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(54) 发明名称

抗非洲猪瘟病毒感染的疫苗

(57) 摘要

本发明涉及减毒非洲猪瘟病毒。减毒病毒保护猪免受随后的强毒病毒攻击。本发明还涉及使用这种减毒病毒治疗和/或预防非洲猪瘟。

1. 减毒非洲猪瘟 (ASF) 病毒, 其中以下基因的表达和/或活性被破坏:
多基因家族 (MGF) 360 12L、13L和14L, 以及
MGF 505 1R,
并且所述减毒ASF病毒包含以下基因的功能形式:
(i) MGF 360 10L和/或11L, 以及
(ii) MGF 505 2R和/或3R。
2. 根据权利要求1的减毒ASF病毒, 其包含MGF 360 10L和11L的功能形式。
3. 根据权利要求1或2的减毒ASF病毒, 其包含MGF 505 2R和3R的功能形式。
4. 根据权利要求1至3中任一项的减毒ASF病毒, 其中以下基因的一个或多个至少部分缺失:
MGF 360 12L、13L和14L, 以及
MGF 505 1R。
5. 根据权利要求1至4中任一项的减毒ASF病毒, 其中以下基因的一个或多个完全缺失:
MGF 360 12L、13L和14L, 以及
MGF 505 1R。
6. 根据权利要求1至5中任一项的减毒病毒, 其中以下基因的一个或多个被中断:
MGF 360 12L、13L和14L, 以及
MGF 505 1R。
7. 根据权利要求1至6中任一项的减毒ASF病毒, 其包含区分感染和免疫动物 (DIVA) 突变。
8. 根据权利要求7的减毒ASF病毒, 其中所述DIVA突变缺乏K145R基因的功能形式和/或缺乏B125R基因的功能形式。
9. 减毒ASF病毒, 其缺乏K145R基因和/或B125R基因的功能形式。
10. 根据权利要求8或9的减毒ASF病毒, 其中所述K145R基因和/或所述B125R基因至少部分缺失。
11. 根据权利要求8至10中任一项的减毒ASF病毒, 其中所述K145R基因和/或所述B125R基因完全缺失。
12. 根据权利要求8至11中任一项的减毒ASF病毒, 其中所述K145R基因和/或所述B125R基因被中断。
13. 疫苗, 其包含根据权利要求1至12中任一项的减毒ASF病毒。
14. 根据权利要求13的疫苗, 其用于治疗 and/或预防受试者的非洲猪瘟。
15. 治疗和/或预防受试者的非洲猪瘟的方法, 其包括向所述受试者施用有效量的根据权利要求13的疫苗的步骤。
16. 根据权利要求14使用的疫苗、或根据权利要求15的方法, 其中所述受试者是家猪。
17. 根据权利要求14或16使用的疫苗、或根据权利要求15或16的方法, 其中所述疫苗遵循初免-加强方案施用。
18. 使ASF病毒减毒的方法, 其包括破坏以下基因的表达和/或活性:
MGF 360 12L、13L和14L, 以及
MGF 505 1R,

同时保留以下基因的功能的步骤:

(i) MGF 360 10L和/或11L,以及

(ii) MGF 505 2R和/或3R。

19. 根据权利要求18的方法,其中所述MGF 360 10L和11L基因的功能被保留。

20. 根据权利要求18或19的方法,其中所述MGF 505 2R和3R基因的功能被保留。

21. 根据权利要求18至20中任一项的方法,其中以下基因的一个或多个至少部分缺失:

MGF 360 12L、13L和14L,以及

MGF 505 1R。

22. 根据权利要求18至21中任一项的方法,其中以下基因的一个或多个完全缺失:

MGF 360 12L、13L和14L,以及

MGF 505 1R。

23. 根据权利要求18至22中任一项的方法,其中以下基因的一个或多个被中断:

MGF 360 12L、13L和14L,以及

MGF 505 1R。

抗非洲猪瘟病毒感染的疫苗

技术领域

[0001] 本发明涉及减毒非洲猪瘟病毒。减毒病毒保护猪免受随后的强毒病毒攻击。本发明还涉及这种减毒病毒用于治疗 and/or 预防非洲猪瘟的用途。

[0002] 发明背景

[0003] 非洲猪瘟 (ASF)

[0004] 非洲猪瘟是由双链DNA病毒非洲猪瘟病毒 (ASFV) 引起的毁灭性家猪出血性疾病。ASFV是非洲猪瘟病毒科 (Asfarviridae) 的唯一成员,主要在细胞的细胞质中复制。ASFV的强毒株可在感染后约5-14天内杀死家猪,死亡率接近100%。

[0005] ASFV可以在疣猪 (*Phacochoerus* sp.)、丛林猪 (*Potamochoerus* sp.) 和钝缘蜱属 (*Ornithodoros*) 的软蜱 (其被认为是载体) 中感染和复制,但在这些物种中几乎没有观察到任何临床症状 (如果有的话) 并且可以确定长期的持续感染。ASFV是在欧洲定居者将猪带入ASFV流行地区后首次描述的,因此是“新发感染”的实例。该病目前在许多撒哈拉以南的国家和欧洲撒丁岛流行。自2007年在跨高加索地区传入格鲁吉亚后,ASFV已在包括俄罗斯联邦在内的邻国广泛传播。2012年乌克兰首次爆发疫情,2013年白俄罗斯首次爆发疫情。2014年,在乌克兰的猪中报道了进一步的爆发并且在立陶宛和波兰的野猪中也检测到病毒。

[0006] 目前没有ASF的治疗方法。非洲以外的国家已经尝试在国家层面上通过限制进口猪和猪肉产品、在饲喂猪前强制煮沸获得许可的废弃动物产品以及在诊断出疾病时实施屠宰政策等方式进行预防。非洲的预防基于使疣猪和被疣猪污染的材料远离猪群的措施。

[0007] 因此,需要改进措施来控制ASFV感染并防止疾病传播。

[0008] 非洲猪瘟病毒 (ASFV)

[0009] 已经比较了ASFV分离株贝宁97/1 (来自西非的高致病性病毒,第1组)、分离株OURT88/3 (来自葡萄牙的非致病性减毒病毒,第1组) 和分离株BA71V (Vero细胞组织培养适应非致病性病毒,第1组) 的全基因组序列 (Chapman等人2008J.Gen Virol.89:397-408)。

[0010] 在OURT88/3基因组中,五个MGF 360基因 (10L、11L、12L、13L和14L) 和两个MGF 505基因 (1R、2R) 缺失,MGF 505R 3R基因被截短。这些基因存在于已测序的所有其他八种ASFV病原分离株的基因组中。Chapman等人 (如上) 未确定导致OURT88/3减毒的任何突变。此外,尽管OURT88/3已显示在某些动物中诱导保护性免疫应答,但这种作用似乎并不普遍。用OURT88/3免疫似乎不能有效地保护一些猪免受随后的攻击。其还与一些猪的不良免疫反应如关节肿胀的诱导有关。

[0011] 在适应于减毒组织培养的BA71V分离株中,基因组包含MGF 505 3R基因但缺少其他七个MGF基因,此外MGF 360 9L基因被截短。

[0012] 先前的六个MGF 360基因 (9L、10L、11L、12L、13L和14L) 和两个MGF 505基因 (1R和2R) 从高致病性南非分离株Pr4中缺失。这种缺失显著降低了原代巨噬细胞培养物中的病毒生长 (Zsak等人2001,如上) 并导致病毒减毒 (引用为未发表的结果,Afonso等人2004 J.Virol 78:1858-1864)。然而,没有进行实验来攻击恢复的猪以确定它们是否受到保护。事实上,在2011年5月堪萨斯州曼哈顿生物安全研究所的非洲猪瘟病毒研讨会上,提及了

Pr4缺失突变体没有保护作用并会诱发疾病的慢性形式。

[0013] 还表明,三个MGF 360基因(12L、13L和14L)和四个MGF 505基因(1R、2R、3R和4R截短)从病原性病毒马拉维 Δ DP71中的缺失会减少病毒在猪中的复制,此外还会使病毒减毒(Neilan等人(2002) J.Virol.76:3095-3104)。然而,同样没有报告任何实验来确定恢复的猪是否受到保护免受攻击。

[0014] 缺失MGF505-1R、-2R和-3R以及MGF360-12L、-13L和-14L产生了赋予对亲本病毒的保护作用的减毒病毒(O'Donnell等人2015 J.Virol.89:6048-6056)。然而,仅MGF360-13L和-14L的缺失不会产生病毒减毒(Borca等人2017 Sci Rep.7:46747)。

[0015] 区分感染和免疫动物(DIVA)疫苗

[0016] DIVA疫苗允许区分已经感染野生型病原体的动物与已经用疫苗免疫的动物。DIVA疫苗缺少至少一种存在于野生型病原体中的免疫原性抗原(DIVA标记物)。感染野生型病原体的动物会产生针对DIVA标记物的抗体,而接种疫苗的动物则不会。可以使用血清学测定来检测针对DIVA标记物的抗体。尽管两组动物都具有针对病原体的其他免疫原的抗体,但感染的动物(具有针对DIVA标记物的抗体)可以与免疫接种的动物(不具有针对DIVA标记物的抗体)区分开来。

[0017] DIVA标记物应当具有免疫原性,但基因的缺失不应影响疫苗的保护能力。

[0018] 发明概述

[0019] 在一个方面,本发明涉及减毒非洲猪瘟病毒,其中特定多基因家族(MGF)基因的表达和/或活性被破坏,而其他特定MGF基因的表达和/或活性未被破坏。

[0020] 本发明还涉及以下发现:非洲猪瘟病毒的K145R和B125R基因可用作DIVA标记物。

[0021] 本发明提供了减毒非洲猪瘟(ASF)病毒,其中以下基因的表达和/或活性被破坏:

[0022] 多基因家族(MGF) 360 12L、13L和14L,以及

[0023] MGF 505 1R,

[0024] 并且该减毒ASF病毒包含以下基因的功能形式:

[0025] (i) MGF 360 10L和/或11L,以及

[0026] (ii) MGF 505 2R和/或3R。

[0027] 本发明还提供了缺乏K145R基因和/或B125R基因的功能形式的减毒ASF病毒。

[0028] 本发明还提供了包含根据本发明的减毒ASF病毒的疫苗。

[0029] 本发明进一步提供了用于治疗 and/或预防受试者的非洲猪瘟的本发明的疫苗。

[0030] 本发明进一步提供了治疗 and/或预防受试者的非洲猪瘟的方法,该方法包括向受试者施用有效量的根据本发明的疫苗的步骤。

[0031] 本发明还提供了使ASF病毒减毒的方法,该方法包括破坏以下基因的活性和/或表达:

[0032] MGF 360 12L、13L和14L,以及

[0033] MGF 505 1R,

[0034] 同时保留以下基因的功能的步骤:

