCACACCGGGGA
GAAGCCGACCGGCAAAAAGACCTCA

[1561] SEQ ID NO.:184

[1562] >TAL1-VPR pretein

[1563]
MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASH
DGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA*

[1565] SEQ ID NO.:185

[1566] ＞TAL1-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC

GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC

GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC

ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT

GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA

TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG

CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCCATGATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG

CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAATAATGGCGGTAAACAAGCCCTGGA

AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAACAATGGAG

GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC

GCCTCACATGACGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA

GCAAGTTGTTGCGATTGCAAGTAATAATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC

ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAATGGTGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA

GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACAATGGTGGTAAGCAGGCGTTGGAAACTGT

[1567] GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATAATGGTGGCAAGC

AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT

AACATTGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT

AGTTGCCATTGCGTCAAATAATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC

TTACACCCGAGCAGGTCGTGGCAATTGCATCTAACAATGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG

TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTCATGATGGTGGTAAGCAAGCACTGGAAACTGTCCAACG

CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATATAGGTGGTAAACAGGCCC

TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAATAAT

GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC

AATAGCATCCAACAATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC

CCGAGCAAGTGGTAGCCATAGCCTCAAATAATGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG

GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATATCGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT

GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAACAATGGTGGTCGTCCGGCACTGGAAA

GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT

CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC

CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG
CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC
GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA
CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC
GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC
AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC
CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC
CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC
CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG
CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC
CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC
GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA
CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA
AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC
GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA
CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG
AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG
ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA
CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG
GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG
GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1568]

[1569] SEQ ID NO.:186

[1570] >TAL1 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG
ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASHDGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHG

[1571]

LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLT
PEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALE
TVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPE
QVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV
KKGLPHAPALIKRTNRRIPERTSHRVAS

[1572] SEQ ID NO.:244

[1573] >TAL1 mRNA

[1574] GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC

ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCCAUGAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAAUAAUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAACAAUGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCACAUGACGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAAUAAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAAUGGUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUAAUGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
[1575] GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAACAUUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAAUAA
UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAACAAUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUCAUGAUGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAAUAUAGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAAUAAUGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCAACAAUGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCAAAUAAUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAAUAUCGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAACAAUGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1576] SEQ ID NO.:187

[1577] ＞TAL2-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASN
GGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNG
[1578] GKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGRPALESIVAQLSRPDPALAAL

[1579]

TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA*

[1580] SEQ ID NO.:188

[1581] ＞TAL2-VPR mRNA

[1582]

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCAATGGTGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAATGGCGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCACATGATGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATAATGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAACAATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAATAATGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACAATGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATGGGGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AATAATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAACAATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAATAATGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTCATGATGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAACAATGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCACATGAC
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCCATGATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC
CCGAGCAAGTGGTAGCCATAGCCTCACATGACGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG
GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAACATTGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT
GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAACAATGGTGGTCGTCCGGCACTGGAAA
GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT

CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC

CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG

CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC

GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA

CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC

GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC

AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC

CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC

CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC

CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG

CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC

[1583] CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC

GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA

CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA

AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC

GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA

CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG

AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG

ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA

CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG

GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG

GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1584] SEQ ID NO.:189

[1585] >TAL2 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG

ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASNGGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK

QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHG

[1586] LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA

LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLT

PEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALE

TVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPE

QVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV

KKGLPHAPALIKRTNRRIPERTSHRVAS

[1587] SEQ ID NO.:245

[1588] >TAL2 mRNA sequence

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCAAUGGUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAAUGGCGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCACAUGAUGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUAAUGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAACAAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAAUAAUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUGGGGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAAUAAUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAACAA
UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAAUAAUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUCAUGAUGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAACAAUGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCACAUGACGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCCAUGAUGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCACAUGACGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAACAUUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAACAAUGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1589]

[1590] SEQ ID NO.:190

[1591] ＞TAL3-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASN
NGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQA

[1592]

LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
[1593] KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA

[1594] SEQ ID NO.:191

[1595] ＞TAL3-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCAATAATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAATGGTGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATGGCGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATGGGGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAACAATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAACATTGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
[1596] GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAATATCGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATATAGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AATAATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAACAATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAACATTGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATATCGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATAATGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACAAT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCCATGATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC
CCGAGCAAGTGGTAGCCATAGCCTCAAATATAGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG
GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATAATGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT
GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAACATTGGTGGTCGTCCGGCACTGGAAA

[1597]

GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT
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CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG
CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC
GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA
CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC
GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC
AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC
CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC
CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC
CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG
CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC
CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC
GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA
CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA
AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC
GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA
CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG
AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG
ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA
CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG
GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG
GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1598] SEQ ID NO.:192

[1599] >TAL3 amino acid sequence

[1600]

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG
ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASNNGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLT
PEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALE
TVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPE
QVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV
KKGLPHAPALIKRTNRRIPERTSHRVAS

[1601] SEQ ID NO.:246

[1602] >TAL3 mRNA sequence

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCAAUAAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAAUGGUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAAUGGCGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUGGGGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAACAAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAACAUUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAAUAUCGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUAUAGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAAUAAUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAACAA
UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAACAUUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUAUCGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAAUAAUGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACAAUGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCCAUGAUGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCAAAUAUAGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAAUAAUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAACAUUGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1603]

[1604] SEQ ID NO.:193

[1605] >TAL4-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASH
DGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLC

[1606] QAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHG

[1607]

LTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
Y*

[1608] SEQ ID NO.:194

[1609] ＞TAL4-VPR mRNA

[1610]

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCCATGATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCCATGACGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAACATTGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATAATGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTCATGATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAATATCGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACAATGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATATAGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AATGGTGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCACATGACGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAATGGCGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATGGGGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCCATGATGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCACATGAC
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCCATGATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC
CCGAGCAAGTGGTAGCCATAGCCTCAAACATTGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG
GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATAATGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT

GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATATCGGTGGTCGTCCGGCACTGGAAA
GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT
CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC
CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG
CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC
GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA
CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC
GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC
AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC
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CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC
CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG
[1611] CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC
CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC
GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA
CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA
AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC
GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCGCCGTGACCCCCGAGGCCAGCCA
CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG
AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG
ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA
CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG
GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG
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[1612] SEQ ID NO.:195

[1613] >TAL4 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG
ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASHDGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQA
[1614] LETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLT
PEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALE
TVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPE
QVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV
KKGLPHAPALIKRTNRRIPERTSHRVAS

[1615] SEQ ID NO.:247

[1616] >TAL4 mRNA sequence

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCCAUGAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCCAUGACGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAACAUUGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUAAUGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UCAUGAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAAUAUCGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUAUAGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAAUGGUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCACAUGA
CGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAAUGGCGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUGGGGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCCAUGAUGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCACAUGACGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCCAUGAUGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCAAACAUUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAAUAAUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUAUCGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1617]

[1618] SEQ ID NO.:196

[1619] >TAL5-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASN
NGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGK

[1620]

QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS

[1621] VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA

[1622] SEQ ID NO.:197

[1623] ＞TAL5-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCAATAATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAACAATGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATAATGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAACAATGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAATAATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC

[1624] ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAACATTGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTCATGATGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCCATGACGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AACAATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAATATCGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAATGGTGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATGGCGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATATAGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACATT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCCATGATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC
CCGAGCAAGTGGTAGCCATAGCCTCACATGACGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG

GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATATCGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT

GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATGGGGGTGGTCGTCCGGCACTGGAAA

GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT

CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC

CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG

CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC

GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA

CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC

GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC

AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC

CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC

CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC

CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG

[1625] CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC

CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC

GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA

CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA

AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC

GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA

CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG

AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG

ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA

CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG

GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG

GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1626] SEQ ID NO.:198

[1627] >TAL5 amino acid

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG

ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASNNGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK

QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG

[1628] LTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA

LETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLT

PEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALE

TVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPE

QVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV

KKGLPHAPALIKRTNRRIPERTSHRVAS

[1629] SEQ ID NO.:248

[1630] >TAL5 mRNA

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCAAUAAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAACAAUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAAUAAUGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAACAAUGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAAUAAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAACAUUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUCAUGAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCCAUGACGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAACAAUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAAUAU
CGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAAUGGUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUGGCGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAAUAUAGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACAUUGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCCAUGAUGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCACAUGACGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAAUAUCGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUGGGGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1631]

[1632] SEQ ID NO.:199

[1633] >TAL6-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASN

[1634] NGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
[1635] VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
Y*

[1636] SEQ ID NO.:200

[1637] ＞TAL6-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCAATAATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAACAATGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATGGTGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATAATGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAATGGCGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
[1638] ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTCATGATGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACATTGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAACAATGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
CATGACGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCACATGATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAATATCGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATAATGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATATAGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACATT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCAATATCGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC

CCGAGCAAGTGGTAGCCATAGCCTCACATGATGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG

GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTCATGACGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT

GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATATAGGTGGTCGTCCGGCACTGGAAA

GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT

CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC

CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG

CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC

GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA

CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC

GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC

AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC

CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC

CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC

[1639] CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG

CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC

CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC

GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA

CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA

AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC

GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA

CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG

AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG

ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA

CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG

GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG

GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1640] SEQ ID NO.:201

[1641] >TAL6 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG

ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASNNGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK

QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHG

[1642] LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQA

LETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLT

PEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALE

TVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPE

QVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV

KKGLPHAPALIKRTNRRIPERTSHRVAS

[1643] SEQ ID NO.:249

[1644] >TAL6 mRNA sequence

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCAAUAAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAACAAUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAAUGGUGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUAAUGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAAUGGCGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUCAUGAUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAUUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAACAAUGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUCAUGACGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCACAUGA
UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAAUAUCGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUAAUGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAAUAUAGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACAUUGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCAAUAUCGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCACAUGAUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUCAUGACGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUAUAGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1645]

[1646] SEQ ID NO.:202

[1647] ＞TAL7-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI
AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASH

[1648] DGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLC
QAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDG
GKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
[1649] VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA*

[1650] SEQ ID NO.:203

[1651] ＞TAL7-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCCATGATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAATGGTGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATAATGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAACATTGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAATATCGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
[1652] ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTCATGACGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAATATAGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATGGCGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
CATGATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAATAATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAACAATGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATGGGGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATAATGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACATT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCAACAATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC

CCGAGCAAGTGGTAGCCATAGCCTCAAACGGTGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG
GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATGGTGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT
GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATATCGGTGGTCGTCCGGCACTGGAAA
GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT
CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC
CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG
CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC
GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA
CCGGATCGAGGAGAAGCGGAAGCGGACCTACGAGACCTTCAAGAGCATCATGAAGAAATCCCCCTTCAGCGGCCCCACCGACCCCC
GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC
AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC
CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC
CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC
[1653] CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG
CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC
CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC
GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA
CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA
AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC
GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA
CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG
AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG
ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA
CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG
GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG
GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1654] SEQ ID NO.:204

[1655] >TAL7 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG
ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASHDGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHG
[1656] LTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLT
PEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALE
TVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPE
QVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV

[1657] KKGLPHAPALIKRTNRRIPERTSHRVAS

[1658] SEQ ID NO.:250

[1659] >TAL7 mRNA sequence

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC

ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG

UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU

GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU

UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG

AACAGGUUGUUGCAAUUGCCAGCCAUGAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA

CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAAUGGUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC

GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAAUAAUGGAGGUAAACAGGCCUUAGAAACCG

UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAACAUUGGUGGAAAA

CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG

UAAUAUCGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG

UCGUCGCGAUUGCGAGUCAUGACGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU

UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAAUAUAGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU

GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUGGCGGUGGCAAGCAAGCGCUUGAAACAGUACAGC

[1660] GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUCAUGAUGGCGGAAAGCAGGCU

CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAAUAA

UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG

CAAUUGCAUCUAACAAUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG

CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUGGGGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA

AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCAAUAAUGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC

UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACAUUGGUGGGAAGCAGGCAUUAGAA

ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCAACAAUGGCGG

AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG

CCUCAAACGGUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA

CAAGUUGUCGCUAUCGCAAGUAAUGGUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA

UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUAUCGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC

GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU

AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1661] SEQ ID NO.:205

[1662] ＞TAL8-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI

AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASH

[1663] DGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLC

QAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNG

GKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQA

[1664]

HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD
DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA*

[1665] SEQ ID NO.:206

[1666] ＞TAL8-VPR mRNA

[1667]

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCCATGATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAATGGTGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATGGCGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATAATGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA
GCAAGTTGTTGCGATTGCAAGTAACAATGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAATAATGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACAATGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATGGGGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AATAATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAACATTGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTCATGACGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATATCGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCAATATAGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACGGT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC
AATAGCATCCAACAATGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC

CCGAGCAAGTGGTAGCCATAGCCTCAAATAATGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG

GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTCATGATGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT

GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATGGTGGTGGTCGTCCGGCACTGGAAA

GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT

CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC

CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG

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AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC

CCCCCCCCAGGTGCTGCCCCAGGCCCCCGCCCCCGCCCCCGCCCCCGCCATGGTGAGCGCCCTGGCCCAGGCCCCCGCCCCCGTGC

CCGTGCTGGCCCCCGGCCCCCCCCAGGCCGTGGCCCCCCCCGCCCCCAAGCCCACCCAGGCCGGCGAGGGCACCCTGAGCGAGGCC

[1668] CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG

CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC

CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC

GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA

CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA

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GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA

CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG

AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG

ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA

CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG

GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG

GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA

AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1669] SEQ ID NO.:207

[1670] >TAL8 amino acid sequence

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG

ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASHDGGKQALETVQRLLPVLCQA

HGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGK

QALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHG

[1671] LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA

LETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLT

PEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALE

TVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPE

QVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV

[1672] KKGLPHAPALIKRTNRRIPERTSHRVAS

[1673] SEQ ID NO.:251

[1674] >TAL8 mRNA sequence

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ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG

UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU

GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU

UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG

AACAGGUUGUUGCAAUUGCCAGCCAUGAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA

CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAAUGGUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC

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UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUAAUGGUGGAAAA

CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG

UAACAAUGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG

UCGUCGCGAUUGCGAGUAAUAAUGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU

UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU

GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUGGGGGUGGCAAGCAAGCGCUUGAAACAGUACAGC

[1675] GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAAUAAUGGCGGAAAGCAGGCU

CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAACAU

UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG

CAAUUGCAUCUCAUGACGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG

CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUAUCGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA

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UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACGGUGGUGGGAAGCAGGCAUUAGAA

ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCAACAAUGGCGG

AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG

CCUCAAAUAAUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA

CAAGUUGUCGCUAUCGCAAGUCAUGAUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA

UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUGGUGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC

GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU

AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1676] SEQ ID NO.:208

[1677] ＞TAL9-VPR protein

MAPKKKRKVGIHGVPAAGSSGSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMI

[1678] AALPEATHEAIVGVGKRGAGARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASN

NGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLC

QAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIG

GKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAAL
TNDHLVALACLGGRPALDAVKKGLPHAPALIKRTNRRIPERTSHRVASGSGGGSGGDALDDFDLDMLGSDALDDFDLDMLGSDALD

[1679] DFDLDMLGSDALDDFDLDMLSGGPKKKRKVGSQYLPDTDDRHRIEEKRKRTYETFKSIMKKSPFSGPTDPRPPPRRIAVPSRSSAS
VPKPAPQPYPFTSSLSTINYDEFPTMVFPSGQISQASALAPAPPQVLPQAPAPAPAPAMVSALAQAPAPVPVLAPGPPQAVAPPAP
KPTQAGEGTLSEALLQLQFDDEDLGALLGNSTDPAVFTDLASVDNSEFQQLLNQGIPVAPHTTEPMLMEYPEAITRLVTGAQRPPD
PAPAPLGAPGLPNGLLSGDEDFSSIADMDFSALLGSGSGSRDSREGMFLPKPEAGSAISDVFEGREVCQPKRLRPFHPPGSPWANR
PLPASLAPTPTGPVHEPVGSLTPAPVPQPLDPAPAVTPEASHLLEDPDEETSQAVKALREMADTVIPQKEEAAICGQMDLSHPPPR
GHLDELTTTLESMTEDLNLDSPLTPELNEILDTFLNDECLLHAMHISTGLSIFDTSLFSGGKRPAATKKAGQAKKKKGSYPYDVPD
YA*

[1680] SEQ ID NO.:209

[1681] ＞TAL9-VPR mRNA

AGGAAATAAGAGAGAAAAGAAGAGTAAGAAGAAATATAAGAGCCACCATGGCCCCCAAGAAGAAGCGGAAGGTGGGCATCCACGGC
GTGCCCGCCGCCGGCAGCAGCGGATCCCATATGGTTGATCTGCGTACCCTGGGTTATAGCCAGCAGCAGCAAGAAAAAATCAAACC
GAAAGTTCGTAGCACCGTTGCACAGCATCATGAAGCACTGGTTGGTCATGGTTTTACCCATGCACATATTGTTGCACTGAGCCAGC
ATCCGGCAGCACTGGGCACCGTTGCAGTTAAATATCAGGATATGATTGCAGCACTGCCGGAAGCAACCCATGAAGCAATTGTTGGT
GTTGGTAAACGCGGAGCTGGTGCACGTGCCCTGGAAGCACTGCTGACCGTTGCCGGTGAACTGCGTGGTCCGCCTCTGCAGCTGGA
TACCGGTCAGCTGCTGAAAATTGCAAAACGTGGTGGTGTTACCGCAGTTGAAGCAGTTCATGCATGGCGTAATGCACTGACCGGTG
CACCGCTGAATCTGACACCGGAACAGGTTGTTGCAATTGCCAGCAATAATGGTGGCAAACAGGCACTGGAAACCGTTCAGCGTCTG
CTGCCGGTTCTGTGTCAGGCACATGGTCTGACCCCTGAACAGGTGGTGGCCATTGCAAGCAACATTGGCGGTAAACAAGCCCTGGA
AACAGTGCAGCGCCTGTTACCGGTGCTGTGCCAGGCCCATGGCTTAACTCCGGAACAGGTGGTAGCGATCGCATCAAATATCGGAG
GTAAACAGGCCTTAGAAACCGTACAGCGCTTACTGCCGGTGTTATGCCAGGCGCACGGCCTGACGCCAGAACAGGTAGTGGCAATC
GCCTCAAATGGTGGTGGAAAACAGGCGTTAGAGACAGTCCAGCGCCTGCTGCCTGTATTATGTCAAGCCCATGGCCTGACCCCAGA

[1682] GCAAGTTGTTGCGATTGCAAGTAATGGCGGGGGTAAACAGGCACTTGAGACAGTTCAACGTTTACTGCCTGTACTGTGCCAAGCTC
ACGGTCTGACTCCGGAACAAGTCGTCGCGATTGCGAGTAATATAGGTGGCAAACAAGCATTAGAAACGGTGCAACGCCTGCTGCCA
GTTCTTTGCCAGGCTCACGGTTTAACCCCTGAGCAGGTTGTAGCTATTGCGAGTAACAATGGTGGTAAGCAGGCGTTGGAAACTGT
GCAAAGACTGCTGCCCGTGTTGTGCCAAGCACATGGTTTAACCCCAGAACAAGTCGTAGCAATCGCAAGCAATAATGGTGGCAAGC
AAGCGCTTGAAACAGTACAGCGTTTATTACCGGTACTTTGTCAGGCCCACGGTCTTACACCAGAACAAGTTGTGGCCATAGCCAGT
AACAATGGCGGAAAGCAGGCTCTGGAAACGGTACAACGTCTGTTACCTGTTCTGTGTCAAGCGCACGGATTAACACCTGAACAAGT
AGTTGCCATTGCGTCAAATAATGGAGGCAAGCAGGCCTTGGAGACAGTGCAGAGATTACTGCCAGTGTTGTGTCAGGCTCATGGCC
TTACACCCGAGCAGGTCGTGGCAATTGCATCTAACATTGGCGGTAAGCAAGCTTTAGAGACTGTTCAGAGACTGCTTCCTGTCCTG
TGCCAGGCACACGGACTTACGCCTGAGCAAGTGGTTGCAATCGCCTCTAATGGGGGTGGTAAGCAAGCACTGGAAACTGTCCAACG
CTTACTTCCGGTGCTTTGTCAAGCACACGGCTTAACGCCAGAGCAGGTCGTCGCCATAGCCAGCCATGATGGTGGTAAACAGGCCC
TTGAAACGGTCCAAAGACTTCTGCCGGTCCTTTGCCAAGCGCATGGGCTGACACCTGAGCAGGTAGTCGCGATTGCCTCAAACGGT
GGTGGGAAGCAGGCATTAGAAACAGTTCAAAGATTATTACCAGTCCTGTGTCAGGCGCATGGGTTAACCCCAGAGCAGGTAGTTGC

[1683]

AATAGCATCCCATGACGGCGGAAAACAAGCGTTGGAAACGGTTCAGCGGTTATTGCCTGTTTTGTGCCAGGCGCATGGTTTGACAC
CCGAGCAAGTGGTAGCCATAGCCTCAAACAATGGGGGTAAACAAGCTTTGGAGACAGTACAACGGCTGCTTCCAGTTTTATGTCAG
GCCCATGGATTGACGCCTGAACAAGTTGTCGCTATCGCAAGTAATAATGGTGGTAAACAAGCGCTTGAAACCGTTCAACGCCTTCT
GCCTGTGCTTTGTCAGGCACATGGATTAACACCCGAACAGGTTGTCGCGATAGCTTCAAATATCGGTGGTCGTCCGGCACTGGAAA
GCATTGTTGCACAGCTGAGCCGTCCTGATCCGGCACTGGCAGCACTGACCAATGATCATCTGGTTGCACTGGCATGTCTGGGTGGT
CGCCCTGCCCTGGATGCAGTTAAAAAAGGTCTGCCGCATGCACCGGCACTGATTAAACGTACCAATCGTCGTATTCCGGAACGTAC
CAGCCATCGTGTTGCTAGCGGCAGCGGCGGCGGCAGCGGCGGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACG
CCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGACGACTTCGACCTGGACATGCTGGGCAGCGACGCCCTGGAC
GACTTCGACCTGGACATGCTGAGCGGCGGCCCCAAGAAGAAGCGGAAGGTGGGCAGCCAGTACCTGCCCGACACCGACGACCGGCA
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GGCCCCCCCCCCGGCGGATCGCCGTGCCCAGCCGGAGCAGCGCCAGCGTGCCCAAGCCCGCCCCCCAGCCCTACCCCTTCACCAGC
AGCCTGAGCACCATCAACTACGACGAGTTCCCCACCATGGTGTTCCCCAGCGGCCAGATCAGCCAGGCCAGCGCCCTGGCCCCCGC
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CTGCTGCAGCTGCAGTTCGACGACGAGGACCTGGGCGCCCTGCTGGGCAACAGCACCGACCCCGCCGTGTTCACCGACCTGGCCAG
CGTGGACAACAGCGAGTTCCAGCAGCTGCTGAACCAGGGCATCCCCGTGGCCCCCCACACCACCGAGCCCATGCTGATGGAGTACC
CCGAGGCCATCACCCGGCTGGTGACCGGCGCCCAGCGGCCCCCCGACCCCGCCCCCGCCCCCCTGGGCGCCCCCGGCCTGCCCAAC
GGCCTGCTGAGCGGCGACGAGGACTTCAGCAGCATCGCCGACATGGACTTCAGCGCCCTGCTGGGCAGCGGCAGCGGCAGCCGGGA
CAGCCGGGAGGGCATGTTCCTGCCCAAGCCCGAGGCCGGCAGCGCCATCAGCGACGTGTTCGAGGGCCGGGAGGTGTGCCAGCCCA
AGCGGCTCCGGCCCTTCCACCCCCCCGGCAGCCCCTGGGCCAACCGGCCCCTGCCCGCCAGCCTGGCCCCCACCCCCACCGGCCCC
GTGCACGAGCCCGTGGGCAGCCTGACCCCCGCCCCCGTGCCCCAGCCCCTGGACCCCGCCCCCCGCCGTGACCCCCGAGGCCAGCCA
CCTGCTGGAGGACCCCGACGAGGAGACCAGCCAGGCCGTGAAGGCCCTGCGGGAGATGGCCGACACCGTGATCCCCCAGAAGGAGG
AGGCCGCCATCTGCGGCCAGATGGACCTGAGCCACCCCCCCCCCCGGGGCCACCTGGACGAGCTGACCACCACCCTGGAGAGCATG
ACCGAGGACCTGAACCTGGACAGCCCCCTGACCCCCGAGCTGAACGAGATCCTGGACACCTTCCTGAACGACGAGTGCCTGCTGCA
CGCCATGCACATCAGCACCGGCCTGAGCATCTTCGACACCAGCCTGTTCAGCGGCGGCAAGCGGCCCGCCGCCACCAAGAAGGCCG
GCCAGGCCAAGAAGAAGAAGGGCAGCTACCCCTACGACGTGCCCGACTACGCCTGAGCGGCCGCTTAATTAAGCTGCCTTCTGCGG
GGCTTGCCTTCTGGCCATGCCCTTCTTCTCTCCCTTGCACCTGTACCTCTTGGTCTTTGAATAAAGCCTGAGTAGGAAGTCTAGAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

[1684] SEQ ID NO.:210

[1685] >TAL9 amino acid sequence

[1686]

GSHMVDLRTLGYSQQQQEKIKPKVRSTVAQHHEALVGHGFTHAHIVALSQHPAALGTVAVKYQDMIAALPEATHEAIVGVGKRGAG
ARALEALLTVAGELRGPPLQLDTGQLLKIAKRGGVTAVEAVHAWRNALTGAPLNLTPEQVVAIASNNGGKQALETVQRLLPVLCQA
HGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGK
QALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHG
LTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQA
LETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGKQALETVQRLLPVLCQAHGLT
PEQVVAIASNGGGKQALETVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNGGGKQALE
TVQRLLPVLCQAHGLTPEQVVAIASHDGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNNGGKQALETVQRLLPVLCQAHGLTPE

[1687]

QVVAIASNNGGKQALETVQRLLPVLCQAHGLTPEQVVAIASNIGGRPALESIVAQLSRPDPALAALTNDHLVALACLGGRPALDAV
KKGLPHAPALIKRTNRRIPERTSHRVAS

[1688] SEQ ID NO.:252

[1689] >TAL9 mRNA sequence

[1690]

GGAUCCCAUAUGGUUGAUCUGCGUACCCUGGGUUAUAGCCAGCAGCAGCAAGAAAAAAUCAAACCGAAAGUUCGUAGCACCGUUGC
ACAGCAUCAUGAAGCACUGGUUGGUCAUGGUUUUACCCAUGCACAUAUUGUUGCACUGAGCCAGCAUCCGGCAGCACUGGGCACCG
UUGCAGUUAAAUAUCAGGAUAUGAUUGCAGCACUGCCGGAAGCAACCCAUGAAGCAAUUGUUGGUGUUGGUAAACGCGGAGCUGGU
GCACGUGCCCUGGAAGCACUGCUGACCGUUGCCGGUGAACUGCGUGGUCCGCCUCUGCAGCUGGAUACCGGUCAGCUGCUGAAAAU
UGCAAAACGUGGUGGUGUUACCGCAGUUGAAGCAGUUCAUGCAUGGCGUAAUGCACUGACCGGUGCACCGCUGAAUCUGACACCGG
AACAGGUUGUUGCAAUUGCCAGCAAUAAUGGUGGCAAACAGGCACUGGAAACCGUUCAGCGUCUGCUGCCGGUUCUGUGUCAGGCA
CAUGGUCUGACCCCUGAACAGGUGGUGGCCAUUGCAAGCAACAUUGGCGGUAAACAAGCCCUGGAAACAGUGCAGCGCCUGUUACC
GGUGCUGUGCCAGGCCCAUGGCUUAACUCCGGAACAGGUGGUAGCGAUCGCAUCAAAUAUCGGAGGUAAACAGGCCUUAGAAACCG
UACAGCGCUUACUGCCGGUGUUAUGCCAGGCGCACGGCCUGACGCCAGAACAGGUAGUGGCAAUCGCCUCAAAUGGUGGUGGAAAA
CAGGCGUUAGAGACAGUCCAGCGCCUGCUGCCUGUAUUAUGUCAAGCCCAUGGCCUGACCCCAGAGCAAGUUGUUGCGAUUGCAAG
UAAUGGCGGGGGUAAACAGGCACUUGAGACAGUUCAACGUUUACUGCCUGUACUGUGCCAAGCUCACGGUCUGACUCCGGAACAAG
UCGUCGCGAUUGCGAGUAAUAUAGGUGGCAAACAAGCAUUAGAAACGGUGCAACGCCUGCUGCCAGUUCUUUGCCAGGCUCACGGU
UUAACCCCUGAGCAGGUUGUAGCUAUUGCGAGUAACAAUGGUGGUAAGCAGGCGUUGGAAACUGUGCAAAGACUGCUGCCCGUGUU
GUGCCAAGCACAUGGUUUAACCCCAGAACAAGUCGUAGCAAUCGCAAGCAAUAAUGGUGGCAAGCAAGCGCUUGAAACAGUACAGC
GUUUAUUACCGGUACUUUGUCAGGCCCACGGUCUUACACCAGAACAAGUUGUGGCCAUAGCCAGUAACAAUGGCGGAAAGCAGGCU
CUGGAAACGGUACAACGUCUGUUACCUGUUCUGUGUCAAGCGCACGGAUUAACACCUGAACAAGUAGUUGCCAUUGCGUCAAAUAA
UGGAGGCAAGCAGGCCUUGGAGACAGUGCAGAGAUUACUGCCAGUGUUGUGUCAGGCUCAUGGCCUUACACCCGAGCAGGUCGUGG
CAAUUGCAUCUAACAUUGGCGGUAAGCAAGCUUUAGAGACUGUUCAGAGACUGCUUCCUGUCCUGUGCCAGGCACACGGACUUACG
CCUGAGCAAGUGGUUGCAAUCGCCUCUAAUGGGGGUGGUAAGCAAGCACUGGAAACUGUCCAACGCUUACUUCCGGUGCUUUGUCA
AGCACACGGCUUAACGCCAGAGCAGGUCGUCGCCAUAGCCAGCCAUGAUGGUGGUAAACAGGCCCUUGAAACGGUCCAAAGACUUC
UGCCGGUCCUUUGCCAAGCGCAUGGGCUGACACCUGAGCAGGUAGUCGCGAUUGCCUCAAACGGUGGUGGGAAGCAGGCAUUAGAA
ACAGUUCAAAGAUUAUUACCAGUCCUGUGUCAGGCGCAUGGGUUAACCCCAGAGCAGGUAGUUGCAAUAGCAUCCCAUGACGGCGG
AAAACAAGCGUUGGAAACGGUUCAGCGGUUAUUGCCUGUUUUGUGCCAGGCGCAUGGUUUGACACCCGAGCAAGUGGUAGCCAUAG
CCUCAAACAAUGGGGGUAAACAAGCUUUGGAGACAGUACAACGGCUGCUUCCAGUUUUAUGUCAGGCCCAUGGAUUGACGCCUGAA
CAAGUUGUCGCUAUCGCAAGUAAUAAUGGUGGUAAACAAGCGCUUGAAACCGUUCAACGCCUUCUGCCUGUGCUUUGUCAGGCACA
UGGAUUAACACCCGAACAGGUUGUCGCGAUAGCUUCAAAUAUCGGUGGUCGUCCGGCACUGGAAAGCAUUGUUGCACAGCUGAGCC
GUCCUGAUCCGGCACUGGCAGCACUGACCAAUGAUCAUCUGGUUGCACUGGCAUGUCUGGGUGGUCGCCCUGCCCUGGAUGCAGUU
AAAAAAGGUCUGCCGCAUGCACCGGCACUGAUUAAACGUACCAAUCGUCGUAUUCCGGAACGUACCAGCCAUCGUGUUGCUAGC