[0035] (i) MGF 360 10L和/或11L,以及

[0036] (ii) MGF 505 2R和/或3R。

附图说明

[0037] 图1显示了用与IRF3可激活启动子(A)、NF- κ B可激活启动子(B)或GAL4可激活启动子(C、D)连接的萤光素酶报告基因转染并表达指定MGF基因的HEK293T细胞中的萤光素酶表达。启动子的表达通过仙台病毒刺激(A)、NF- κ B p65转染(B)或IRF3-GAL4DBD嵌合体转染(C)或p65-GAL4DBD嵌合体转染(D)来激活。MGF基因抑制萤光素酶表达(即IRF3和NF- κ B活性)(A、B),MGF360-12L特别特异性抑制IRF3和NF- κ B激活转录的能力(C、D)。

[0038] 图2是MGFA和MGFB缺失的示意图。在每个基因名称下方,总结了IRF3和NF- κ B依赖性萤光素酶报告基因的抑制信息,并列出了任何已确定的宿主靶标。

[0039] 图3描述了用格鲁吉亚 Δ K145R Δ MGFA(C组)、格鲁吉亚 Δ K145R Δ MGFB(D组)和格鲁吉亚 Δ B125R Δ MGFA(BA组)病毒对猪进行免疫、加强和攻击的实验方案。

[0040] 图4显示了D、C和BA组中的猪在免疫和攻击后的存活率。

[0041] 图5显示了C组(A)、BA组(B)、D组(C)和对照F组(D)的猪在免疫和攻击后的温度。

[0042] 图6显示了C组(A)、BA组(B)、D组(C)和对照F组(D)的猪在免疫和攻击后的临床评分。

[0043] 图7显示C组(A)、BA组(B)、D组(C)和对照F组(D)的猪在免疫和攻击后在通过定量PCR测量的全血中病毒基因组(病毒血症)的水平。

[0044] 图8显示了攻击后全血中感染性病毒的水平。

[0045] 图9显示了C组(A、B)和BA组(C、D)的猪在免疫前、加强前和攻击前的T细胞反应。在免疫前、加强前和攻击前收集外周血单核细胞(PBMC),并用同源强毒格鲁吉亚2007/1毒株(A、C)或异源基因型I强毒毒株贝宁97/1(B、D)的活ASFV刺激。通过Elispot测定法测量产生干扰素 γ 的细胞的数量。

[0046] 图10显示了在C组(A)和BA组(B)的猪中使用商业竞争性ELISA(Ingenasa)在免疫后测量的对主要ASFV衣壳蛋白p72/B646L的抗体反应。

[0047] 图11显示了用表达与HA表位标签融合的B125R基因的质粒转染的Vero细胞。将细胞固定并透化,然后用抗HA抗体染色,然后用适当的二抗染色。以绿色显示的B125R蛋白定位于细胞表面。细胞核以蓝色显示。

[0048] 发明详述

[0049] 非洲猪瘟病毒(ASFV)

[0050] 非洲猪瘟病毒(ASFV)是非洲猪瘟(ASF)的病原体。ASFV的基因组结构是本领域已知的,详见Chapman等人2008 J.Gen.Virol.89:397-408。ASFV是大型、二十面体、双链DNA病毒,其具有含有至少150个基因的线性基因组。基因的数量在病毒的不同分离株之间略有不同。ASFV与其他大型DNA病毒,例如痘病毒、虹彩病毒和拟态病毒有相似之处。与其他病毒性出血热一样,其复制的主要靶细胞是单核细胞、巨噬细胞谱系细胞。

[0051] 基于编码主要衣壳蛋白p72的B646L基因C端区域的序列变异,已鉴定出22种ASFV基因型(I-XXII)。所有ASFV P72基因型都在东部和南部非洲流行。基因型I已在欧洲、南美、加勒比和西非流行。基因型VIII被限制在四个东非国家。

[0052] 以下给出来自一些基因型的毒株的实例。

[0053] 基因型I:OURT88/3;巴西/79;里斯本/60;BA715;Pret;贝宁97/1;IC/1/96;IC/576;CAM/82;马德里/62;马耳他/78;ZAR85;Katange63;多哥;达喀尔59;Ourt88/1;BEN/1/

97;Dom_Rep;VAL/76;IC/2/96;Awoshie/99;NIG/1/99;NIG/1/98;ANG/70;BEL/85;SPEC120;里斯本/57;ASFV-Warm;GHA/1/00;GAM/1/00;加纳;HOL/86;NAM/1/80;NUR/90/1;CAM/4/85;ASFV-Teng;Tegani;ASFV-E75。

[0054] 基因型II:格鲁吉亚2007/1;POL/2015/波德拉谢(波兰毒株);比利时/Etalle/wb/2018;ASFV/基辅/2016/131;中国/2018/安徽XCGQ

[0055] 基因型III:BOT 1/99

[0056] 基因型IV:ASFV-War;RSA/1/99/W

[0057] 基因型VI:MOZ 94/1

[0058] 基因型VII:VICT/90/1;ASFV-Mku;RSA/1/98

[0059] 基因型VIII:NDA/1/90;KAL88/1;ZAM/2/84;JON89/13;KAV89/1;DEZda;AFSV-Ma1;马拉维LIL 20/1

[0060] 基因型IX:UGA/1/95

[0061] 基因型X:BUR/1/84;BUR/2/84;BUR/90/1;UGA/3/95;TAN/Kwh12;HindeII;ASFV-Ken;强毒乌干达65。

[0062] ASFV分离株

[0063] 本发明的减毒ASF病毒可以衍生自野生型ASF病毒分离株,但包括其基因组中的突变使得以下基因的表达和/或活性被破坏:MGF 360基因12L、13L和14L和MGF 505基因1R。

[0064] 本发明的减毒ASF病毒可以衍生自野生型ASF病毒分离株,但缺少K145R基因或B125R基因的功能形式。

[0065] 术语“野生型”表示该病毒(在某个时间点)存在于野外,并且是从自然宿主如家猪、蜚或疣猪中分离出来的。下表1总结了迄今为止描述的ASFV分离株及其基因库登录号。

[0066] 表1

[0067]

分离株	国家	宿主	年份	毒性	GenBank 登录号
格鲁吉亚 2007/1	格鲁吉亚	猪	2007	高	FR682468
BA71qqV	西班牙	猪	1971	组织培养 适应	U18466
贝宁 97/1	西班牙	猪	1997	高	AM712239
OURT88/3	葡萄牙	蜱	1988	低	AM712240
肯尼亚	肯尼亚	猪	1950	高	AY261360
马拉维 Lil20/1	马拉维	蜱	1983	高	AY261361
Mkuzi	祖鲁兰	蜱	1978	未知	AY261362
Pretorisuskop/96/4	南非	蜱	1996	高	AY261363
Tangani 62	马拉维	猪	1962	高	AY261364
Warmbaths	南非	蜱	1987	未知	AY261365
Warthog	纳米比亚	疣猪	1980	未知	AY261366
Pol16_20186_07	波兰	猪	2018	高	MG939583
猪/HLJ/2018	中国	猪	2018	强毒	MK333180
DB/LN/2018	中国	干血猪饲料	2018	未知	MK333181
比利时 2018/1	比利时	山猪	2018	强毒	LR536725
中国/2018/安徽 XCGQ	中国	猪	2018	强毒	MK128995
Ken05/TK1, Ken06 Bus	肯尼亚		2005/06	未知	NC_044945 KM111295
R35, R25, R7, R8, N10	乌干达		2018	未知	MH025920, MH025918,

[0068]						MH025917, MH025916, MH025919
	Pol_17_03029_C201	波兰	猪	2017	未知	MG939587
	26544/OG10	撒丁/意大利	猪	2017	未知	KM102979
	47/Ss?2008	撒丁/意大利	猪	2008	未知	KX354450
	比利时/Etalle/wb/2018	比利时	山猪	2018	强毒	MK543947
	ASFV/基辅/2016/131	乌克兰	猪	2016	未知	MN194591
	ASFV-SY18	中国	猪	2018	未知	MH766894
	ASFV_HU_2018	匈牙利	山猪	2019	未知	MN715134
	ASFV-wbBS01	中国	山猪	2019	未知	MK645909
	ASFV 格鲁吉亚 2007/1 (新型)	格鲁吉亚	猪	2007	强毒	LR743116
	ASFV/猪/中国 /CAS19-01/2019	中国	猪	2019	未知	MN172368
	ASFV/LT14/1490	拉脱维亚	山猪	2019	未知	MK628478
	奥金佐沃_02/14	俄罗斯	猪	2014		NC_044948
	ASFV 捷克共和国 2017/1	捷克共和国	山猪	2017	未知	LR722600
	ASFV 摩尔多瓦 2017/1	摩尔多瓦	猪	2019	未知	LR722599
	RSA_2_2008	南非	猪	2008	未知	MN336500
	LIV_5_40	赞比亚	蜚		未知	MN318203
	ASFV/POL/2015/波德 拉谢	波兰	山猪	2015	强毒	MH681419

[0069] 本发明的减毒ASFV的基因组可以对应于任何ASFV基因型。本发明的减毒ASFV的基因组可以基本上对应于任何ASFV基因型。

[0070] 术语“对应于”是指本发明的减毒ASFV基因组的其余部分与野生型毒株相同。“基因组的其余部分”是指除本发明所涉及的以下基因之外的所有基因：MGF 360 10L、11L、12L、13L和14L以及MGF 505 1R、2R和3R以及B125R和K145R。本发明涉及的基因也可以对应于野生型毒株。在实施方案中，MGF 360 10L、11L、12L、13L和14L以及MGF 505 1R、2R和3R以及B125R和K145R对应于野生型毒株。在MGF 360 12L、13L和14L以及MGF 505 1R对应于野生型毒株的情况下，它们的表达和活性可以被基因间区域如启动子中的突变破坏。在实施方案中，MGF 360 12L、13L和14L以及MGF 505 2R和3R以及B125R和K145R对应于野生型毒株。换言之，本发明的减毒ASFV的基因可以与野生型毒株的基因相同。在实施方案中，本发明的减毒ASFV的基因除MGF 360 12L、13L和14L以及MGF 505 1R之外，与野生型毒株的基因相同。在实施方案中，本发明的减毒ASFV的基因除MGF 360 12L、13L和14L以及MGF 505 1R以及B125R和/或K145R之外，与野生型毒株的基因相同。

[0071] 除了基因组的其余部分可以包含一个或多个突变之外，术语“基本上对应于”的意思与“对应于”相同。一个或多个突变可以在其他基因中（即不在本发明涉及的基因中）。

[0072] 减毒ASFV的基因组可以对应于或基本上对应于基因型I。减毒ASFV的基因组可以对应于或基本上对应于基因型II。减毒ASFV的基因组可以对应于或基本上对应于基因型III。减毒ASFV的基因组可以对应于或基本上对应于基因型IV。减毒ASFV的基因组可以对应于或基本上对应于基因型V。减毒ASFV的基因组可以对应于或基本上对应于基因型VI。减毒

ASFV的基因组可以对应于或基本上对应于基因型VII。减毒ASFV的基因组可以对应于或基本上对应于基因型VIII。减毒ASFV的基因组可以对应于或基本上对应于基因型IX。减毒ASFV的基因组可以对应于或基本上对应于基因型X。