[1691] 等同物

[1692] 本领域技术人员将认识到或仅使用常规实验能够确定本文所述的本发明的特定实施例的许多等同物。这些等同物旨在被以下权利要求所涵盖。

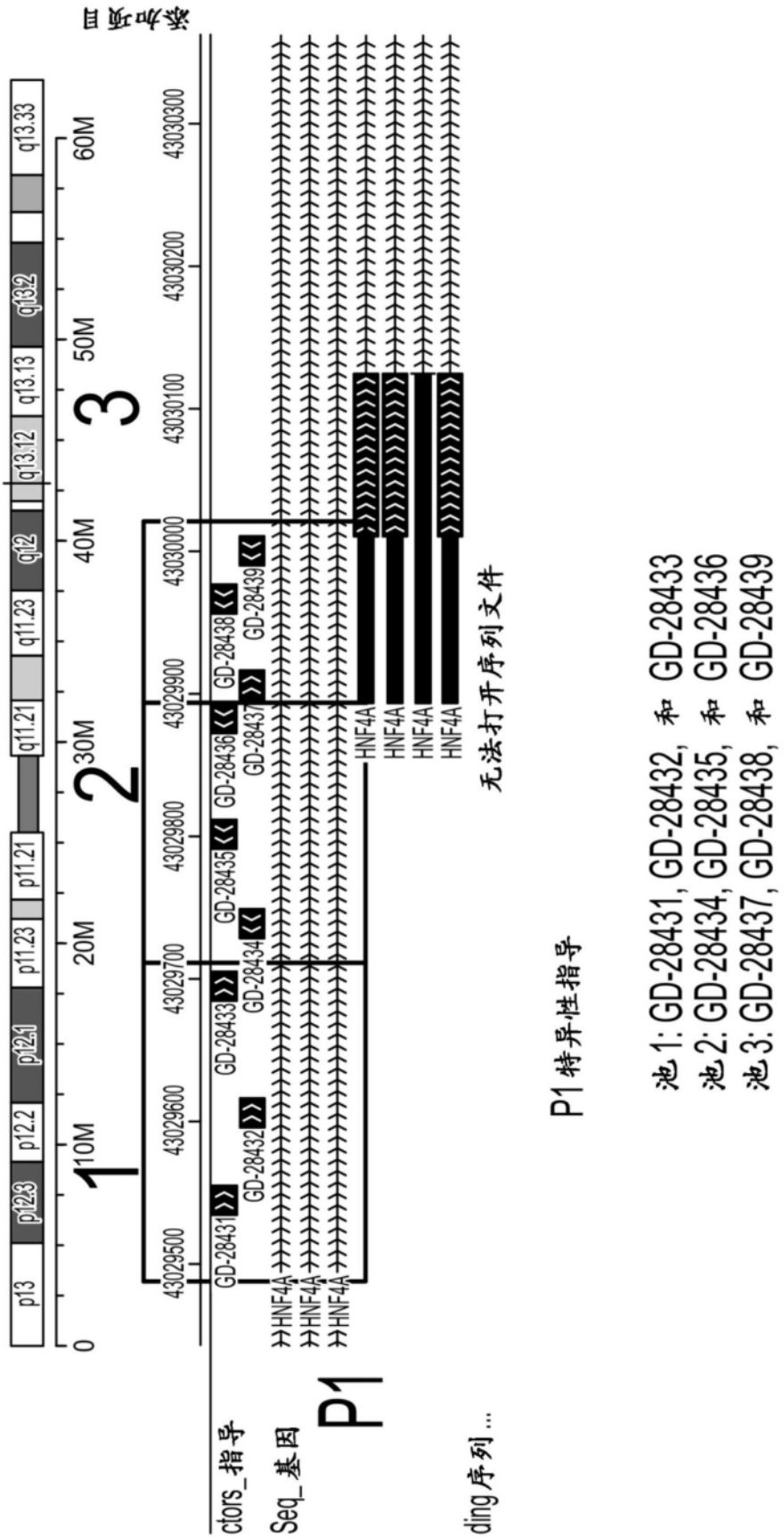

染色体
p13
p12.3
p12.2
p12.1
p11.23
p11.21
q11.21
q11.23
q12
q13.12
q13.13
q13.32
q13.33
0
10M
20M
30M
40M
50M
60M
1
2
3
43029500
43029600
43029700
43029800
43029900
43030000
43030100
43030200
43030300
GD-28431
GD-28432
GD-28433
GD-28434
GD-28435
GD-28436
GD-28437
GD-28438
GD-28439
HNF4A
HNF4A
HNF4A
HNF4A
HNF4A
HNF4A
HNF4A
P1
ctors_指导
Seq_基因
ding序列...
无法打开序列文件
P1特异性指导
池1: GD-28431, GD-28432, 和 GD-28433
池2: GD-28434, GD-28435, 和 GD-28436
池3: GD-28437, GD-28438, 和 GD-28439

图1

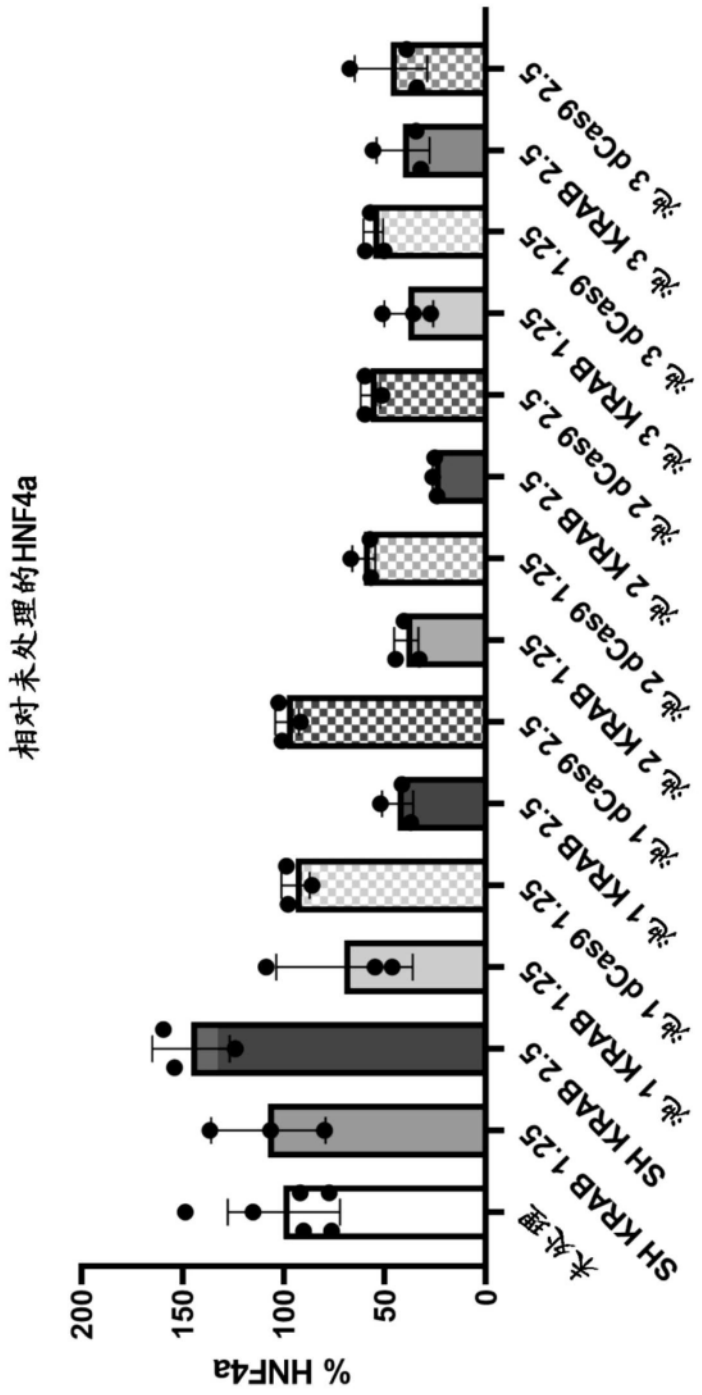

相对未处理的HNF4a
% HNF4a
200
150
100
50
0
未处理
SH KRAB 1.25
SH KRAB 2.5
孔 1 KRAB 1.25
孔 1 KRAB 2.5
孔 1 dCas9 1.25
孔 1 dCas9 2.5
孔 2 KRAB 1.25
孔 2 KRAB 2.5
孔 2 dCas9 1.25
孔 2 dCas9 2.5
孔 3 KRAB 1.25
孔 3 KRAB 2.5
孔 3 dCas9 1.25
孔 3 dCas9 2.5

图2

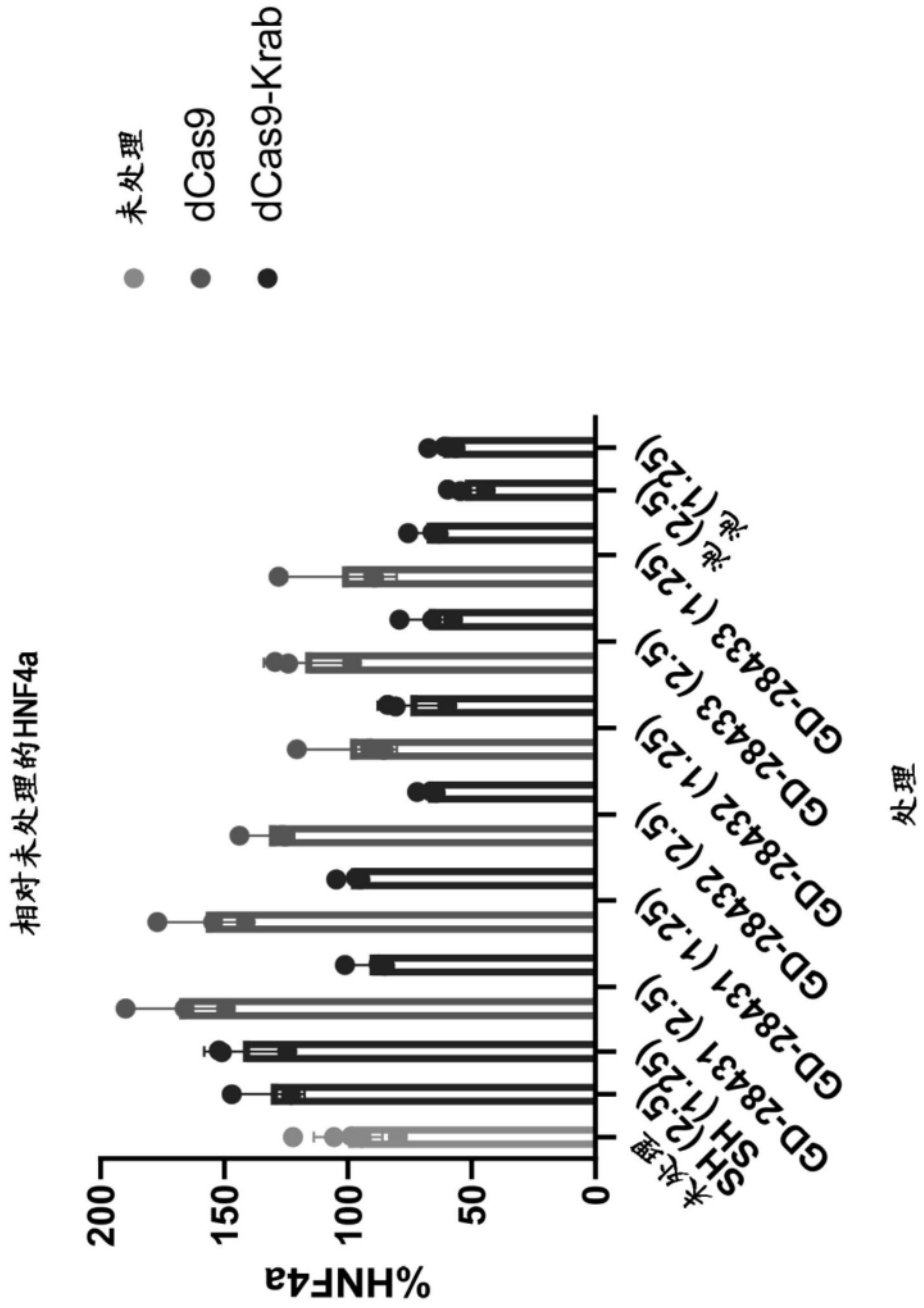
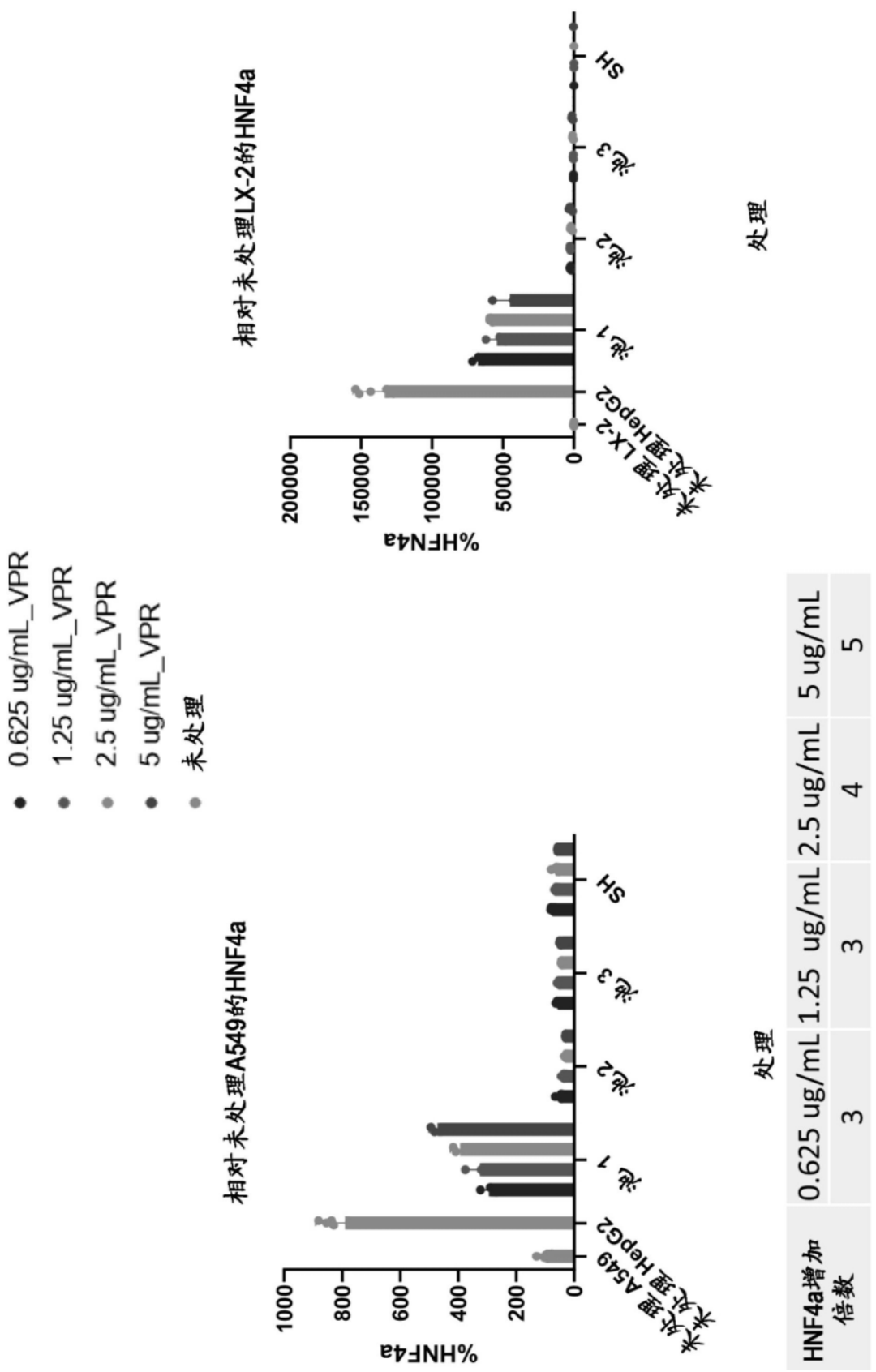

未处理
dCas9
dCas9-Krab
相对未处理的HNF4a
%HNF4a
200
150
100
50
0
未处理
SH (2.5)
SH (1.25)
GD-28431 (2.5)
GD-28431 (1.25)
GD-28432 (2.5)
GD-28432 (1.25)
GD-28433 (2.5)
GD-28433 (1.25)
未处理 (2.5)
未处理 (1.25)
处理

图3



HNF4a增加倍数	0.625 ug/mL	1.25 ug/mL	2.5 ug/mL	5 ug/mL
	3	3	4	5

图4A

图4B

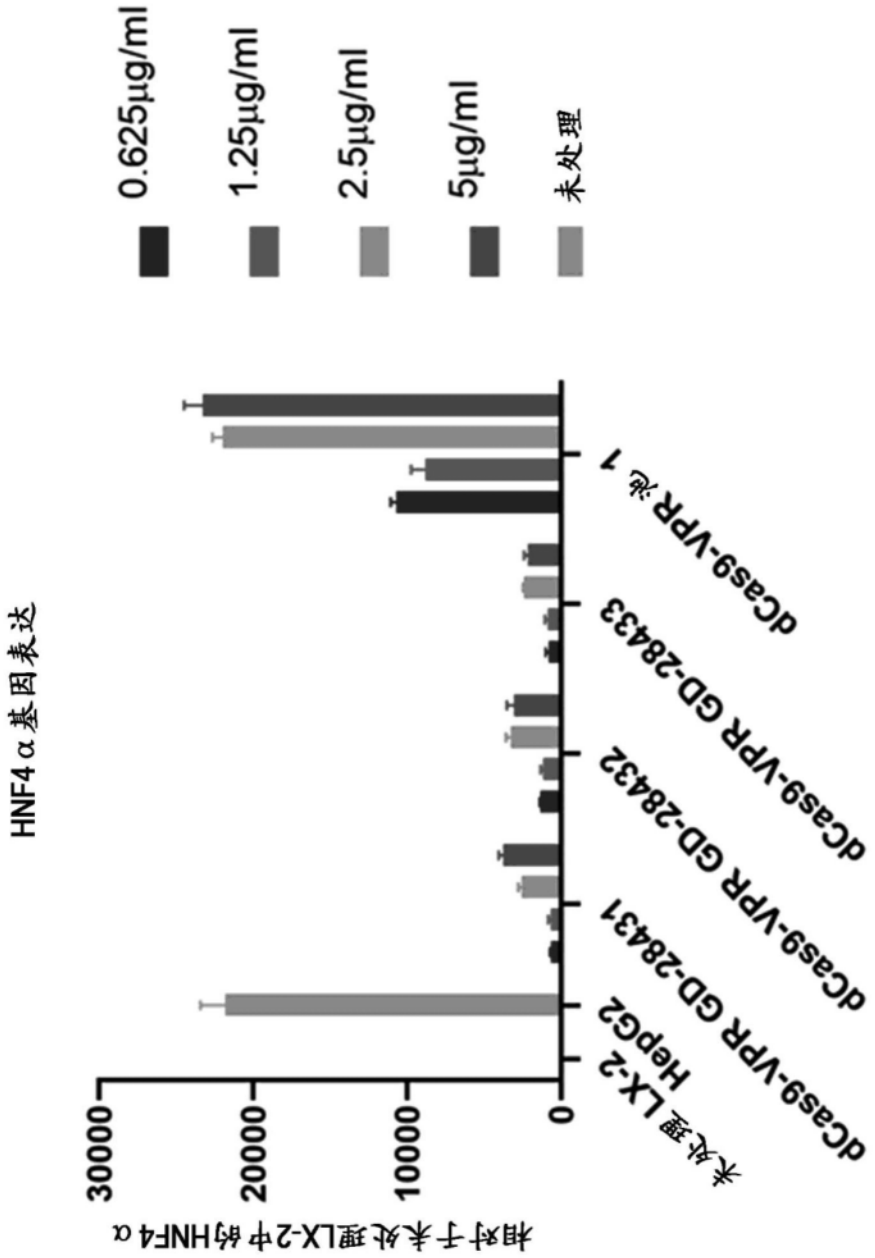

0.625μg/ml
1.25μg/ml
2.5μg/ml
5μg/ml
未处理
HNF4α基因表达
相对于未处理LX-2中的HNF4α
30000
20000
10000
0
未处理 LX-2
HepG2
dCas9-VPR GD-28431
dCas9-VPR GD-28432
dCas9-VPR GD-28433
dCas9-VPR 池 1

图5

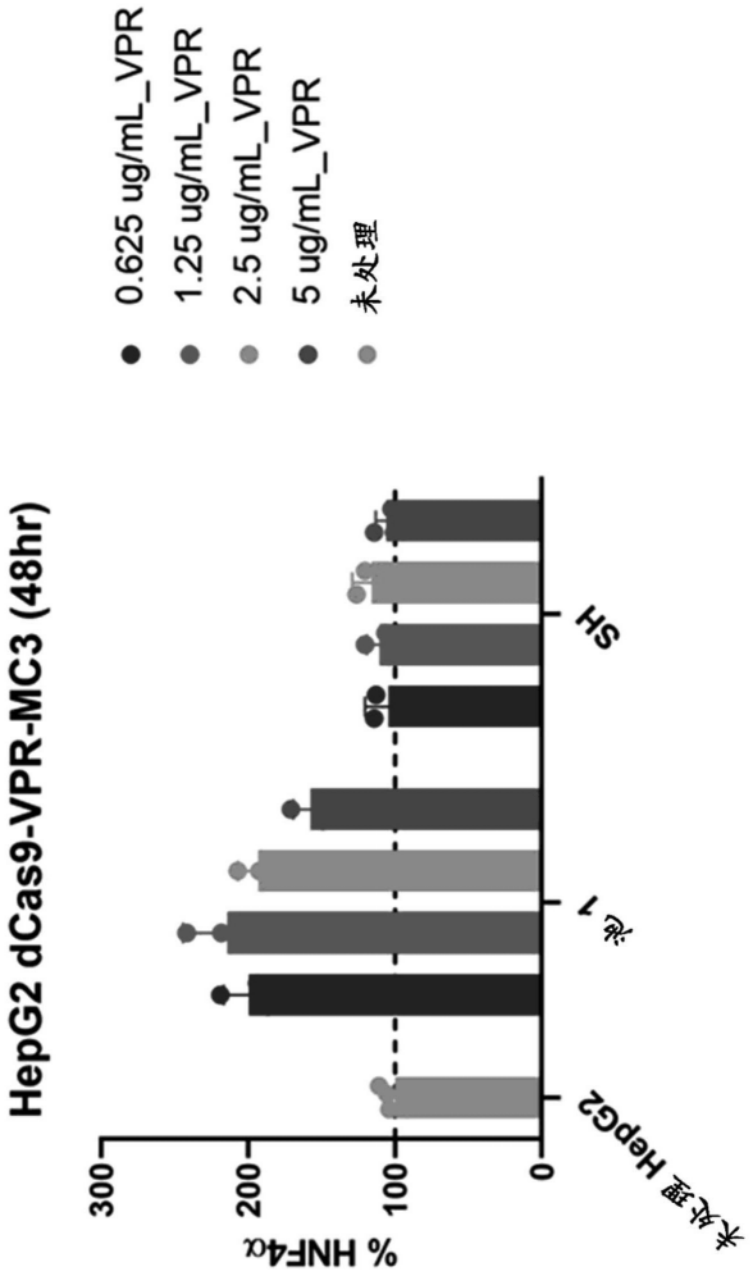

HepG2 dCas9-VPR-MC3 (48hr)
0.625 ug/mL_VPR
1.25 ug/mL_VPR
2.5 ug/mL_VPR
5 ug/mL_VPR
未处理
% HNF4α
300
200
100
0
未处理 HepG2
孔 1
SH

图6

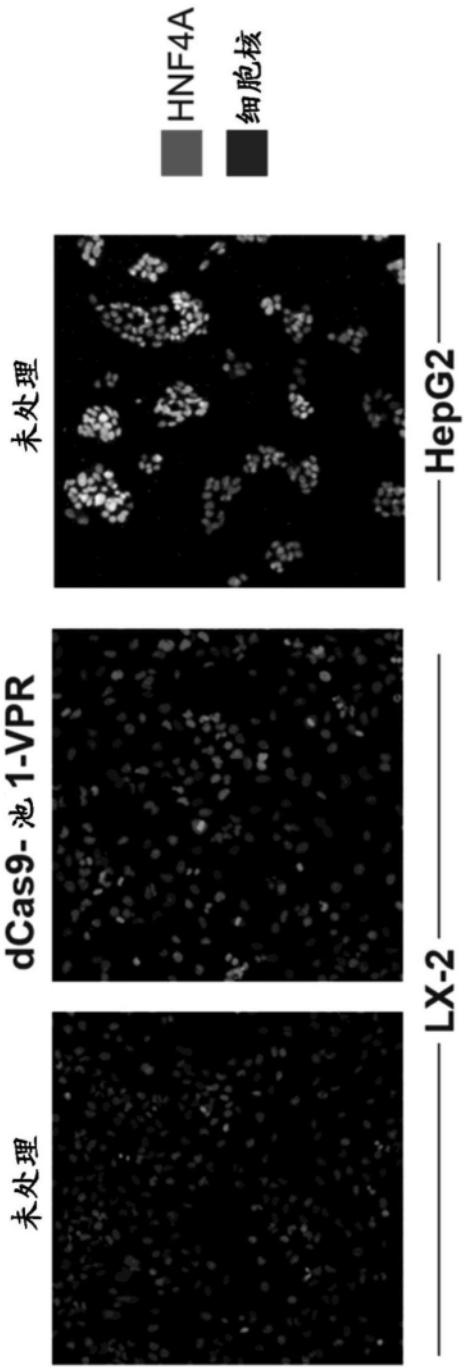


图7

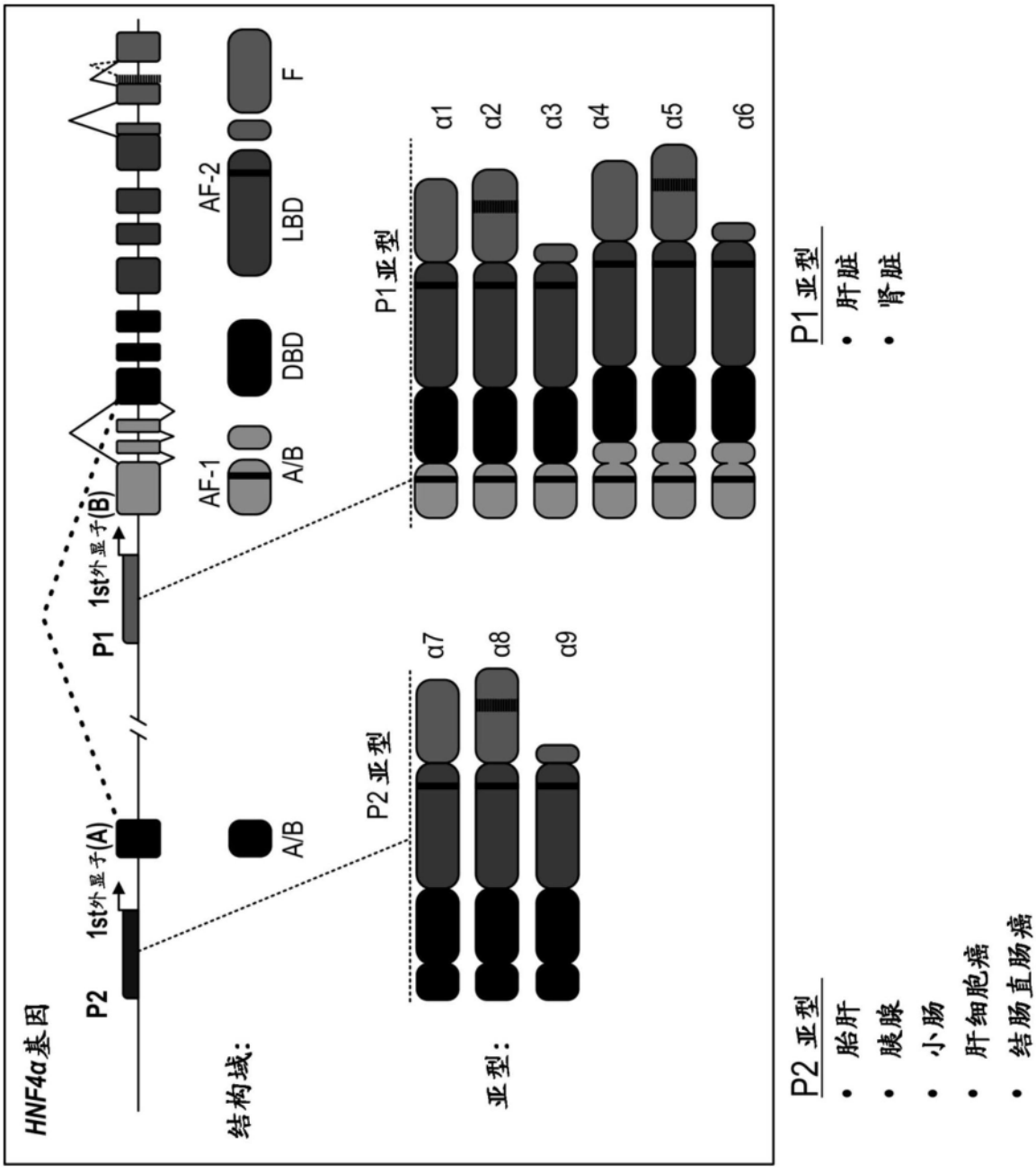

HNF4α基因
P2
1st外显子(A)
P1
1st外显子(B)
结构域:
A/B
AF-1
A/B
DBD
AF-2
LBD
F
P2 亚型
P1 亚型
亚型:
α7
α8
α9
α1
α2
α3
α4
α5
α6
P2 亚型
• 胎肝
• 胰腺
• 小肠
• 肝细胞癌
• 结肠直肠癌
P1 亚型
• 肝脏
• 肾脏