[0073] 本发明的减毒ASFV的基因组可以对应于或基本上对应于强毒ASFV毒株的基因组。已知的强毒ASF病毒株包括：格鲁吉亚2007/1、贝宁97/1、肯尼亚、马拉维Li120/1、Pretorisuskop/96/4和Tengani 62。减毒ASFV的基因组可以对应于或基本上对应于格鲁吉亚2007/1毒株的基因组。减毒ASFV的基因组可以对应于或基本上对应于贝宁97/1毒株的基因组。

[0074] 本发明的减毒ASFV的基因组可以对应于或基本上对应于毒力目前未知的ASFV毒株的基因组，例如：Mkuzi、Warmbaths和Warthog。

[0075] 在实施方案中，本发明的减毒ASFV的基因组不对应于OURL88/3的基因组。在实施方案中，本发明的减毒ASFV不是OURL88/3。

[0076] 多基因家族 (MGF)

[0077] ASFV含有存在于基因组的左右可变区的五个多基因家族。MGF以每个基因中存在的平均密码子数命名：MGF 100、110、300、360和505/530。MGF 300、360和505/530成员的N端区域彼此具有显著的相似性。已经表明MGF 360和505家族编码涉及促进感染细胞存活和抑制I型干扰素反应的宿主范围功能所必需的基因。

[0078] 根据本发明的减毒ASFV破坏了以下基因的表达和/或活性：

[0079] 多基因家族 (MGF) 360 12L、13L和14L，以及

[0080] MGF 505 1R，

[0081] 并且包含以下基因的功能形式：

[0082] (i) MGF 360 10L和/或11L，以及

[0083] (ii) MGF 505 2R和/或3R。

[0084] 换言之，根据本发明的减毒ASFV缺乏以下基因的功能形式：

[0085] MGF 360 12L、13L和14L，以及

[0086] MGF 505 1R，

[0087] 并且包含以下基因的功能形式：

[0088] (i) MGF 360 10L和/或11L，以及

[0089] (ii) MGF 505 2R和/或3R。

[0090] 这些基因在多种ASFV毒株基因组中的位置提供于下表2。还提供了每个基因与相应的贝宁97/1基因的序列同一性。

[0091] 表2a-MGF 360-10L

	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	20677	19607	100
	格鲁吉亚 2007/1	26438	25368	93
	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	30628	29563	82
[0092]	马拉维-Lil/20	24802	23763	91
	Mkuzi 1979	28139	27069	99
	Pretorisuskop/96/4	27186	26116	96
	Tengani 62	21600	20530	92
	Warmbaths	26361	25322	94
	Warthog	23130	22091	95
	E75	19981	18911	100
[0093]	表2b-MGF 360-11L			
	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	21764	20703	100
	格鲁吉亚 2007/1	27526	26465	97
[0094]	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	31716	30655	84
	马拉维-Lil/20	25892	24831	86
	Mkuzi 1979	29225	28164	99
	Pretorisuskop/96/4	28275	27214	97
[0095]	Tengani 62	22688	21627	97
	Warmbaths	27449	26388	97
	Warthog	24218	23157	97
	E75	21068	20007	100
[0096]	表2c-MGF 360-12L			
	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	24668	23616	100
	格鲁吉亚 2007/1	30434	29382	96
	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	34566	33549	90
[0097]	马拉维-Lil/20	28731	27682	92
	Mkuzi 1979	32125	31073	97
	Pretorisuskop/96/4	31150	30098	95
	Tengani 62	25592	24540	96
	Warmbaths	30346	29294	96
	Warthog	27088	26036	96
	E75	23971	22920	99
[0098]	表2d-MGF 360-13L			

	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	25901	24840	100
	格鲁吉亚 2007/1	31656	30595	97
	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	35812	34757	90
[0099]	马拉维-Lil/20	29980	28925	91
	Mkuzi 1979	33347	32286	99
	Pretorisuskop/96/4	32368	31307	95
	Tengani 62	26814	25753	95
	Warmbaths	31559	30498	95
	Warthog	28338	27277	95
	E75	25204	24143	99
[0100]	表2e-MGF 360-14L			
	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	27146	26073	100
[0101]	格鲁吉亚 2007/1	32913	31840	99
	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	37194	36121	92
	马拉维-Lil/20	31266	30193	92
	Mkuzi 1979	34620	33547	99
[0102]	Pretorisuskop/96/4	33598	32525	97
	Tengani 62	28056	26983	97
	Warmbaths	32820	31747	96
	Warthog	29568	28495	97
	E75	26449	25376	100
[0103]	表2f-MGF 505-1R			
	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	21971	23566	100
	格鲁吉亚 2007/1	27734	29329	95
	BA71V	Deleted		
	OURT88/3	Deleted		
	肯尼亚 1950	31904	33496	91
[0104]	马拉维-Lil/20	26041	27627	93
	Mkuzi 1979	29425	31020	96
	Pretorisuskop/96/4	28449	30044	94
	Tengani 62	22891	24486	95
	Warmbaths	27651	29246	95
	Warthog	24387	25982	95
	E75	21275	22870	100
[0105]	表2g-MGF 505-2R			

	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
	贝宁 97/1	27352	28932	100
	格鲁吉亚 2007/1	33119	34699	99
	BA71V	17725	19304	99
	OURT88/3	29532	29981	76
	肯尼亚 1950	37419	38985	90
[0106]	马拉维-Lil/20	31541	33121	93
	Mkuzi 1979	34826	36406	99
	Pretorisuskop/96/4	33795	35374	97
	Tengani 62	28261	29830	98
	Warmbaths	33029	34597	96
	Warthog	29773	31352	97
	E75	26655	28236	99

[0107] 表2h-MGF 505-3R

	毒株	起始核苷酸号	终止核苷酸号	核苷酸同一性%
[0108]	贝宁 97/1	29019	29861	100
	格鲁吉亚 2007/1	34786	35625	96
	BA71V	20398	21915	100
	OURT88/3	20850	22367	100
	肯尼亚 1950	40295	41815	89
	马拉维-Lil/20	34322	35842	89
[0109]	Mkuzi 1979	37500	39017	99
	Pretorisuskop/96/4	36480	37985	89
	Tengani 62	30926	32443	90
	Warmbaths	35712	37232	93
	Warthog	32449	33954	90
	E75	29330	30847	100

[0110] 下面给出了来自不同毒株的MGF基因的基因(即核苷酸)序列。

[0111] MGF 360 10L基因序列

[0112] SEQ ID No.11-贝宁97/1MGF 360 10L (NC_044956.1:19607-20677)

[0113] TTATAACGATGTATCATTGATGTCATAATTCAAATAGGCCAACATACTTTTGGATTTATAGTTTTTTAA
TAGACGATATATTTTGTAGGATCTGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATGTCTAATGATA
AACGATGAGATATCAAATAGTAATTCTGTTGCTCTGCCAAGGCTTTTGCCTCTTCAAAGGCATCGGCCCCAGATCT
ATACAAAAGAACAGGTTATCCATATTATAGAATCGTATGGAGGCAATCATGGCCAAATTAATATTAGCTCCTAAGAT
AAAACAATAATATATAGTTAAAAAATTGTTATCTTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATACGGA
TTTTTCTTTTTTCGTACAAATTATGTAGGTCAAACAGCTTATTATAGCAAAGAGCACATGTTAACCACCACGTATTC
AGATACTTAAAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACGATAAAACAGTATAT
AGTTAACATATCACCATCCGAAATATTACTTAATACGTTGGTATCTTCTGCTAAATTTTTTAGCTTCCAATGTATAC
ACGACTTTATTTCCCTTATAATGACATAGGCTGAAAAGGGATTGTCATTAAAAAATTTAAGACATAAGATAATATTA
TTACTAGTAGTGTTAGGATGTATTAATTTAAAGAATATGTGCATAATCTTCTTTTTATCCACTTGGTACTTGGCTCC
TAATTCCCAGCAAAATTCTCGAATAGGTGGCGTATTCGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCAATCCG
TAAACATTTTTTATTAATTGATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCA
AAGTTTGGCAGCTTTATCAGCATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGCCCGCAGCGTTC

TAAGATAACATGGTAATCAATAGATACATGCTGACTGGCTAATACCTTTTTGGCGAAGGATTGCAAGGAAGGAACCA
T

[0114] SEQ ID No.12-中国/2018/安徽XCGQ MGF 360 10L (MK128995.1:25402-26439)

[0115] CTAGGCCAACATACTTTTAAATTTATAGTTTTTTAATAGATGATATATTTTGCTAGGATCTGCTTCTTT
TAACGTTAATAGCGAGGAGTCTGCACTATAAATGTCTAATGATAAATGATGAGATATCAAATAGTAATTCCGTTGCT
CTGCTAGGGCCTTTGCCTCTTCAAAGGCGTCGGCTCCCAGATCTATACAAAAGAACAAGTTATCCATATTATAAAAT
CGTACGCAGGCAAGCATAGCTGAATTAATATTAGCTCCTAAGAGAAAACAATAATATATGGTTAAAAAATTGTTATC
TTTTGTGCAGGCCATCCGCATCATTTTCATCCACGTCCATGCGGATCTTTTCCTTTTCATACAAATTATGTAGGTCAA
ACAGCTTATTA AAAACAAAGAGCACAGATTAACCACCACGTATTTAGATACTTAAAATGTTGGTAAACATAAGAAATG
GCCTCCCTAAGATTATCCTGCAATGCCACTATAAAACAGTATATCGTTAACATATCACCATCCGACATATTACTTAA
TATGTCGGTGTCTTCTACTAACCTTTTCAACTTCCAATATATGGATGACCTTATTTCCCTTATAATGACATAGGCTG
GAAAGGGATTATCATTA AAAAGTTTAAGACATAAGATAATATTACTGCTAGTAGTGCCAGGGTGTATTAATTTAAAG
AACATGTGCATAATCTTCTTTTATCCACGCGGTA CTGGCTCCTAATTCCCAGCAA AATTCTCGAACAGGCGGCGT
ATTGGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCATTCTGTAAACAGTTTTATTA ACTGATAGTTGTTTTCTT
TTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCGTCTGCAAAGCTTGGCAGCTTTATCAGCATATGTTTGCAA
TCAAGGGAAATTGGGGCCTTATACCACCATAGTCCGCAGCGTTCTAAGATAACATGGTACTCAATAGATACTTGCTG
TCTGGCTAGTACCTTTTTTGGCGAAGGATTGTAAGGAAGGAAACAT

[0116] SEQ ID No.13-格鲁吉亚2007/1MGF 360 10L (LR743116.1:26373-27410)