图8

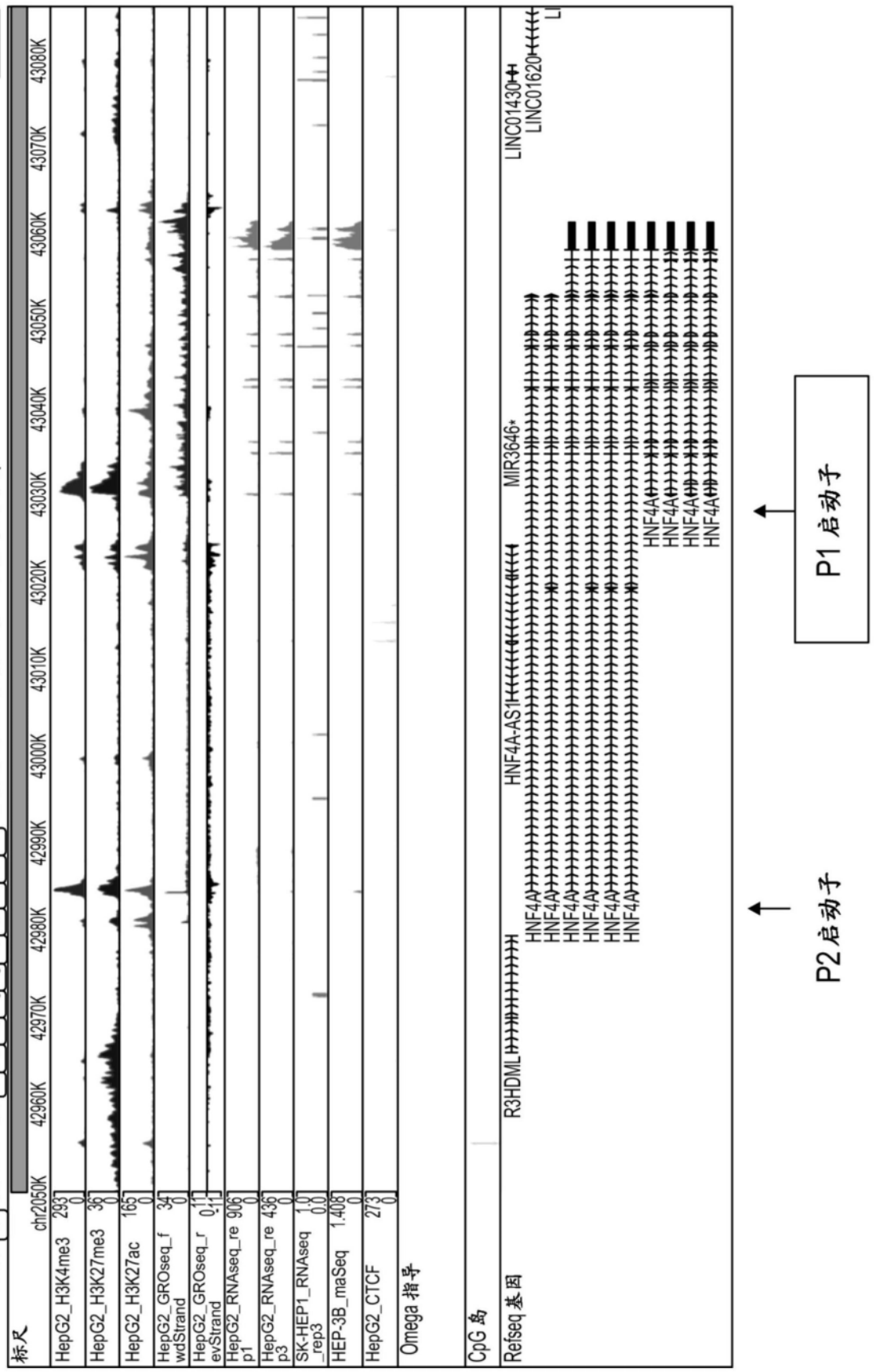

工具:
查看137.7 kb的区域，1像素跨越78 bp
元数据 >
标尺
chr2:
42960K
42970K
42980K
42990K
43000K
43010K
43020K
43030K
43040K
43050K
43060K
43070K
43080K
HepG2_H3K4me3
HepG2_H3K27me3
HepG2_H3K27ac
HepG2_GROseq_fwdStrand
HepG2_GROseq_revStrand
HepG2_RNAseq_rep1
HepG2_RNAseq_rep3
SK-HEP1_RNAseq_rep3
HEP-3B_maSeq
HepG2_CTCF
Omega 指导
CpG 岛
Refseq 基因
R3HDML
HNF4A-AS1
MIR3646
LINC01430
LINC01620
HNF4A
P1 启动子
P2 启动子

图8(续)

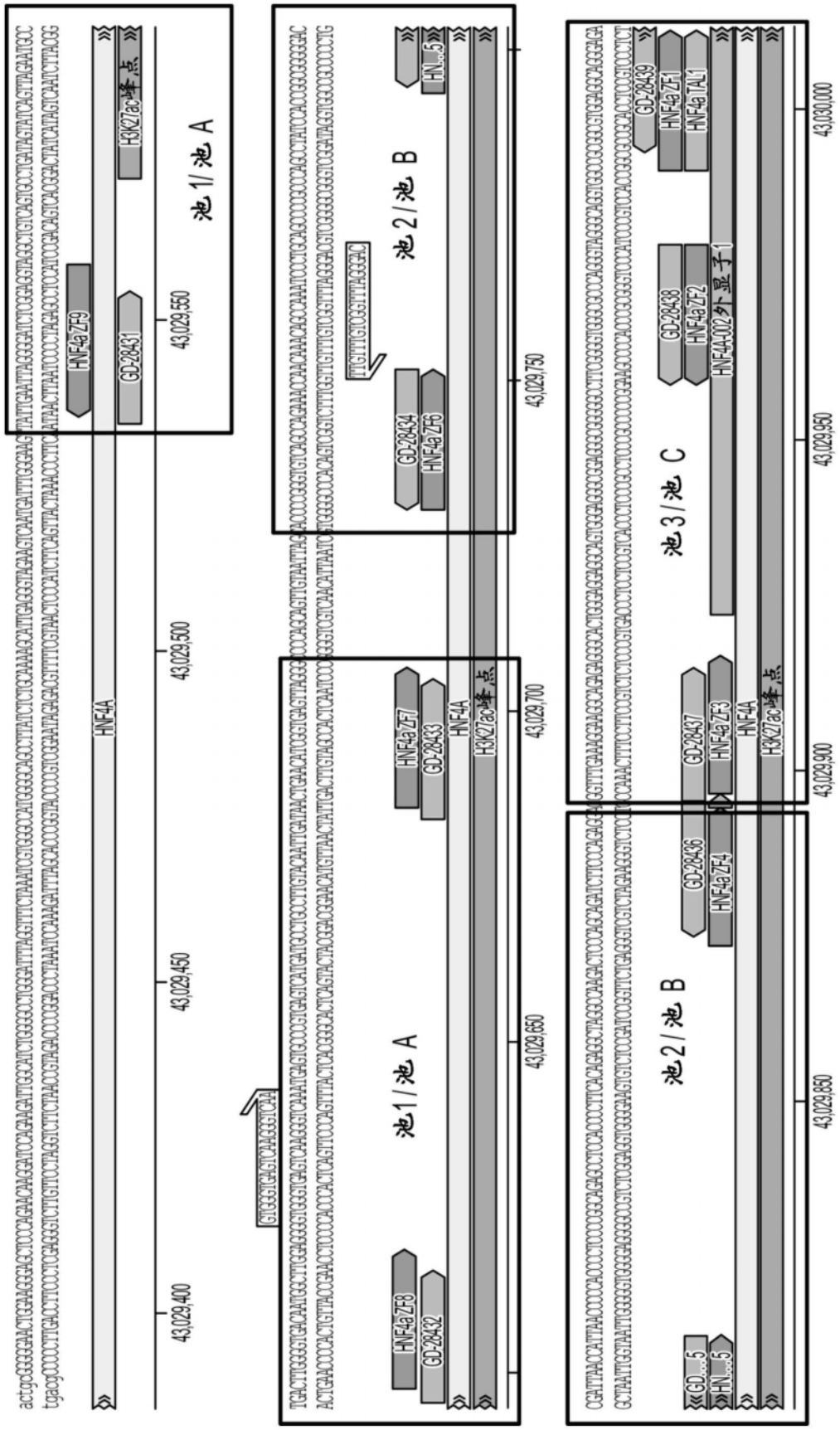

池1/池A
池2/池B
池3/池C
HNF4A
H3K27ac峰点
HNF4a ZF9
GD-28431
HNF4a ZF8
GD-28432
HNF4a ZF7
GD-28433
HNF4a ZF6
GD-28434
HNF4a ZF5
GD-28435
HNF4a ZF4
GD-28436
HNF4a ZF3
GD-28437
HNF4a ZF2
GD-28438
HNF4a ZF1
GD-28439
HNF4A-002外显子1
HNF4a TAL1
43,029,400
43,029,450
43,029,500
43,029,550
43,029,650
43,029,700
43,029,750
43,029,850
43,029,900
43,029,950
43,030,000

图9

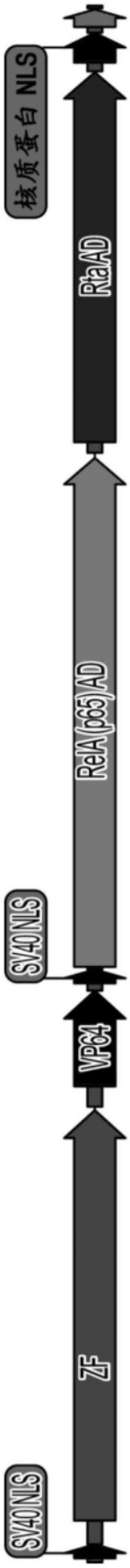


图10

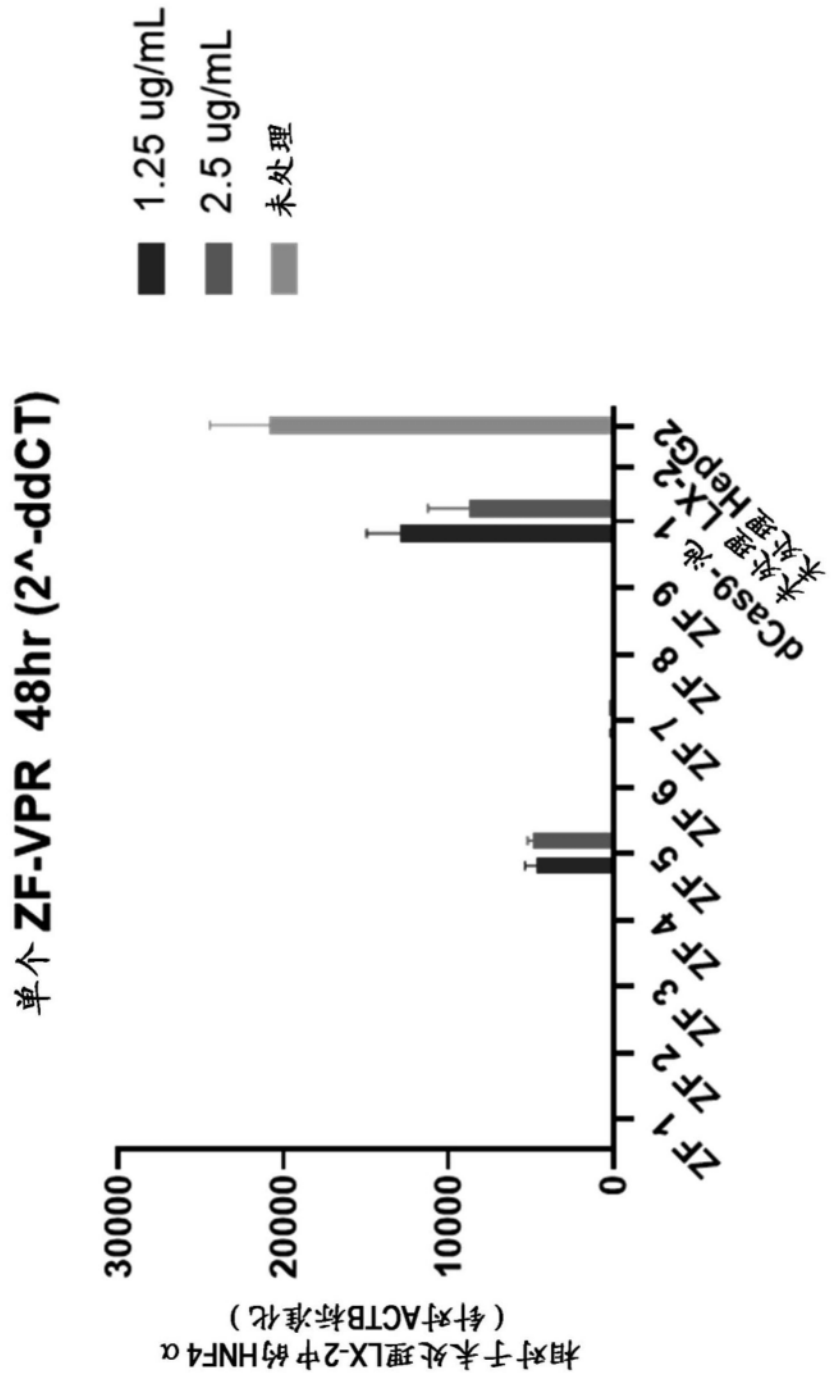

1.25 ug/mL
2.5 ug/mL
未处理
单个 ZF-VPR 48hr (2^-ddCT)
相对于未处理LX-2中的HNF4α
（针对ACTB标准化）
30000
20000
10000
0
ZF 1
ZF 2
ZF 3
ZF 4
ZF 5
ZF 6
ZF 7
ZF 8
ZF 9
dCas9-无关 LX-2
未处理 HepG2

图11

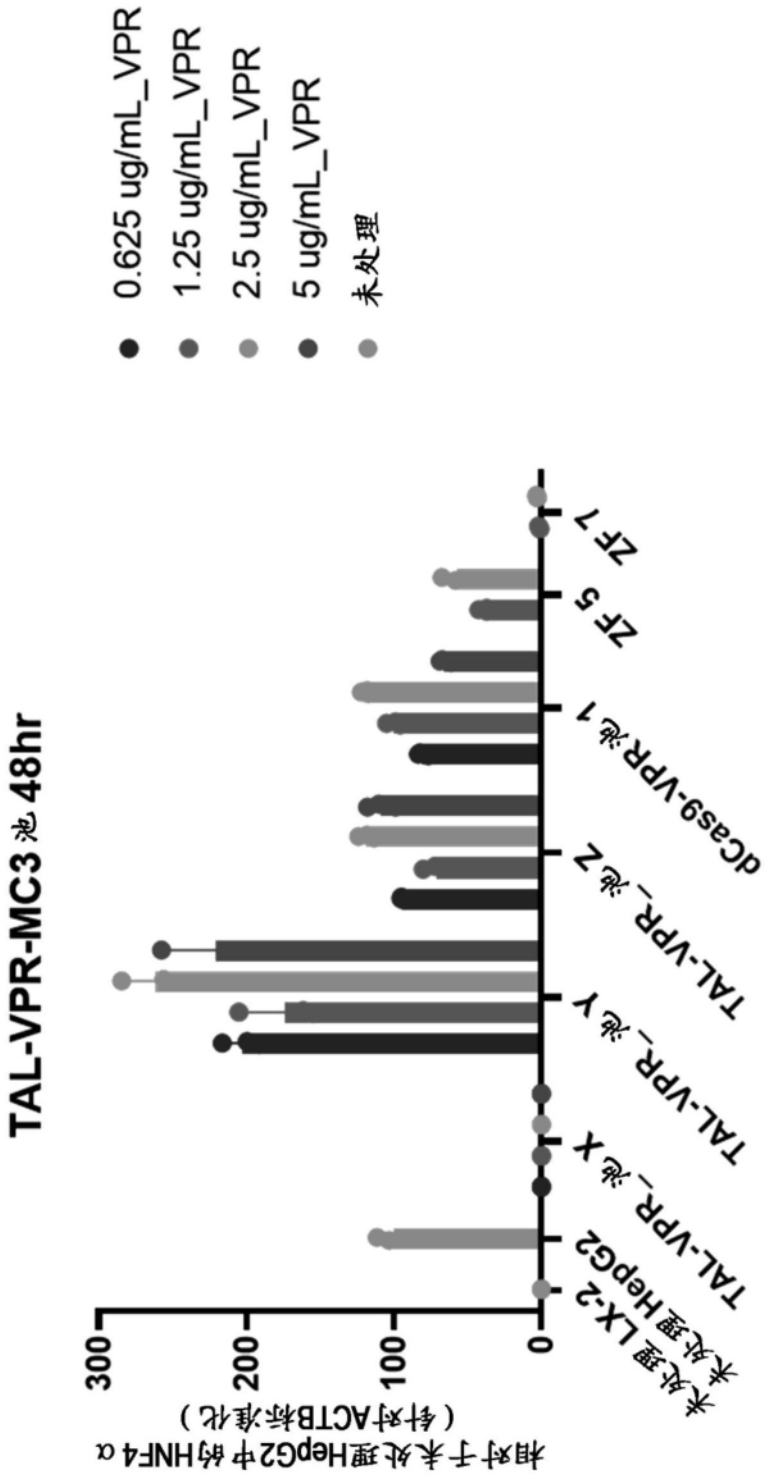

0.625 ug/mL_VPR
1.25 ug/mL_VPR
2.5 ug/mL_VPR
5 ug/mL_VPR
未处理
TAL-VPR-MC3池 48hr
相对于未处理HepG2中的HNF4α
（针对ACTB标准化）
300
200
100
0
未处理LX-2
未处理HepG2
TAL-VPR_池X
TAL-VPR_池Y
TAL-VPR_池Z
dCas9-VPR池1
ZF 5
ZF 7