[0117] CTAGGCCAACATACTTTTAAATTTATAGTTTTTTAATAGATGATATATTTTGTTAGGATCTGCTTCTTT
TAACGTTAATAGCGAGGAGTCTGCACTATAAATGTCTAATGATAAATGATGAGATATCAAATAGTAATTCCGTTGCT
CTGCTAGGGCCTTTGCCTCTTCAAAGGCGTCGGCTCCCAGATCTATACAAAAGAACAAGTTATCCATATTATAAAAT
CGTACGCAGGCAAGCATAGCTGAATTAATATTAGCTCCTAAGAGAAAACAATAATATATGGTTAAAAAATTGTTATC
TTTTGTGCAGGCCATCCGCATCATTTTCATCCACGTCCATGCGGATCTTTTCCTTTTCATACAAATTATGTAGGTCAA
ACAGCTTATTA AAAACAAAGAGCACAGATTAACCACCACGTATTTAGATACTTAAAATGTTGGTAAACATAAGAAATG
GCCTCCCTAAGATTATCCTGCAATGCCACTATAAAACAGTATATCGTTAACATATCACCATCCGACATATTACTTAA
TATGTCGGTGTCTTCTACTAACCTTTTCAACTTCCAATATATGGATGACCTTATTTCCCTTATAATGACATAGGCTG
GAAAGGGATTATCATTA AAAAGTTTAAGACATAAGATAATATTACTGCTAGTAGTGCCAGGGTGTATTAATTTAAAG
AACATGTGCATAATCTTCTTTTATCCACGCGGTA CTGGCTCCTAATTCCCAGCAA AATTCTCGAACAGGCGGCGT
ATTGGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCATTCTGTAAACAGTTTTATTA ACTGATAGTTGTTTTCTT
TTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCGTCTGCAAAGCTTGGCAGCTTTATCAGCATATGTTTGCAA
TCAAGGGAAATTGGGGCCTTATACCACCATAGTCCGCAGCGTTCTAAGATAACATGGTACTCAATAGATACTTGCTG
TCTGGCTAGTACCTTTTTTGGCGAAGGATTGTAAGGAAGGAAACAT

[0118] SEQ ID No.14-Ken05/Tk1 MGF 360 10L (NC_044945.1:27310-28380)

[0119] TTACGACGTTGTATCATTATTGTGATAATCCAAATAGGCCGACATACTTTTTGATTTATAATTGTTTAA
TAGATGGTATATTTTTTTAGGGTTGCTTCTTTAGCGTGAATAGAGAGGGATCTGGATGATAGATATCTAATGACA
AACGATGTGATATTAAATAATAGTCCCCTGCTCTGCTAGGGCTTTTGCCTCTTCAAGGCATTGGCCCCCAAGTCT
ATACAAAAGAACAGATTATCTATATTA AAAA ACTGTATGGCAGCAAGCATCGCCATATTGATATCGGCCCTAAAAT
AAAACAATAATACATCGTTAAAAAGTTGTTATCTTTCGTGCAAGCTATGCGCATCATTTTCATTAATGTCTATGCGAA
TTTTTTCCTGCTCATAGAGATAATGGAGGTCAAACAGTTTATTA AAAACACAGAGCACAGATTAACCACCACGTATTC

AGGTGCTTAAAATGTTGGTAAAAATACGAGACGGCCTCCCTAAGACCATTCTGCAAGGCCACCATAAAACAATATAA
AGTTAGCATATCGCCGTCCGAAACATCGCGTAGTAGGTCTTCGTCTTCTACTAACCTCCTCAGCCTCCAATAAAGAG
ACGACTTTATTTCCCTTATAATCACATAGGTAGGAAAAGGATTCTCATTAAAAAGCTTATGACATAAGATAATATAT
TGACTCGTTTTGTTCTCTATAAAATTTAAAAAACATATGCATCACCTTTTTTTTATCTAAGCGATAGTTCGCTCCTAA
TTCCCAACAAAACCTCTCGAGTAGGCTGTGTATTGGCACAAATGTATCCATAGTTGATGTTTGACCCCCACTCCGTGA
ACAGTTTTATTAATTGATAGTTGTTTTCTTTGCAGCTATCATCAATGCCGTATTGAGGTCCAGGCCATCCGCAAAG
TATGGCAACCTTATTAACATGTGTTTACAATCAAGTGAAATTGGAGCCTTATACCACCATAACCCGCAGCGCTTCAA
AATATGATAGTAGTCTTCAGGCAGCACATGCTGGCTGGCTAATATCTTTTTGGCGAAAGATTGCAGGAAGGAAACA
T

[0120] SEQ ID No.15-Ken06.Bus MGF 360 10L (NC_044946.1:23437-24507)

[0121] TTACGACGTTGTATCATTGATGTGATAATCCAAATAGGCCAACATACTTTTTGATTTATAGTTGTTTAA
TAGATGGTATATTTTTTTAGGGTTTCGCTTCTTTAGCGTGAATAGAGAGGGATCTGGATGATAGATATCTAATGACA
AACGTTGTGATATTAAATAATAGTCCCGCTGCTCTGCTAGGGCTTTTGCTCTTCGAAGGCATTGGCTCCCAAGTCT
ATACAAAAGAACAGATTATCTATATTAAAGAACTGTATGGCAGCAAGCATGGCCATATTGATATCGGCCCTAAAAT
AAAACAATAATACATCGTTAAAAAGTTATTATCTTTCGTGCAAGCTATGCGCATCATTTTATTAATGTCTATGCGAA
TCTTTTCCTGCTCATAGAGATAATGGAGGTCAGACAGTTTATTTAAATACAGAGCACAGATTAACCACCACGTATTC
ATGTGCTTAAAATGTTTCGTAAAAATACGAGACGGCCTCCCTAAGATCATTCTGCAAGGCCACCATAAAACAATATAT
AGTTAGCATATCGCCGTCCGAAACATCACGTAGTAGGTCTTCATCTTCTACTAACCTCCTCAGCCTCCAATAAAGAG
ACGACTTTATTTCCCTTATAATCACATAGGTAGGAAAAGGATTCTCATTAAAAAGCTTATGACATAAGATAATATAT
TGACTTGTTTTGTTCTCTATAAAATTTAAAGAACATGTGTATCACCTTTTTTTTATCCATGCGATAGTTCGCTCCTAA
TTCCCAACAAAACCTCTCGGGTAGGCTGTGTATTGGCACAAATGTATCCATAGTTGATGTTTGACCCCCACTCCGTGA
ATAGTTTTATTAATTGATAGTTGTTTTCTTTGCAGCTATCATCAATGCCGTATTGAGATCCAGGCCATCCGCAAAG
TATGGCAACCTTATTAACATGTGTTTGAATCAAGTGAAATTGGAGCCGTATACCACCATAACCCGCAGTATTTCAA
AATATGATAGTAGTCTTCAGGCAGCACATGCTGACTGGCTAATATCTTTTTGGCGAAAGACTGTAAAGAAGGAAACA
T

[0122] SEQ ID No.16-肯尼亚1950MGF 360 10L (AY261360.1:29558-30628)

[0123] TTACGACGTTGTATCATTAATGTGATAATCCAAATAGGCCGACATACTTTTTGATTTATAGTTGTTTAA
TAGATGGTATATTTTTTTAGGGTTTCGCTTCTTTAGCGTGAATAGAGAGGGATCTGGATGATAGATATCTAATGACA
AACGATGTGATATTAAATAATAGTCCCGCTGCTCTGCTAGGGCTTTTGCTCTTCGAAGGCATTGGCCCCCAAGTCT
ATACAAAAGAACAGATTATCCATATTAAAGAACTGTATGGCAGCAAGCATGGCCATATTGATATCGGCCCTAAAAT
AAAACAATAATACATCGTTAAAAAGTTGTTATCTTTCGTGCAAGCTATGCGCATCATTTTATTAATGTCTATGCGAA
TTTTTTCCTGCTCATAGAGATAATGGAGGTCAAACAGTTTATTTAAACACAGAGCACAGATTAACCACCACGTATTC
AGGTGCTTAAAATGTTGGTAAAAATACGAGACGGCCTCCCTAAGATCATTCTGCAAGGCCACCATAAAACAATATAA
AGTTAGCATATCGTCGTCCGAAACATCGCGTAGTAGGTCTTCGTCTTCTACTAATCTCCTCAGCCTCCAATAAAGAG
ACGACTTTATTTCCCTTATAATCACATAGGTAGGAAAAGGATTCTCATTAAAAAGCTTATGACATAAGATAATATAC
TGACTCGTTTTGTTCTCTATAAAATTTAAAAAACATATGCATCACCTTTTTTTTATCTAAGCGATAGTTTGCTCCTAA
TTCCCAACAAAACCTCTCGAGTAGGCTGTGTATTGGCACAAATGTATCCATAGTTGATGTTTGACCCCCACTCCGTGA
ACAGTTTTATTAATTGATAGTTGTTTTCTTTGCAGCTATCATCAATGCCGTATTGAGGTCCAGGCCATCCGCAAAG
TATGGCAACCTTATTAACATGTGTTTACAATCAAGTGAAATTGGAGCCTTATACCACCATAACCCGCAGCGCTTCAA

AATATGATAGTAGTCTTCAGGCAGCACATGCTGGCTGGCTAATATCTTTTTGGCGAAAGATTGCAGGAAGGAAACA
T

[0124] SEQ ID No.17-L60 MGF 360 10L (NC_044941.1:19956-21026)

[0125] TTATAACGATGTATCATTGATGTCATAATTCAAATAGGCCAACATACTTTTTGATTTATAGTTTTTTAA
TAGACGATATATTTTGTAGGATCTGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATGTCTAATGATA
AACGATGAGATATCAAATAGTAATTCTGTTGCTCTGCCAAGGCTTTTGCCCTCTCAAAGGCATCGGCCCCCAGATCT
ATACAAAAGAACAGGTTATCCATATTATAGAATCGTATGGAGGCAATCATGGCCAAATTAATATTAGCTCCTAAGAT
AAAACAATAATATATAGTTAAAAAATTGTTATCTTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATACGGA
TTTTTTCTTTTTTCGTACAAATTATGTAGGTCAAACAGCTTATTATAGCAAAGAGCACATGTAAACCACCACGTATTC
AGATACTTAAAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACGATAAAACAGTATAT
AGTTAACATATCACCATCCGAAATATTACTTAATACGTTGGTATCTTCTGCTAAATTTTTTAGCTTCCAATGTATAC
ACGACTTTATTTCCCTTATAATGACATAGGCTGAAAAGGGATTGTCATTAATAAATTTAAGACATAAGATAATATTA
TTACTAGTAGTGTTAGGATGTATTAATTTAAAGAATATGTGCATAATCTTCTTTTTATCCACTTGGTACTTGGCTCC
TAATTCCCAGCAAAATTCTCGAATAGGTGGCGTATTCGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCAATCCG
TAAACATTTTTATTAATTGATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCA
AAGTTTGGCAGCTTTATCAGCATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGCCCGCAGCGTTC
TAAGATAACATGGTAATCAATAGATACATGCTGACTGGCTAATACCTTTTTGGCGAAGGATTGCAAGGAAGGAACCA
T

[0126] SEQ ID No.18-马拉维Li1-20/1 (1983) MGF 360 10L (AY261361.1:23735-24802)

[0127] TTACACTGTGTCATGCCCATCATAGTCAAAATATACCATCATATTTTTTGATTTATAGTTTTTTAATAG
ATGATATATTTTTTTAGGATCTGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATATCTATTGATAAAC
GATGATACATCAAAAAGTAATTCCGCTGGTCTGCCAGGGCTTTTGCCCTCTCAAAGGCATCGGCTCCCAGGTCTATA
CAAAAGAACAAGTTATCCATATTATAGAATTGTACGCAGGCAAGCATAGCCTGATTAATATTAGCTCCTAAGAGAAA
ACAGTAATATATGGTTAAAAAGTTGTTATCTTTAGTGCAGGCTATGCACATCATTTTCATCCATGTCCATGCGGATCT
TTTCCTTTTCATACAAATCATGTAGGTCAAACAGCTTATTTAAACAAAGAGCACAGATTAACCACCACGTATTCAGA
TGCTTAAATGTTGGTAAAAATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCAGGATAAAACAGTATATAGT
CAACATATCATCATCCGACATATTACTTAATATGTCAGTGTCTTCTACTAACCTTCTCAGCTTCCAATATATAGACG
ACTTTATTTCCCTTATAATGACATAGGTTGGAAAAGGATTATTATTTAAAGTTTAAGACATAAGATAATATTACTA
CTAGTAGTGCCATGATGTATTAATTTAAAAAACATATGCATAACCTTATTTTTATCCACTTGGTACTTGGCTCCTAA
TTCCCAGCAAAATTCTCGAACAGGCGGCGTATTAGCGCAAATTAATCCATAGTTGATGTCCGCGCCCCATTCCGTAA
ACAGTTTTATTAAGTATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCAAAG
CTTGGCAGCTTTATTAACATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGTCCGCAATGTTTTAA
GATATAATGATAATCAATGGATACATGATGTCTAGCTAATACCTTTTTGGCGAAGGATTGTAAAGAAGGAAACAT

[0128] SEQ ID No.19-Mkuzi 1979MGF 360 10L (AY261362.1:27069-28139)

[0129] TTATAACGATGTATCATTGATGTCATAATTCAAATAGGCCAACATACTTTTTGATTTATAGTTTTTTAA
TAGACGATATATTTTGTAGGATCTGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATGTCTAATGATA
AACGATGAGATATCAAATAGTAATTCTGTTGCTCTGCCAAGGCTTTTGCCCTCTCAAAGGCATCGGCCCCCAGATCT
ATACAAAAGAACAGGTTATCCATATTATAGAATCGTATGGAGGCAATCATGGCCAAATTAATATTAGCTCCTAAGAT
AAAACAATAATATATAGTTAAAAAATTGTTATCTTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATACGGA

TTTTTCTTTTCGTACAAATTATGTAGGTCAAACAGCTTATTATAGCAAAGAGCACATGTTAACCACCACGTATTC
AAATACTTAAAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACGATAAAACAGTATAT
AGTTAACATATCACCATCCGAAATATTACTTAATACGTTGGTATCTTCTGCTAAATTTTTTAGCTTCCAATGTATAC
ACGACTTTATTTCCCTTATAATGACATAGGCTGAAAAGGGATTGTCATTAAAAAATTTAAGACATAAGATAATATTA
CTACTAGTAGTGCTAGGATGTATTAATTTAAAGAATATGTGCATAATCTTCTTTTTATCCACTTGGTGCTTGGCTCC
TAATTTCCAGCAAAATTCTCGAATAGGTGGCGTATTTCGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCAATCCG
TAAACATTTTTATTAATTGATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCA
AAGTTTGGCAGCTTTATCAGCATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGCCCGCAGCGTTC
TAAGATAACATGGTGATCAATAGATACATGCTGACTGGCTAATACCTTTTTGGCGAAGGATTGCAAGGAAGGAAACA
T

[0130] SEQ ID No.20-Pretorisuskop/96/4MGF 360 10L (AY261363.1:26116-27186)

[0131] TTATAACGTTGTATTATTGACGTCATAATTCAAATAGGCCAATATACTTTTTGATTTATAGTTTTTTAA
TAGATGATATATTTTTGTTAGGATCCGCTTCTTTAACGTTAATAACGAGGAATCTGGACTATAAATGTCTAATGATA
AACAAATGAGATATCAAAAAGTAATTCCGTTGCTCTGCCAGGGCTTTTGCCCTCTCAAAGGCATCGGCCCCAGGTCT
ATACAAAAGAATAAGTTATCTATGTTATAGAATTGTATGGAGGCAATCATAGCTAAATTAATATTAGCTCCTAAGAT
AAAACAATAATATATGGTTAAAAAATTGTTATCTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATGCGGA
TCTTTTCCTTTTCATACAAATGATGTAGGTCAAACACCTTATTATAGCAAAGAACACATGTTAACCACCACGTATTC
AGATACTTAAAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACGATAAAACAGTATAT
AGTTAACATATCTCCATCCGAAATATTACTTAATACGTTGGTATCTTCTGCTAACTTTTTTAGCTTCCAATGTATAC
ACGACTTTATTTCCCTTATAATGACATAGGCTGAAAAGGGATTGTCATTAAAAAGTTTAAGACATAAGATAATATTA
CTACTAGTAGTGCTAGGATGTATTAATTTAAAGAATATGTGCATAATCTTCTTTTTATCCACTTGGTACTTGGCTCC
TAATTTCCAGCAAAATTCTCGAACAGGTGGCGTATTTCGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCAATCCG
TAAACATTTTTATTAATTGATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCA
AAGTTTGGCAGCTTTATCAGCATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGCCCGCAGCGTTC
TAAGATAATATGGTGATCAATGGATACATGCTGTCTGGCTAGTACCTTTTTGGCGAAGGATTGTAAGGAAGGAAACA
T

[0132] SEQ ID No.21-Tengani 62 MGF 360 10L (AY261364.1:20530-21600)

[0133] TTATAACAATGTATCATTGATATCATCATTCAAATAGGCCAACATATTTTTTGATTTATAGTTTTTTAA
TAGATGATTTATTTTTGTTAGGATCTGTTTCTTTAACGTTAATAGCAAGGAGTCTGGCTTATAAATGTCTAATGATA
AACGATGAGATATTAAATAGTAATTCCGTTGCTCTGCCAGGGCTTTTGCCCTCTCAAAGGCGTCGGCTCCAGATCT
ATACAAAAGAACAAGTTATCCATATTATAAAATCGTACGCAGGCAAGCATAGCTGAATTAATATTAGCTCCTAAGAG
AAAACAATAATATATAGTTAAAAAATTGTTATCTTTGTGCAGGCCATCCGCATCATTTTCATCCACGTCCATGCGGA
TCTTTTCCTTTTCATACAAATTATGTAGGTCAAACAGCTTATTAACAAAGAGCACAGATTAACCACCACGTATTT
AGATACTTAAAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACTATAAAACAGTATAT
CATTAAACATATCACCATCCGACATATTACTTAATATGTCGGTGTCTTCTACTAACCTTTTCAGCTTCCAATATATGG
ATATCCTTATTTCCCTTATAATGACATAGGCTGAAAAGGGATTATCATTAAAAAGTTTAAGACATAAGATAATATTA
CTGCTAGTAGTGCCAGGATGTATTAATTTAAAGAACATGTGTATAATCTTCTTTTTATCCACGCGGTGCTTGGCTCC
TAATTTCCAGCAAAATTCTCGAACAGACGGCGTATTGGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCATTCCG
TAAACAGTTTTATTAAGTATAGTTATTTTCCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCGTCTGCA

AAGCTTGGCAGCTTTATCAGCATATGTTTGCAGTCAAGTGAAATTGGAGCCTTATACCACCATAGTCCGCAACGTTC
TAAGATAACATGGTACTCAATAGATACTTGCTGTCTGGCTAGTACCTTTTTGGCGAAGGATTGTAAGGAAGGAAACA
T

[0134] SEQ ID No.22-Warmbaths MGF 360 10L (AY261365.1:25300-26361)

[0135] TCATATTGTATCATCATGGTTAAAAATATGCCGTCATATTTTTGATTTATAGTTTTTTAATAGATGATA
TATTTTGTAGGGTCCGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATGTCTAATGATAAACGATGAG
ATATCAAAAAGTAATTCCGTTGCTCTGCCAGAGCCTTTGCCTCTTCAAAGGCGTCGGCCCCCAGGTCTATACAAAAG
AACAGGTTATCCATATTATAGAATCGTATGGAGGCAATCATGGCCAAATTAATATTAGCTCCTAAGATAAAACAATA
ATATATAGTTAAAAAATTGTTATCTTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATGCGGATTTTTTCCT
TTTCGTACAAATTATGTAGGTCAAACAGCTTATTAACAAAGAGCACAGATTAGCCACCACATATTCAGATACTTA
AAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACCATAAAACAGTATATCGTTAACAT
ATCACCATCTGAAATATCACTTAATACGTCGGTGTCTTCTACTAACTTTCTCAGCTTCCAATATATGGATGACTTTA
TTTCCCTTATAATGACATAGGCTGAAAAGGGTTATCATTAAAAAGTTTAAGACATAAGATAATATTACTGCTAGTA
GTGCCAGGATGTATTAATTTAAAGAACATGTGCATAATCTTCTTTTTATCCACGCGGTACTTGGCTCCTAGTTCCCA
GCACAATTCTCGAACAGGCGGTGATTGGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCATTCCGTAAACAGTT
TTATTAAGTATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCAAAGCTTGGC
AGCTTTATCAGCATATGTTTGCAATCAAGTGAAATTGGAGCCTTATACCACCATAGTCCGCAGCGTTCTAAGATAAC
ATGGTAATCAATAGATACATGCTGTCTGGCTAGTACCTTTTTGGCGAAGGATTGTAAGGAAGGAAACAT

[0136] SEQ ID No.23-Warhog MGF 360 10L (AY261366.1:22069-23130)

[0137] TCATATTGTATCATCATGGTTAAAAATATGCCGTCATATTTTTGATTTATAGTTTTTTAATAGATGATA
TATTTTGTAGGGTCCGCTTCTTTTAACGTTAATAGCGAGGAGTCTGGACTATAAATGTCTAATGATAAACGATGAG
ATATCAAAAAGTAATTCCGTTGCTCTGCCAGGGCTTTTGCCTCTTCAAAGGCATCGGCCCCCAAGTCTATACAAAAG
AACAGGTTATCCATATTATAAAATCGTATGGAGGCAATCATGGCCAAATTAATATTAGCTCCTAAGATAAAACAATA
ATATATAGTTAAAAAATTGTTATCTTTTGTGCAGGCTATCCGCATCATTTTCATCCATGTCCATGCGGATTTTTTCCT
TTTCGTACAAATTATGTAGGTCAAACAGCTTATTAACAAAGAGCACAGATTAGCCACCACGTATTCAGATATTTA
AAATGTTGGTAAACATAAGAAATGGCCTCCCTAAGATTATCCTGCAATGCCACCATAAAACAGTATATCGTTAACAT
ATCACCATCCGAAATATTACTTAATACGTCGGTGTCTTCTACTAACTTTTTCAGCTTCCAATATATGGATGACTTTA
TTTCCCTTATAATGACATAGGCTGAAAAGGGTTATCATTAAAAAGTTTAAGACATAAGATAATATTACTGCTAGTA
GTGCCAGGATGTATTAATTTAAAGAACATGTGCATAATCTTCTTTTTATCCACGCGGTACTTGGCTCCTAGTTCCCA
GCACAATTCTCGAACAGGCGGTGATTGGCGCAAATTAACCCATAGTTGATGTCTGCGCCCCATTCCGTAAACAGTT
TTATTAAGTATAGTTGTTTTCTTTGTAGCCAACATTAGTGCCGTATTAAGGTCCAAGCCATCTGCAAAGCTTGGC
AGCTTTATCAGCATATGTTTGCAATCAAGGAAATTTGGAGCCTTATACCACCATAGTCCGCAGCGTTCTAAGATAAC
ATGGTAATCAATAGATACATGCTGTCTGGCTAGTACCTTTTTGGCGAAGGATTGTAAGGAAGGAAACAT