图12

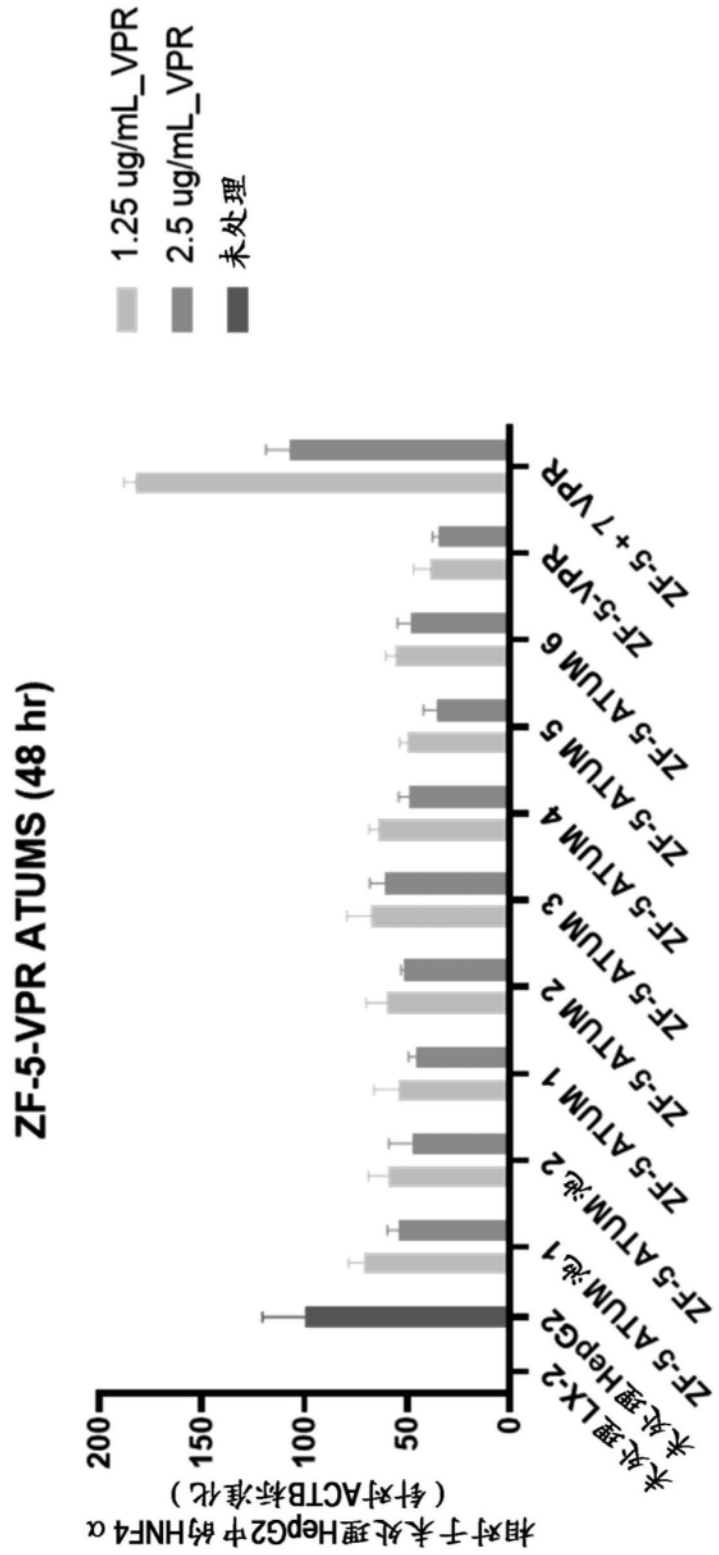

ZF-5-VPR ATUMS (48 hr)
1.25 ug/mL_VPR
2.5 ug/mL_VPR
未处理
相对于未处理HepG2中的HNF4α
（针对ACTB标准化）
200
150
100
50
0
未处理LX-2
未处理HepG2
ZF-5 ATUM 组 1
ZF-5 ATUM 组 2
ZF-5 ATUM 1
ZF-5 ATUM 2
ZF-5 ATUM 3
ZF-5 ATUM 4
ZF-5 ATUM 5
ZF-5 ATUM 6
ZF-5-VPR
ZF-5 + 7 VPR

图13

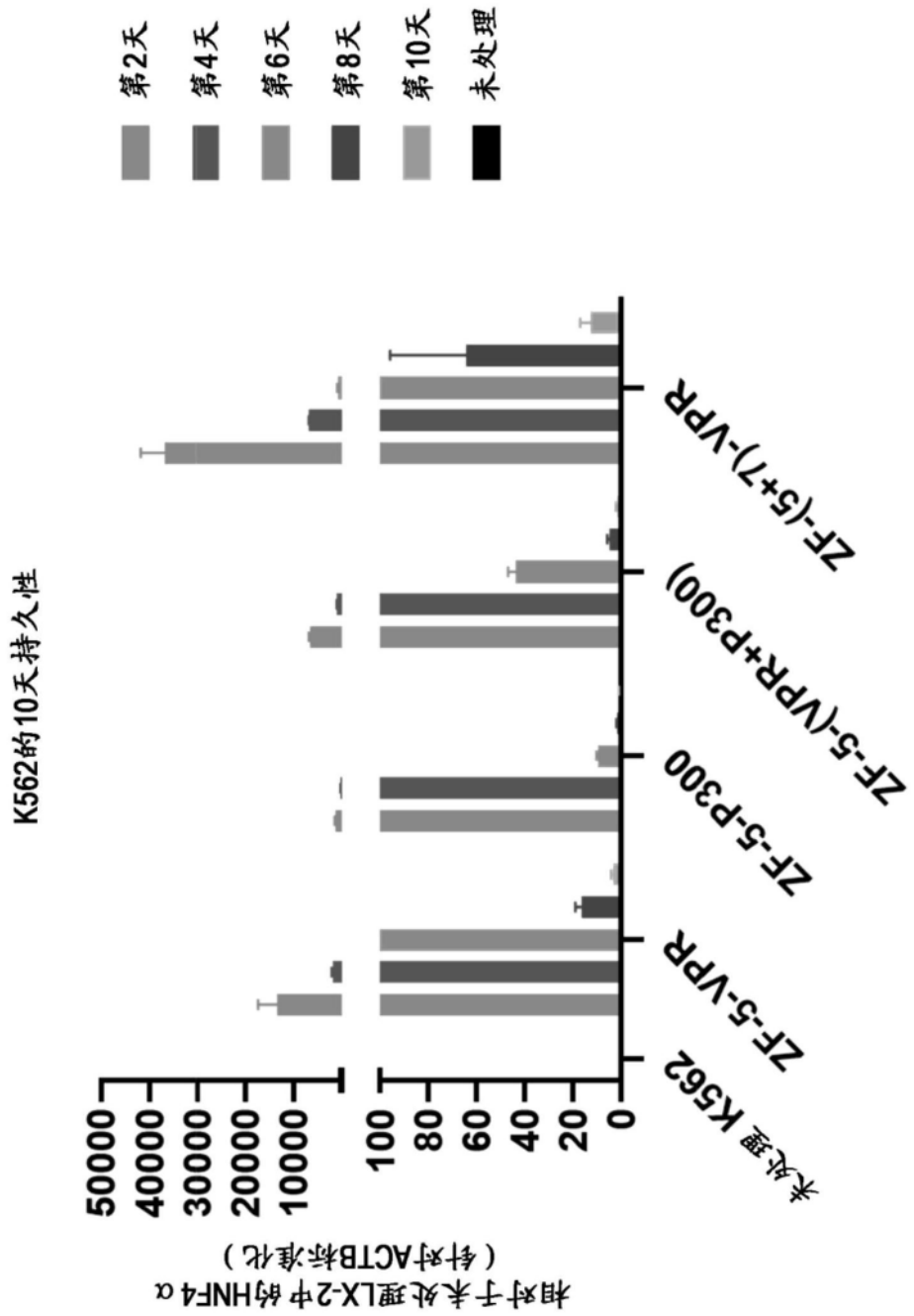

第2天
第4天
第6天
第8天
第10天
未处理
K562的10天持久性
相对于未处理LX-2中的HNF4α
（针对ACTB标准化）
50000
40000
30000
20000
10000
100
80
60
40
20
0
未处理 K562
ZF-5-VPR
ZF-5-P300
ZF-5-(VPR+P300)
ZF-(5+7)-VPR

图14

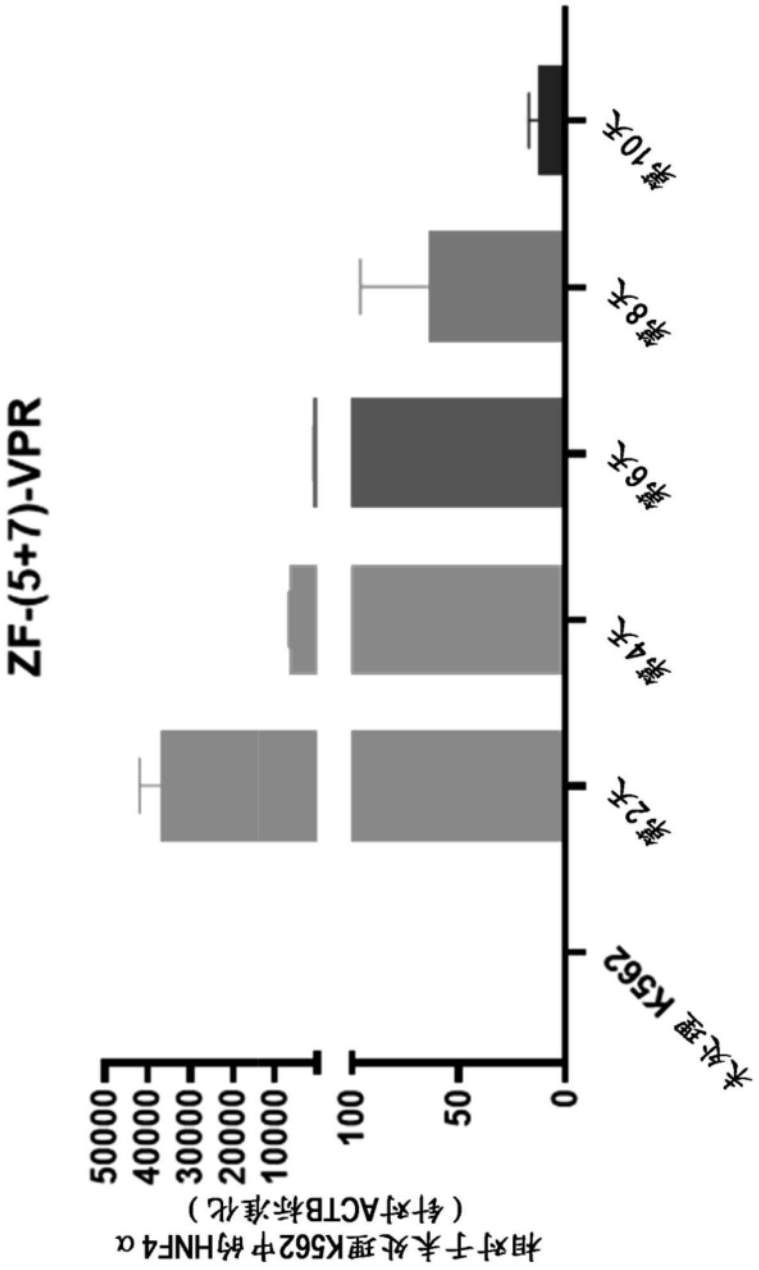

ZF-(5+7)-VPR
未处理 K562
第2天
第4天
第6天
第8天
第10天
0
50
100
10000
20000
30000
40000
50000
相对于未处理K562中的HNF4α
（针对ACTB标准化）

图15

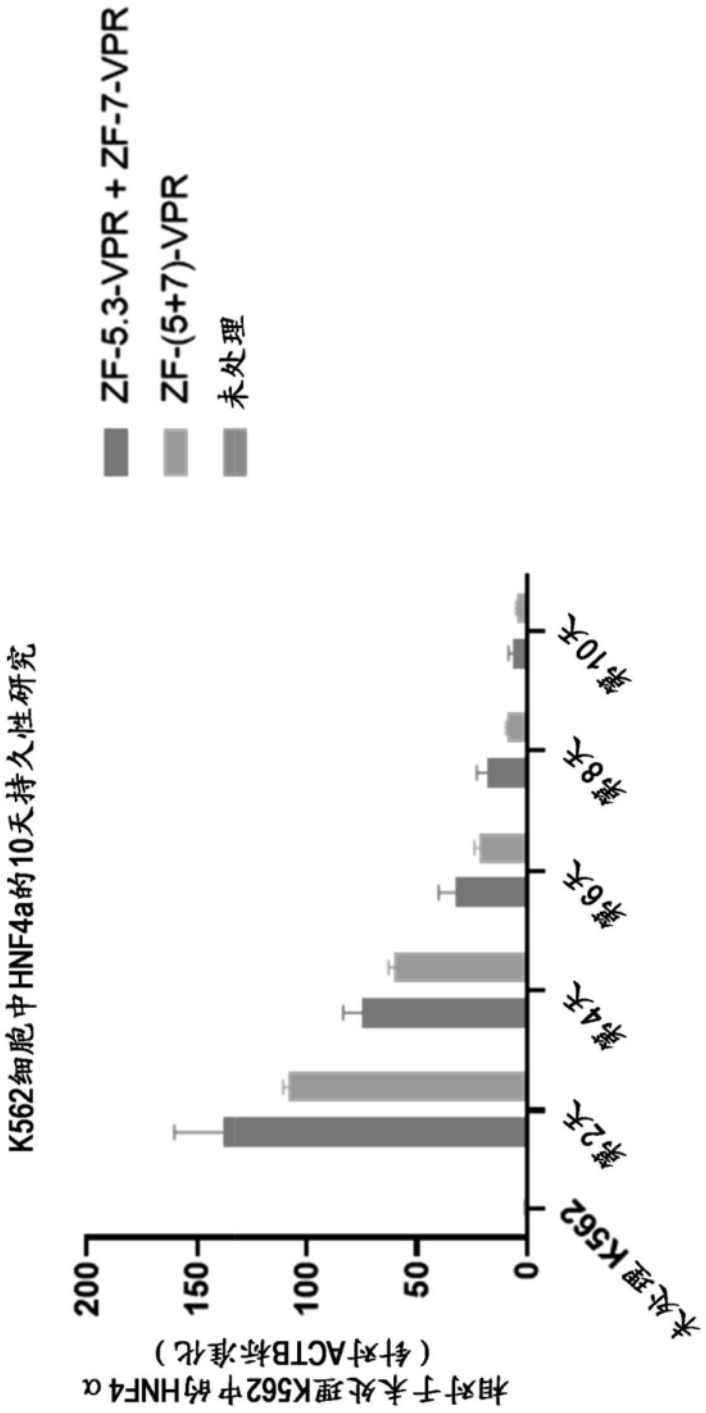

K562细胞中HNF4a的10天持久性研究
ZF-5.3-VPR + ZF-7-VPR
ZF-(5+7)-VPR
未处理
相对于未处理K562中的HNF4α
（针对ACTB标准化）
200
150
100
50
0
未处理K562
第2天
第4天
第6天
第8天
第10天