[0138] 在实施方案中,本发明的减毒ASFV包含MGF 360 10L的功能形式。适当地,MGF 360 10L的功能形式包含SEQ ID No.11、12、13、14、15、16、17、18、19、20、21、22或23的序列。适当地,MGF 360 10L的功能形式包含与SEQ ID No.11、12、13、14、15、16、17、18、19、20、21、22或23具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地,MGF 360 10L的功能形式由SEQ ID No.11、12、13、14、15、16、17、18、19、20、21、22或23的序列组成。

[0139] MGF 360 11L基因序列

[0140] SEQ ID No.24-贝宁97/1MGF 360 11L (NC_044956.1:20703-21764)

[0141] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGTAATTTAT
TTTTTCAGGGTCCATAACGTTTCGACAACAGAGAAATGACTGGATTGTAATGCTTTAATGATAAGGCATGGGCTATCA
GATAATTTTCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGGCGTTGGCGCCCAGGTCTATACAAAAGAACAGG
TTTCCAAGATTATAGTTTTGTATGGAAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCCGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATTTCATCGATATCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGCAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCGATGTAGGCGCGGGTATTTTC
TGGTAAAAGTAGCGAATAGCATCTTTGAGGTCATAGTCCACCGCTATAGCATACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCTAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAAACACCTCGTGGCAAAGATAATATTGCTACTGGTTTTTA
TCGCGCGTTCGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAGCAGGTTGACCTT
ATAAATAGTTTATTACGTGAATATGAAGCATAATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGACACGCACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0142] SEQ ID No.25-中国/2018/安徽XCGQ MGF 360 11L (MK128995.1:26467-27528)

[0143] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGCAATTTAT
TTTTTCAGGGTCCGTAACGATCGACAACAGAGAAATAACCGGATTGTAATGCTTTAATGATAAGGCATGGGCTATCA
GATAATTTTCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGGCATCGGCACCCAGGTCTATACAAAAGAACAGG
TTTCCAAGATTATAGTTTTGTATGGAAACAAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCCGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATTTCATCAATATCCATGCGGACCCTTTCTATTTTCGT
ACAGCTCGTGAAGGTGCAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGACGCGGGTATTTTC
TGGTAAAAGTAGCGGATAGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAAACACCTCGTGGCAAAGATAATATTGCTACTGGTTTTTA
TCGCGCGTTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAACAGGTTGACCTT
ATAAATAATTTATTGCGTGAATATGAAGCATAATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGACATG
ATATTGATCTACCGGTATACACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0144] SEQ ID No.26-格鲁吉亚2007/1MGF 360 11L (NC_044959.1:26465-27526)

[0145] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGCAATTTAT
TTTTTCAGGGTCCGTAACGATCGACAACAGAGAAATAACCGGATTGTAATGCTTTAATGATAAGGCATGGGCTATCA
GATAATTTTCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGGCATCGGCACCCAGGTCTATACAAAAGAACAGG
TTTCCAAGATTATAGTTTTGTATGGAAACAAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCCGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATTTCATCAATATCCATGCGGACCCTTTCTATTTTCGT
ACAGCTCGTGAAGGTGCAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGACGCGGGTATTTTC
TGGTAAAAGTAGCGGATAGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCCTCAGAT

CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAACACCTCGTGGCAAAGATAATATTGCTACTGGTTTTA
TCGCGCGTTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAACAGGTTGACCTT
ATAATAATTTATTGCGTCGAATATGAAGCATAATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGACATG
ATATTGATCTACCGGTATACACTGCCCAGGAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0146] SEQ ID No.27-L60 MGF 360 11L (NC_044941.1:21052-22113)

[0147] TTATCTTTGTTTATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGTAATTTAT
TTTTTCAGGGTCCATAACGTTTCGACAACAGAGAAATGACTGGATTGTAATGCTTTAATGATAAGGCATGGGCTATCA
GATAATTTTCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGGCGTTGGCGCCCAGGTCTATACAAAAGAACAGG
TTTCCAAGATTATAGTTTTGTATGGAAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCCGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATTTTCATCGATATCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGCAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCGATGTAGGCGCGGGTATTTTC
TGGTAAAAGTAGCGAATAGCATCTTTGAGGTCATAGTCCACCGCTATAGCATACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCTAGCATGAAGGTTATCTCCATGAGCCCTCTTAACTCCCACATGATTTCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAACACCTCGTGGCAAAGATAATATTGCTACTGGTTTTA
TCGCGCGTCGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAGCAGGTTGACCTT
ATAAATAGTTTATTACGTGAATATGAAGCATAATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGACACGCACTGCCCAGGAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0148] SEQ ID No.28-Ken05/Tk1 MGF 360 11L (NC_044945.1:28407-29468)

[0149] TTATCTGCGTTCATAATCGAGAAAAACCACCATATTTCTTTGAGTGATAATTTTTTAACATAGAATTTAT
CTTTTCTGGGTCGGTCACGGCCGACAACAGGGAAATCACCGGGTTATAATGTTTTAATGATAAGGCATCGGCTATCA
AATAATTTTCTTTTGTATTGCTAGGGCTTTGCCTTCTTCAAAGGCGTTGGCACCCAGGTCTATACAAAAGAACATG
TTCCCGAGATTATAGTTTTGTATGGAAACAAACATGGCTTGATTGATGTTGGCCCCCATGATAAAACAGTAGTAAAT
AGCTGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATCTCATCGATATCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGCAACACATTGTTATAAAAAAAGGGCGCACATAAGCCGCCACCGATGTAGATGGGTATACTTC
TGATAAAAATAGTGGATGGCCTTTTTGAGGCCGTAGTCTACCGCTATGGCGTACCAGTATTTGGTTAACATATTGCT
GAAGGAGTTGTCATGGTCCAACATGTAGGTTATTTCCATGAGTCCCCTTAGCTCCCACATGATTTCTCCTCCTCAGAT
CCAAATCATCCACATGTTTCAGATTGGCGTTATTGGAAAACATTTTCGTGGCATAAGATAATATTACTGTTCGGTTTTG
TTGCGCGTCGTATCAAAGAAAATTTTTAAATATACTCTCTATCTAAACGGTCTTTGGCTCCAAGTTCTCTACATAG
ATTGCGGGTGTGCTCCGAATGAGCACAAACCAGTCCATAATTAATATCGGCACCCCACTCAACAAACAGCCTTATCA
AGTCATGATTGTTTTCTTCGCGGCTTTCATCAGTACGGTGTTCAATTCAATACCCTCGCTAAAACAGGTTGACTTT
ATAAACATTTTGTACGATACGTATAAAATGTAATAGGGCCATCATACCACCACAACCCGCAGCATTTTCAGGATATG
ATATTGATCTACCGGTATACACTGTTTGGCCAGCACTTTCTTGATAGGGATTGCAAGGAAGGCAACAT

[0150] SEQ ID No.29-Ken06.Bus MGF 360 11L (NC_044946.1:24534-25595)

[0151] TTATCTGCGTTCATAATCGAGAAAAACCACCATATTTCTTTGAGTGATAATTTTTTAACATAGAATTTAT
CTTTTCCGGGTCGGTCACGGCCGACAACAGGGAAATCACCGGGTTATAATGTTTTAATGATAAGGCATCGGCTATCA

AATAATTTTCCTTTTGTATTGCTAGGGCTTTGCCTTCTTCAAAGGCGTTGGCACCCAGGTCTATACAAAAGAACATG
TTCCCAGATTATAGTTTTGTATGGAACAAACATGGCTTGATTGATGTTGGCACCCATGATAAAACAGTAGTAAAT
AGTTGAATAGCTATAATCTTGGATGCAGGCTATGTGCATCATCTCATCGATATCCATGCGGATCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACATTGTTATAAAAAAGGGCGCACATGAGCCGCCACCGATGTAGATGGGTATACTTC
TGATAAAATAGTGGATGGCTTTTTGAGGCCGTAGTCTACCGCTATGGCGTACCAGTATTTGGTTAACATGTTGCT
GAAGGAGTTGTCATGGTCCAACATGTAGGTTATCTCCATGAGTCCCCTTAGCTCCCACATGATTTCCCTCCCTCAGGT
CCAAATCATCCACATGTTTCAGATTGGGGTTATTGGAACAACTTCGTGGCATAAGATAATATTACTGTGCGTTTTG
TTGCGCGTCGTATCAAAGAAAATTTTAAATATACTCTTTATCTAAACGGTCTTTGGCCCCCTAGTTCTCTGCATAG
ATCGCGGGTGTGCTCCGAATGAGCACAAACCAGTCCATAATTAATATCGGCACCCCACTCAGTAAATAATTTTATTA
GGTCATGATTGTTTTCTTCGCGGCTTTCATCAGTACGGTGTCAATTCAATACCCTCGCTAAAACAGGTTGACTTT
ATAACATTTTGTACGATACGTATAAAATGTAATAGGGCCATCATACCACCACAACCCGCAACTTTTCAGGATATG
ATATTGATCTACCGGTATACACTGTTTGGCCAGCACTTTTTTGGATAGGGATTGCAAGGAAGGCAACAT

[0152] SEQ ID No.30-肯尼亚1950MGF 360 11L (AY261360.1:30655-31716)

[0153] TTATCTGCGTTCATAATCGAGAAAAACCACCATATTCTTTGAGTGATAATTTTTTAACATAGAATTTAT
CTTTTCTGGGTGCGTCACGGCCGACAACAGGGAAATCACCGGGTTATAATGTTTTAATGATAAGGCATCGGCTATCA
AATAATTTTCCTTTTGTATTGCTAGGGTTTTGCCTTCTTCAAAGGCGTTGGCACCCAGGTCTATACAAAAGAACATG
TTCCCAGATTATAGTTTTGTATGGAACAAACATGGCTTGATTGATGTTGGCCCCCATGATAAAACAGTAGTAGAT
AGCTGAATAGCTATAATCTTGGATGCAGGCTATGTGCATCATCTCATCGATATCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACATTGTTATAAAAAAGGGCGCACATAAGCCGCCACCGATGTAGATGGGTATACTTC
TGATAAAATAGTGGATGGCTTTTTGAGGCCGTAGTCTACCGCTATGGCGTACCAGTATTTGGTTAACATATTGCT
GAAGGAGTTGTCATGGTCCAACATGTAGGTTATCTCCATGAGTCCCCTTAGCTCCCACATGATTTCCCTCCCTCAGAT
CCAAATCATCCACATGTTTCAGATTGGGGTTATTGGAACAACTTCGTGGCATAAGATAATATTACTGTGCGTTTTG
TTGCGCGTCGTATCAAAGAAAATTTTAAATATACTCTCTATCTAAACGGTCTTTGGCTCCAAGTTCTCTGCATAG
ATTGCGGGTGTGCTCCGAATGAGCACAAACCAGTCCATAATTAATATCGGCACCCCACTCAACAAACAGCCTTATCA
AGTCATGATTGTTTTCTTCGCGGCTTTCATCAGTACGGTGTCAATTCAATACCCTCGCTAAAACAGGTTGACTTT
ATAACATTTTGTACGATACGTATAAAATGTAATAGGGCCATCATACCACCACAACCCGAGCATTTCAGGATATG
ATATTGATCTACCGGTATACACTGTTTGGCCAGCACTTTCTTGGATAGGGATTGCAAGGAAGGCAACAT