图16

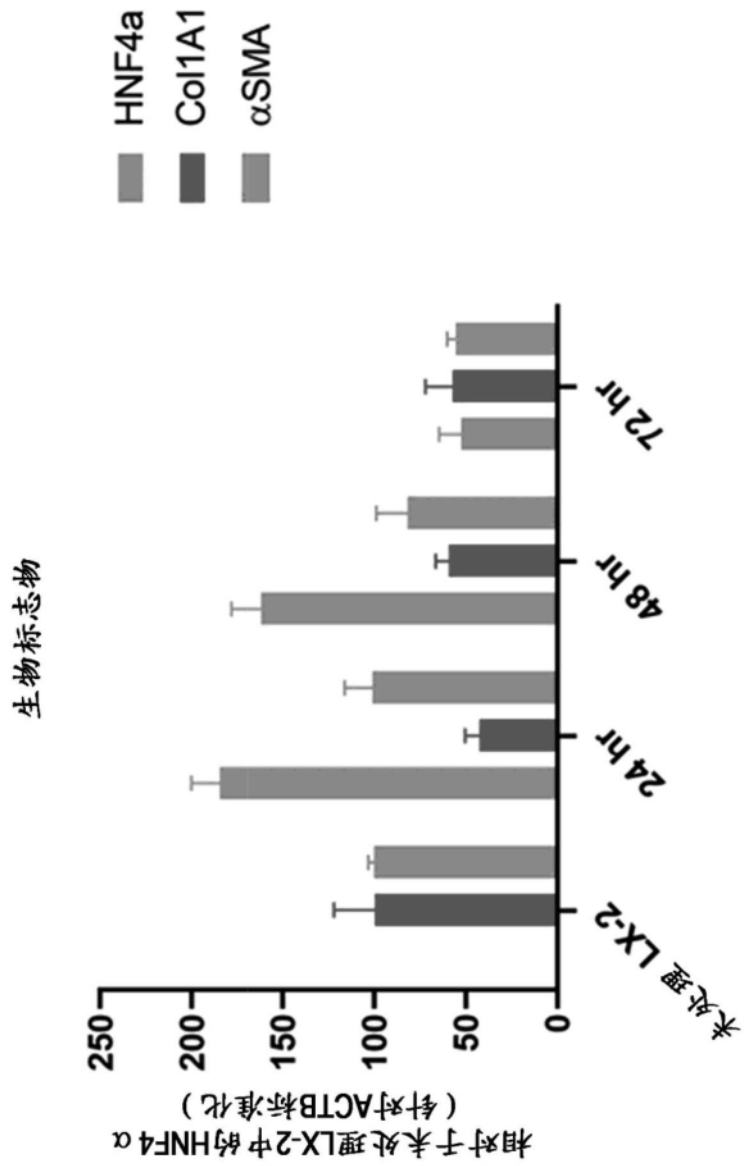

HNF4a
Col1A1
αSMA
生物标志物
相对于未处理LX-2中的HNF4α
（针对ACTB标准化）
250
200
150
100
50
0
未处理 LX-2
24 hr
48 hr
72 hr

图17

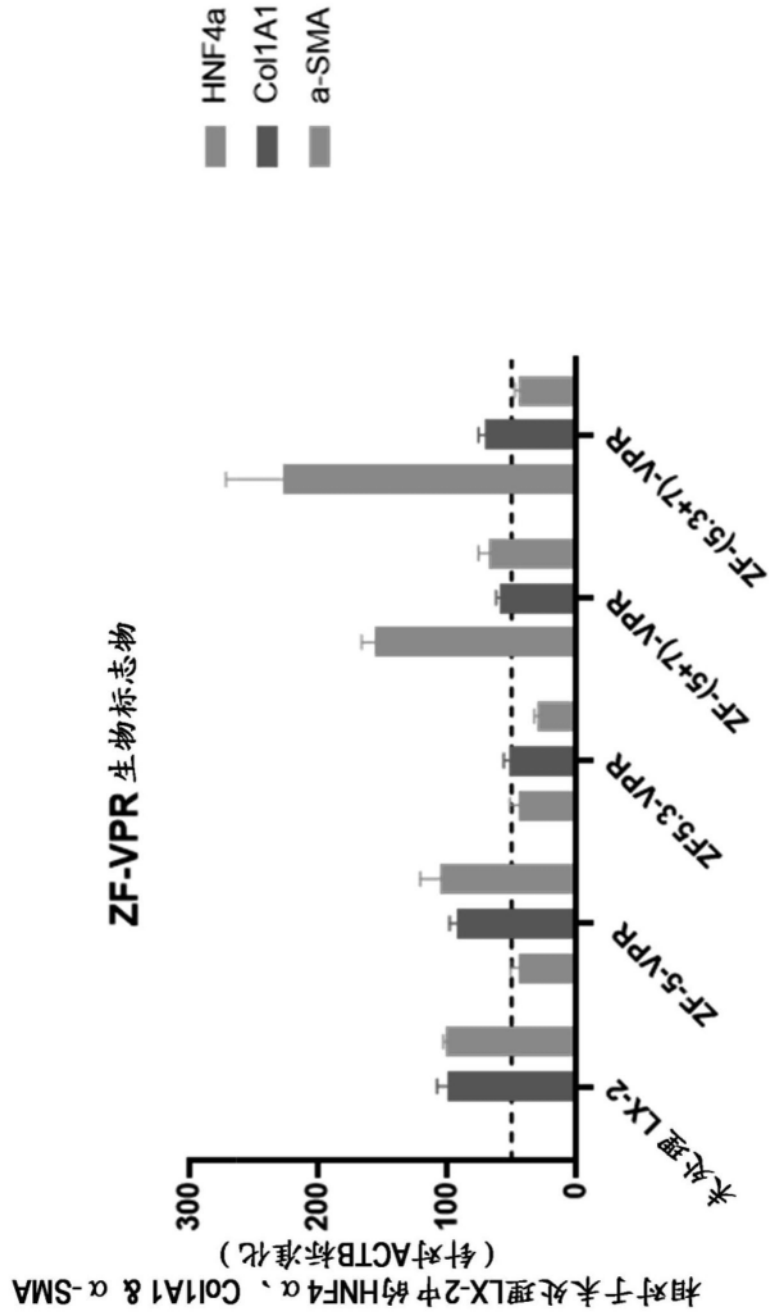

HNF4a
Col1A1
a-SMA
ZF-VPR 生物标志物
未处理 LX-2
ZF-5-VPR
ZF-5.3-VPR
ZF-(5+7)-VPR
ZF-(5.3+7)-VPR
0
100
200
300
（针对ACTB标准化）
相对于未处理LX-2中的HNF4α、Col1A1 & α-SMA

图18

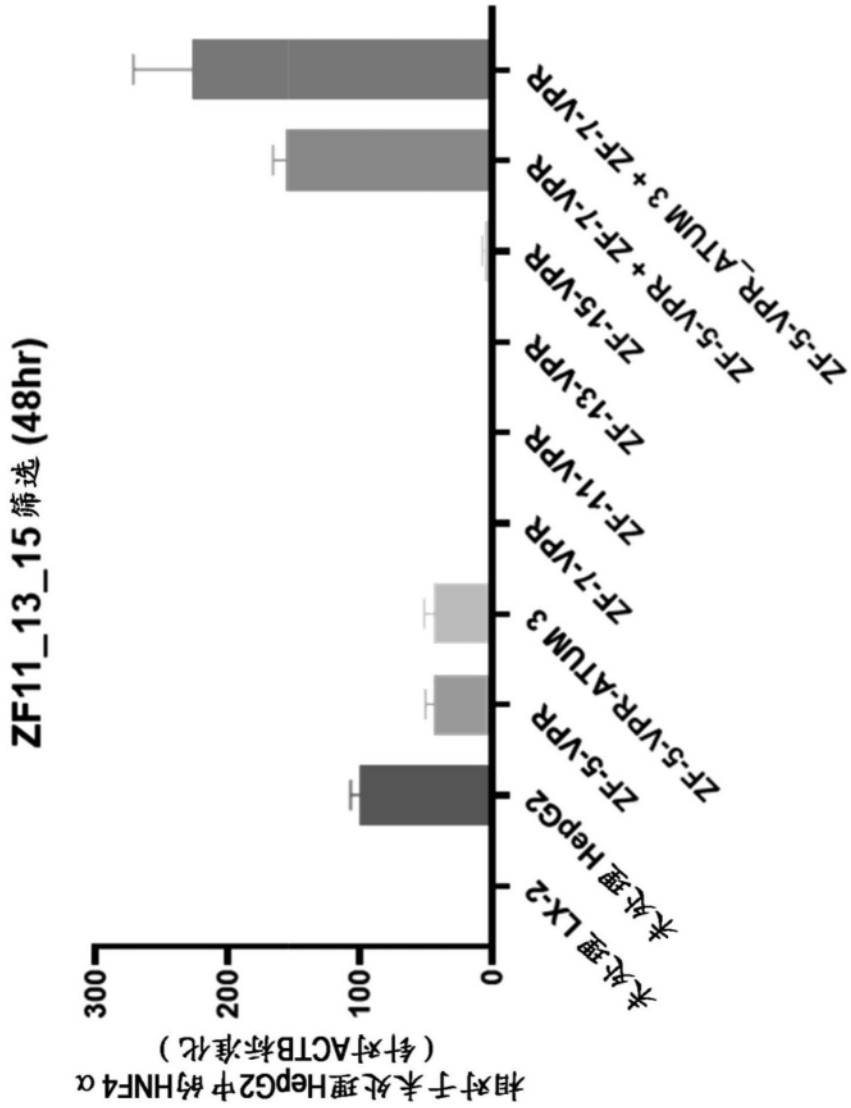

ZF11_13_15 筛选 (48hr)
相对于未处理HepG2中的HNF4α
（针对ACTB标准化）
300
200
100
0
未处理 LX-2
未处理 HepG2
ZF-5-VPR
ZF-5-VPR-ATUM 3
ZF-7-VPR
ZF-11-VPR
ZF-13-VPR
ZF-15-VPR
ZF-5-VPR + ZF-7-VPR
ZF-5-VPR_ATUM 3 + ZF-7-VPR

图19

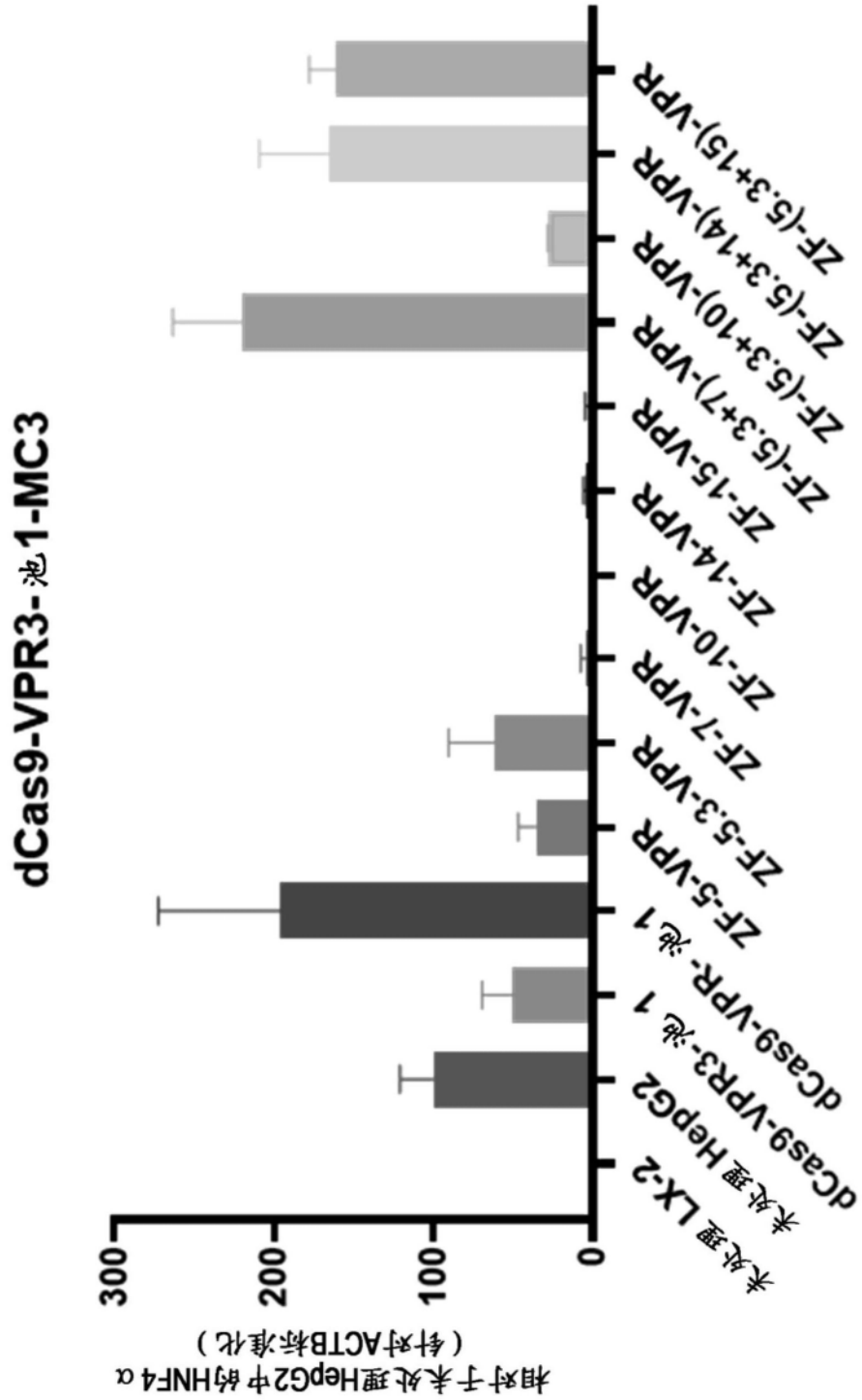

dCas9-VPR3-池1-MC3
相对于未处理HepG2中的HNF4α
（针对ACTB标准化）
300
200
100
0
未处理 LX-2
未处理 HepG2
dCas9-VPR3-池 1
dCas9-VPR- 池 1
ZF-5-VPR
ZF-5.3-VPR
ZF-7-VPR
ZF-10-VPR
ZF-14-VPR
ZF-15-VPR
ZF-(5.3+7)-VPR
ZF-(5.3+10)-VPR
ZF-(5.3+14)-VPR
ZF-(5.3+15)-VPR

图20

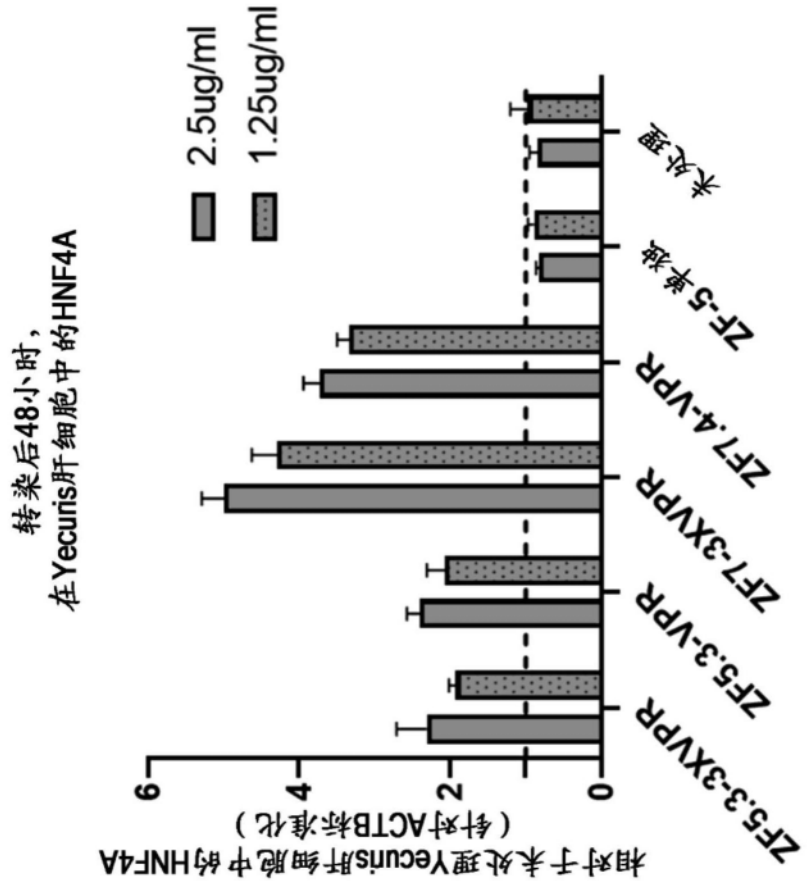

转染后48小时，
在Yecuris肝细胞中的HNF4A
2.5ug/ml
1.25ug/ml
相对于未处理Yecuris肝细胞中的HNF4A
（针对ACTB标准化）
0
2
4
6
未处理
ZF-5.参考
ZF7.4-VPR
ZF7-3XVPR
ZF5.3-VPR
ZF5.3-3XVPR

图21

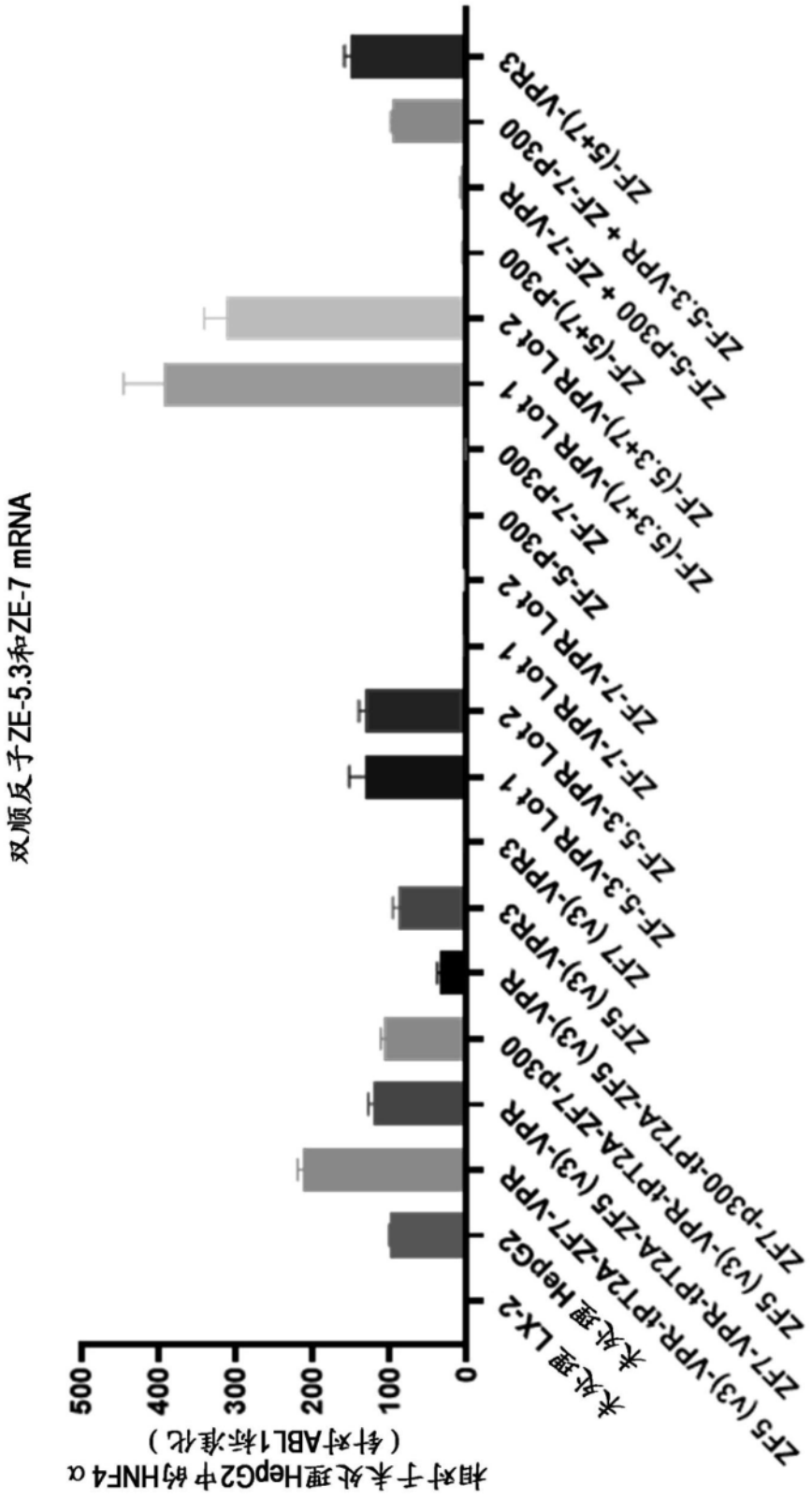

双顺反子ZE-5.3和ZE-7 mRNA
相对于未处理HepG2中的HNF4α
（针对ABL1标准化）
500
400
300
200
100
0
未处理 LX-2
未处理 HepG2
ZF7-VPR-IRT2A-ZF7-VPR
ZF5-VPR-IRT2A-ZF5 (V3)-VPR
ZF7-p300-IRT2A-ZF5 (V3)-VPR
ZF7 (V3)-VPR3
ZF5 (V3)-VPR3
ZF-5.3-VPR Lot 2
ZF-5.3-VPR Lot 1
ZF-7-VPR Lot 2
ZF-7-VPR Lot 1
ZF-5-p300
ZF-7-p300
ZF-(5.3+7)-VPR Lot 1
ZF-(5.3+7)-VPR Lot 2
ZF-5-p300 + ZF-7-p300
ZF-5.3-VPR + ZF-7-VPR
ZF-(5+7)-VPR3

图22

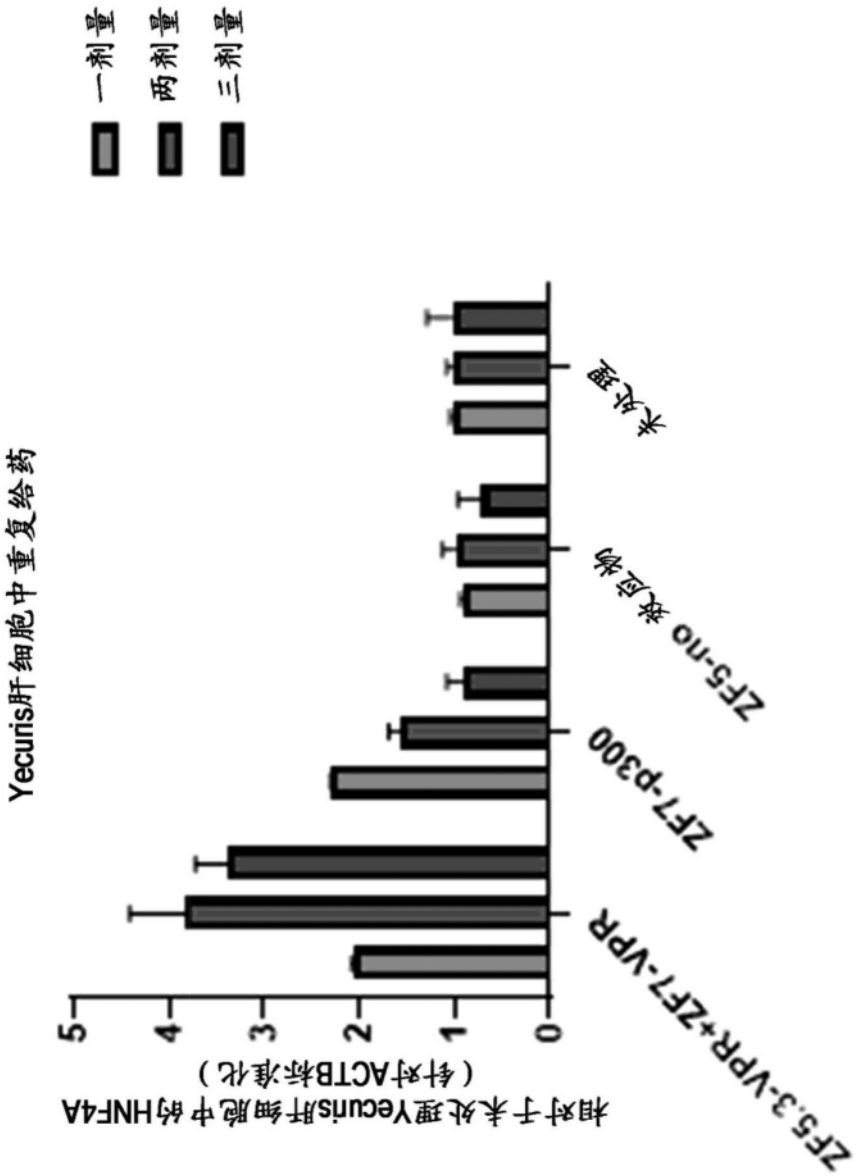

一剂量
两剂量
三剂量
Yecuris肝细胞中重复给药
相对于未处理Yecuris肝细胞中的HNF4A
（针对ACTB标准化）
0
1
2
3
4
5
ZF5.3-VPR+ZF7-VPR
ZF7-p300
ZF5-no 效应物
未处理

图23

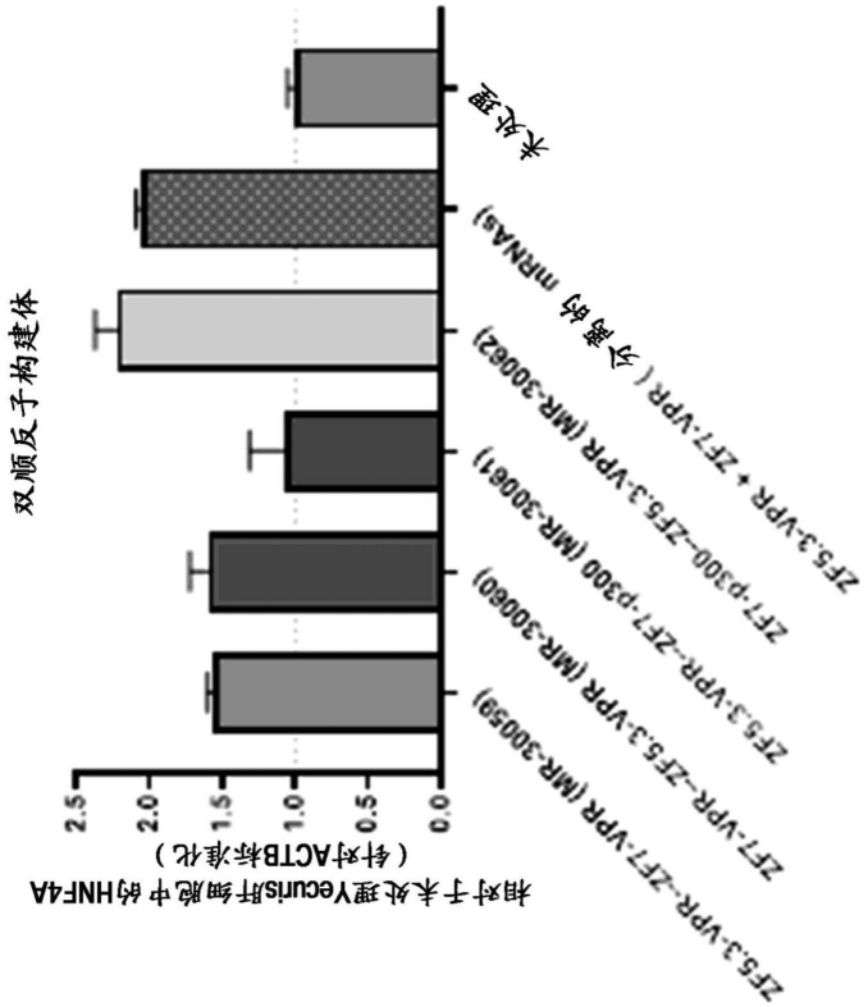

双顺反子构建体
相对于未处理Vecuris肝细胞中的HNF4A
（针对ACTB标准化）
2.5
2.0
1.5
1.0
0.5
0.0
未处理
ZF5.3-VPR + ZF7-VPR（分离的 mRNAs）
ZF7-p300–ZF5.3-VPR (MR-30062)
ZF5.3-VPR–ZF7-p300 (MR-30061)
ZF7-VPR–ZF5.3-VPR (MR-30060)
ZF5.3-VPR–ZF7-VPR (MR-30059)

图24

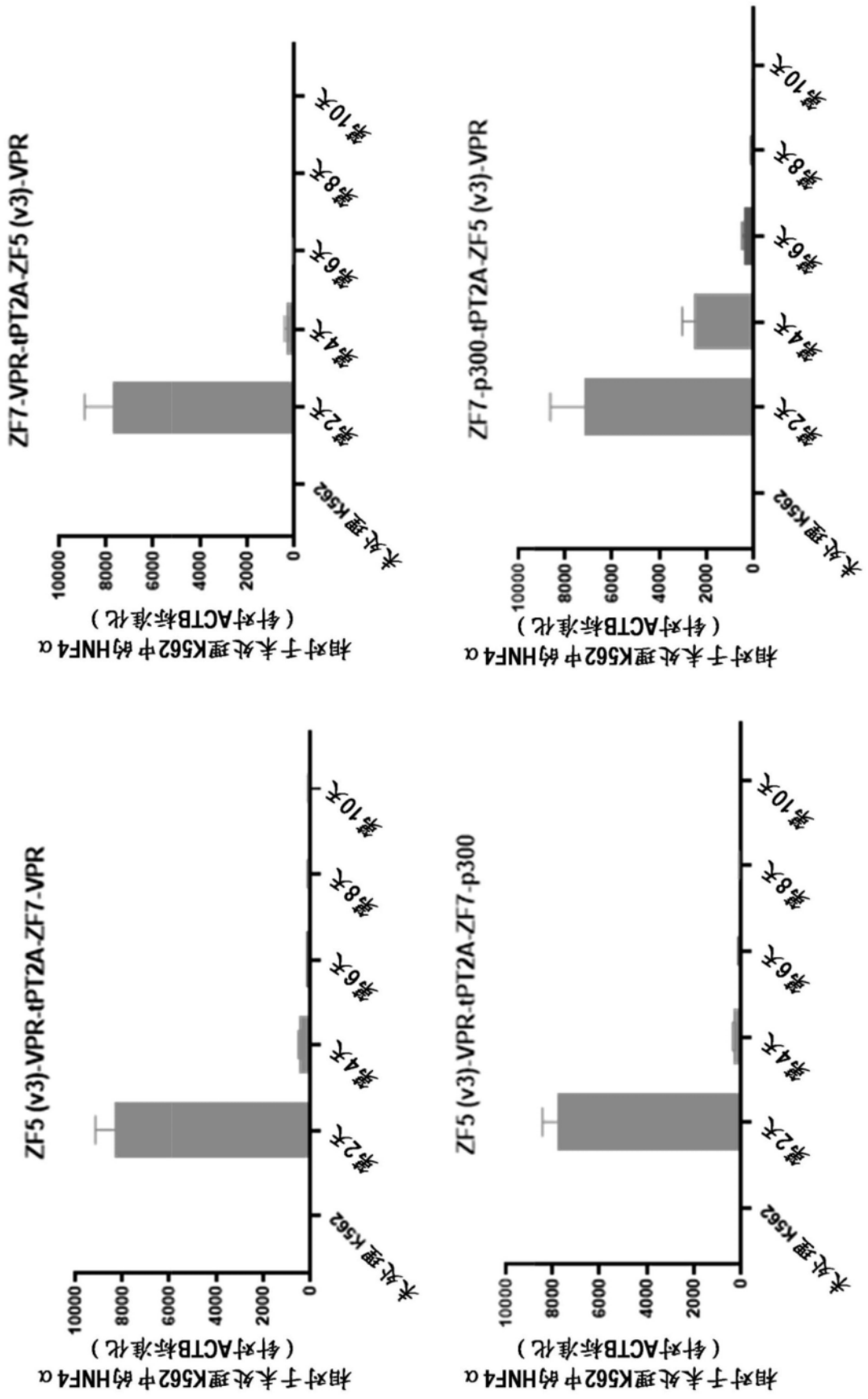

ZF7-VPR-tPT2A-ZF5 (v3)-VPR
ZF7-p300-tPT2A-ZF5 (v3)-VPR
ZF5 (v3)-VPR-tPT2A-ZF7-VPR
ZF5 (v3)-VPR-tPT2A-ZF7-p300
相对于未处理K562中的HNF4α
（针对ACTB标准化）
10000
8000
6000
4000
2000
0
未处理K562
第2天
第4天
第6天
第8天
第10天

图25