[0154] SEQ ID No.31-马拉维Li1-20/1 (1983) MGF 360 11L (AY261361.1:24831-25892)

[0155] TTATCTTCGTTTCATAATCAAGAAAAACCTCATATTTATTGAGTGATAATTTTTTAACATGCAATTTAT
TTTTTCAGGGTCCATAATGACCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATCGGCTATCA
GATAATTTTCCTTTTGTCTGCCAAAGCTTTCCCTCCTCAAAGGCGTTGGCCCCCAGATCTATACAAAAGAACATG
TTCCCAAGATTATAGTTTTGTATAGAAACAAGCATGGCTTGATTGATGTTGGCCCCCATGATAAAACAGTAATAAAT
AGCCGCATAGCTATAATCTTGGACGCAGGCTATGTGCATCATTTTCATCAATATCCATGCGGACCCTTTCTATTACAT
ACAGCTCGTGAAGGTGGAACACGTTGTTGTAACAAAAAGGGCGCACATAAGCCGCCAGTGGTGTAGATGGGTATACCTC
TGATAAAATAATGGATAGCCTTTTTGAGGCCATAGTCTACCGCTATGGCGTACCAGTATTTGGTTAACATATTGCT
AAAGGAGTTGTCATGGTCCAACATGTAGGTTATCTCCATGAGTCCCCTTAGCTCCCACATGATTTCCCTCCCTCAGAT
CCAAATTATCCACATTTTTCAGGTTGGGGTTATTGGAACAACTTCGTGGCATAAGATAATATTACTGTGCGTTTTG
TTGCGCGTCGTATCAAAGAAAATTTTAAATATAATCTCTATCTAAACGATCTTTGGCTCCTAGTTCTCTGCATAG
ATTACGGGTGTGCTCCGTATGGGCACAAATCAGTCCATAATTAATATCGGCACCCCACTCGGCAACAGCCTTATCA

AGTCATGGTTGTTTTCTTCGCGGCTTTCATCAGTACGGTGTTC AATTCAATACCCTCGCTAAAACAGGTTGACCTT
ATAAACATTTTGTGACGATAAACGTAAATGTAATAGGGCCATCATACCACCACAACCCGAGCACTTTAAGACATG
ATATTGATCTACCGGTACACACTGTTTGGCCAGCACTTTCTTAGTTAAAGATTGTAAGGAAGGCAACAT

[0156] SEQ ID No.32-Mkuzi 1979MGF 360 11L (AY261362.1:28164-29225)

[0157] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGTAATTTAT
TTTTTCAGGGTCCATAACGATCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATGGGCTATCA
GATAATTTCCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGGCGTTGGCGCCCAGGTCTATACAAAAGAACAGG
TTTCCAAGATTATAGTTTTGTATGGAAACCAGCATAGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GACCGAATAGCTATAATCTTGATGCAGGCTATGTGCATCATTTTCATCAATATCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGGCGCGGGTATTTTC
TGGTAAAAGTAGCGAATAGCATCTTTGAGGTCATAGTCCACCGCTATAGCATACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCTAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCTCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAACACCTCGTGGCAAAGATAATATTGCTACTGGTTTTTA
TCGCGCGTCGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTCACAG
ATCACGGGTATTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGAATAAGCAGGTTGACCTT
ATAAATAGTTTATTACGTGCAATATGAAGCATAATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGACACGCACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0158] SEQ ID No.33-Pretorisuskop/96/4MGF 360 11L (AY261363.1:27214-28275)

[0159] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGCGATTTAT
TTTTTCAGGGTCCGTAACCACCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATTGGCTATCA
GATAATTTCCCTTTTGTCTGCCAAAGCTTTGCCCTCTTCAAAGGCGTTGGCACCCAGGTCTATACAAAAGAACAGG
TTCCCAAGATTATAGTTTTGTATGGAAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCTGAATAGCTATAATCTTGACGCAGGCTATGTGCATCATTTTCATCAATGTCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGCCGCGGGTATTTTC
TGGTAAAAGTAGCGGATAGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAAACAGTGCT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGGAAAACACCTCGTGGCAAAGATAATATTGTTACTGGTTTTTA
TCGCGCGTTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTCACAG
ATCACGGGTATTTCCGTGAGAGCACAAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGAATAAGCAGGTTGACCTT
ATAAATATTCTATTACGTGCAATATGAAGCATTATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCTACCGACACGCACTGCCCAGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0160] SEQ ID No.34-Tengani 62MGF 360 11L (AY261364.1:21627-22688)

[0161] TTATCTTTGTTTCATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAACATGCAATTTAT
TTTTTTAGGGTCTGTAACGACCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATCGGCTATCA
GATAATTTCCCTTTTGTCTGCCAAAGCTTTGCCTTCCTCAAAGGCGTTGGCTCCCAGGTCTATACAAAAGAACAGG
TTCCCAAGATTATAGTTTTGTATGGAAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCCGAATAGCTATAATCTTGACGCAGGCTATGTGCATCATTTTCATCAATGTCCATGCGGACCCTTTCTATTTTCGT

ACAGCTCGTGAAGGTGGAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGACGCGGGTATTTC
TGGTAAAAGTAGCGGATCGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAACAGTGCT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGAAAAACACCTCGTGGCAAAGATAATATTGTTACTGGTTTTA
TCGCGCGTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCACCCAGCTCTTTGCACAG
ATCACGGGTATTTCCGTGAGAGCACAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAGCAGGTTGACCTT
ATAAATAGTTTATTACGTGAATCTGAAGCATAATGGGTCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGACACGCACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0162] SEQ ID No.35-Warmbaths MGF 360 11L (AY261365.1:26388-27449)

[0163] TTATCTTTGTTTATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAAACATGCGATTTAT
TTTTTCAGGGTCCGTAACCACCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATTGGCTATCA
GATAATTTCCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGCGTTGGCACCCAGGTCTATACAAAAGAACAGG
TTCCCAAGATTATAGTTTTGTATGGAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAGAT
GGCTGAATAGCTATAATCTTGACGCAGGCTATGTGCATCATTTCATCAATGTCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACGTTGTTGTAAAAAAGGGCGCACATGAGCCGCCACCTATGTAGCCGCGGGTATTTC
TGGTAAAAGTAGCGGATAGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAACAGTGCT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCCCCCCTCAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGAAAAACACCTCGTGGCAAAGATAATATTGTTACTGGTTTTA
TCGCGCGTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTCCGTGAGAGCACAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAGCAGGTTGACCTT
ATAAATATTCTATTACGTGAATATGAAGCATTATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGACACGCACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0164] SEQ ID No.36-Warhog MGF 360 11L (AY261366.1:23157-24218)

[0165] TTATCTTTGTTTATAATCAAGAAAAATCCCCATATTTATTGAGTGATAATTTTTTAAACATGCGATTTAT
TTTTTCAGGGTCCGTAACCACCGACAACAGAGAAATGACCGGATTGTAATGCTTTAATGATAAGGCATTGGCTATCA
GATAATTTCCCTTTTGTCTGCCAAAGCTTTGCCCTCCTCAAAGCGTTGGCCCCCAGGTCTATACAAAAGAACAGG
TTCCCAAGATTATAGTTTTGTATGGAACCAGCATGGCTTGATTGATGTTGGCTCCCATGATAAAACAGTAGTAAAT
GGCTGAATAGCTATAATCTTGACGCAGGCTATGTGCATCATTTCATCAATGTCCATGCGGACCCTTTCTATTTTCAT
ACAGCTCGTGAAGGTGGAACACGTTGTTGTAAAAAAGAGCGCACATGAGCCGCCACCTATGTAGCCGCGGGTATTTC
TGGTAAAAGTAGCGGATAGCATCTTTGAGGTCATAGTCCACCGCTATCGCGTACCAGTATTTGGTTAAACAGTACT
AAAGCTATCATCATGGTCCAGCATGAAGGTTATCTCCATGAGCCCTCTTAACCTCCACATGATTTCTCCCCTTAGAT
CCAGATTATCTATAATCCTTAAATTGGGGTTATTGAAAAACACCTCGTGGCAAAGATAATATTGTTACTGGTTTTA
TCGCGCGTGTATCAAAGAAAATTTTTAAATATACTCTCTTTCTAAATATTCTTTGGCTCCCAGCTCTTTGCACAG
ATCACGGGTATTTCCGTGAGAGCACAATCATTCCATAGTTAATATCTGCACCCCATTCAGTAAACAGCTTTATCA
AGTCATGATTATTCTCCTTCACGGCTTTCATCAGTCCTATGTTTAACTCGATACCTTGACTAAAGCAGGTTGACCTT
ATAAATATTCTATTACGTGAATATGAAGCATTATGGGGCCATTATGCCACCACAGGCCACAACACTTCAGGATATG
ATAATGATCCACCGATACGCACTGCCCCGCCAGTACTTTCTTCGTGAGGGATTGCAGGGAAGGCAACAT

[0166] 在实施方案中,本发明的减毒ASFV包含MGF 360 11L的功能形式。适当地,MGF 360 11L的功能形式包含SEQ ID No.24、25、26、27、28、29、30、31、32、33、34、35或36的序列。适当地,MGF 360 11L的功能形式包含与SEQ ID No.24、25、26、27、28、29、30、31、32、33、34、35或36具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地,MGF 360 11L的功能形式由SEQ ID No.24、25、26、27、28、29、30、31、32、33、34、35或36的序列组成。

[0167] MGF 360 12L基因序列

[0168] SEQ ID No.37-贝宁97/1MGF 360 12L (NC_044956.1:23616-24668)

[0169] TCATCTTAAATCATAGGAAAGGAAGATCATCATATTTTTGAAAAGTAATTTTTTAACGCATGATCTATGATTTTCAGGGTCCGTGCTTTTAGGCAACGGGATGGTGGTCGGACTATAAATCTTTAGAGATAAAATGTTTTTATAAGCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAAACATCAGCCCCCAGATCCATACAAAAGAACATGTTTCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAACATATAGCAGTAGTACATGGT TGAAAGGTTGTGGTCTTTGATGCAGGCAATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCTTTTTCATACG CCTCATGGAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCATGTGTGTATATTTTTGG TAAAAATACTGTATGGCCTCTTTTCAGGCTATAGCGTACGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG CAAAACTCATTATTTAGCAGATCGGTTTTTTCTATTAACCTCCCTTAACCTCCAGAAAATTTCTATCCTCAATTTCA GATTATTTACTTTTTGTAATATCGGATTGTTGGAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA AACTTTAGATCTATGAAAATTTGTAAAATTTCTCTTCATTCAAGATCTCCTTGGCACCTAACTCTTGACAGAGGTC CCGGGTATGCTCCGTGTTGACAGATACCAGCCCATAGTTGATGTCCGCCCCCCTCTGTAAATAGTTTTATAAGGC TGTAGTTGTTTTCCCTTACAGCCTTTACTAACGCCGTATTTAGGTCTAAGCCCTCTTAATGCCTGATGATTTTATG AGCCTTAGGTTATGATCAAACGTGATCGGAGCATTATACCACCATAGATCATAATATTTTAAAAGATAATGTTGGTT CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAAAGATTGCAGGGAAGGCAACAT

[0170] SEQ ID No.38-中国/2018/安徽XCGQ MGF 360 12L (MK128995.1:29384-30436)

[0171] TCATCTTAAATCATAGGTAAGGAAGATCATCATATTTTTGAAACGTAATTTTTTAACGCATGATCTATGATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAAGCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAAACATCAGCCCCCAGATCTATACAAAAGAACATGTTTCTATATTATAGTACTGTATTGAGCTAAGCATGGCCTGATTGATGTTGGCGCCCAGGACATAGCAGTAGTACATGGT TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCTTTTTCATACG CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTTTGG TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG CGAAAACTCATTATTTAGCAGATCGGTTTTTACTATTAACCTCCCTTAACCTCCAGAAAATTTCTATCCTCATTTTTTA TATTATTTACTTTTTGTAATATCGGATTGTTGGAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA AACTTTAGATCTATAAAAATTTGTAAAATTTCTCTTCATTCAAGGTTTCCTTGGCACCTAGCTCTCGACAGAGGTC CCAGGTGTGCTCCGTGTTGACAGATACCAGCCCGTAGTTGATGTCCGCCCCCCTCTGTCAAACAGTTTTATAAGGT TGTAGTTGTTTTCCCTTACAGCCTTCACTAACGCCGTATTTAGGTTTAAGCCCTCTTAATACCTGCTGATTTTATG AGCCTTAGGTTATGATCAAACGTGATCGGAGCATCATGCCACCATAGGTCATAACACTTTAAAAGATAATGTTGGTT CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAAGATTGCAGGGAAGGCAACAT

[0172] SEQ ID No.39-格鲁吉亚2007/1MGF 360 12L (LR743116.1:30355-31407)

[0173] TCATCTTAAATCATAGGTAAGGAAGATCATCATATTTTTGAAACGTAATTTTTTAACGCATGATCTATGATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAA

GCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAAACATCAGCCCCCAGATCTATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGCTAAGCATGGCTTGATTGATGTTGGCGCCCAGGACATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCTTTTCATACG
CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG
CGAAAACCTCATTATTTAGCAGATCGGTTTTTACTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTTTTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGGAAAAACACCTCATGGCATAAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAAATTTGTAAAATTTCTTCTTCATTCAAGGTTTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCAGGTGTGCTCCGTGTTGACAGATACCAGCCCGTAGTTGATGTCGCGCCCCCCTCTGCAAACAGTTTTATAAGGT
TG TAGTTGTTTTCCCTTACAGCCTTCACTAACGCCGTATTTAGGTTTAAGCCCTCTTTAATACCTGCTGATTTTTATG
AGCCTTAGGTTATGATCAAACGTGATCGGAGCATCATGCCACCATAGGTCATAACACTTTAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAGAGATTGCAGGGAAGGCAACAT

[0174] SEQ ID No.40-Ken06.Bus MGF 360 12L (NC_044946.1:27428-28483)

[0175] TCATCTTAGATCATAAGTAAGGAAGACCATCATATTTTTTGAAGTAATTTTTTAACGCATGATCTAT
AATTTTCAGGGTCCGTGCTTTTAGGCAATGGGGTAGTGGCCGGGCTATAAATCTTTAGGGATAAAATATTCCTTATAG
GCTCATACCCTTCTGTCCCACTAGAGCCATACCCTCTTCAAAAGCATCGGCCCCCAGATCCATACAAAAGAATATG
TTTTCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAGCATATAGCAGTAGTATAT
TGTTGAAAGGTTGTGGTCTTTGATGCAGGCTATCCGCATCATCTCTTCTAAATCCATACAGATCTTGTCTTTTCAT
ACGCCTCATGAAGGTCAAACACGTTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTT
TGGTAAAAATACTGTATGGCCTCTTTCAAGTTGTAGCGTACGGCTATAGCGTACCAGTATTTGAGTAATAGTGTATT
GAGCGAAAACCTCATTATTTAGCAGATCGGTTTTTTCTATTATCTCCCTTA ACTCCCAAAAATTTCTATCCTCATT
TCAGGTTATTTACCTTTTTTAAAAGTAAATTATCGGAAAACACCTCATGACATAAGATAATGTTACTACTGGTTTTA
TAAAATTTTAAATCTATGAAAATTTGTAAAATATCCCCTTCATTAAAGGTCTTCTTGGCGCCTAGCTCTCGACAGAG
GTCCCAGGTGTGCTCCGTGTTGACAGATATCAGCCCGTAGTTAATGTTGCGCCCCCCTCCGTAAATAGTTTTATAA
GACTGTAGTTGTTTTCCCTTACAGCCTTCACTAATGCCATGTTTAGGTCTAAGCCTTCTTGAATGCCTGCTAATTTT
ATCAGCCTTAGGTTATGATCAAACGTGATCGGAGCATTATTCACCATAGATCGTAACACTTTAAAGATAATGTTG
GTCCTCGGGCAGACATTGTCTAGCCAGCACCTTTTTTGGTCAAAGATTGCAGGGAAGGCAACAT

[0176] SEQ ID No.41-肯尼亚1950MGF 360 12L (AY261360.1:33549-34604)

[0177] TCATCTTAGATCATAAGTAAGGAAGACCATCATATTTTTTGAAGTAATTTTTTAACGCATGATCTAT
AATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGGCTATAAATCTTTAGGGATAAAATATTCCTTATAG
GCTCATACCCTTCTGTCCCACTAGAGCCATACCCTCTTCAAAAGCATCGGCCCCCAGATCCATACAAAAGAATATG
TTTTCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAGCATATAGCAGTAGTATAT
CGTTGAAAGGCTGTGGTCTTTGATGCAGGCTATCCGCATCATCTCTTCTAAATCCATACAGATCTTGTCTTTTCAT
ACGCCTCATGAAGGTCAAACACGTTATTA AAAACAAAGAGCACATGTTAATCGCCACGTATTCAGGTGCGTATATTTT
TGGTAAAAATACTGTATGGCCTCTTTCAAGTTGTAGCGTACGGCTATAGCGTACCAGTATTTGAGTAATAGTGTATT
GAGCGAAAACCTCATTATTTAGCAGATCGGTTTTTTCTATTATCTCCCTTA ACTCCCAAAAATTTCTATCCTCATT
TCAGGTTATTTACCTTTTTTAAAAGTAGATTATCGGAAAACACCTCATGACATAAGATAATGTTACTACTGGTTTTA
TGAAACTTTAAATCTATGAAAATTTGTAAAATATCCCCTTCATTAAAGGTCTTCTTGGCGCCTAGCTCTCGACAGAG
GTCCCAGGTGTGCTCCGTGTTGACAGATATCAGCCCGTAGTTGATGTTGCTCCCCCTCCGTAAATAGTTTTATAA

GACTGTAGTTGTTTTCTTTACAGCCTTCACTAATGCCATGTTTAGGTCTAAGCCTTCTTGAAGGCCTGCTGATTTT
ATCAGCCTTAGGTTATGATCAAACGTGATCGGAGCATTATTCACCATAGATCGTAACACTTTAAAAGATAATGTTG
GTCCTCGGGCAGACATTGTCCAGCCAGCACCTTTTTGGTCAGAGATTGCAGGGAAGGCAACAT

[0178] SEQ ID No.42-L60 MGF 360 12L (NC_044941.1:23965-25017)

[0179] TCATCTTAAATCATAGGAAAGGAAGATCATCATATTTTTTGAAGTAATTTTTTAACGCATGATCTAT
GATTTTCAGGGTCCGTGCTTTTAGGCAACGGGATGGTGGTCGGACTATAAATCTTTAGAGATAAAATGTTTTTATAA
GCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAAACATCAGCCCCCAGATCCATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAACATATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCAATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCTTTTTCATACG
CCTCATGGAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGCTATAGCGTACGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG
CAAAAACCTCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCAATTTCA
GATTATTTACTTTTTGTAAATATCGGATTGTTGGAAAAACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATGAAAATTTGTAAAATTTCTCTTCATTCAAGATCTCCTTGGCACCTAACTCTTGACAGAGGTC
CCGGGTATGCTCCGTGTTGACAGATACCAGCCCATAGTTGATGTCCGCCCCCCTCTGTAAATAGTTTTATAAGGC
TG TAGTTGTTTTCCCTTACAGCCTTTACTAACGCCGTATTTAGGTCTAAGCCCTCTTTAATGCCTGATGATTTTATG
AGCCTTAGGTTATGATCAAACGTGATCGGAGCATTATACCACCATAGATCATAATATTTTAAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAAAGATTGCAGGGAAGGCAACAT

[0180] SEQ ID No.43-马拉维Li1-20/1 (1983) MGF 360 12L (AY261361.1:27682-28731)

[0181] TCATCTTAAATCGTAGGAAAGGAAGGTCATCATATTTTTTGATTTATAATTTTTTAACACATGATCTAT
TATTTTCAGGGTCCGTGTTTTTAGGTAACGGGGCAGTGGACGGACTATAGATCTTTAGGGATAAAATGTTTCCTTATAA
GCTCATACCCTTCCCCTACAGGCATATTCTCTTCGAAAACATCAGCCCCCAGATCCATACAAAAGAACATGTTTTCT
ATATTATAGTACTGTATTGAGGCAAGCATGGCCTGATTAATGTTGGCGCCAGGACATAGCAGTAGTATATCGTTGA
AAGGTTGTGGTCTTTGATGCAGGCTACTCGCATCATCTCTTCTAAGTCCATATAGATCTTGTCTTTTTCATACGCCT
CATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTTTGATAA
AAATACTGTATGGCCTCTTTTCAGGTTATAGCGTACGGCTATAGCGTACCAGTATTTGAGTAATAATGTATTGAGTGA
AACTCATTATTTAACAGATCGGTTTTTTTTTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTTCAGAT
TATTTACTTTTTGTAAATAACGGATTGTTGGAAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATAAAAC
TTTAGATCGATGAAAATTCGTAAAATTTCTCTTCATTTAAGGTCTCCTTGGCGCCTAGCTCTCTGCAGAGGTCCCG
GGTGTGCTCCGTGTTGACAGATACCAGCCGTAGTTGATGTCCGCCCCCCTCTGTAAAAAGCTTTATAAGGTTGT
AGTTGTTTTCCCTTACAGCCTTTACTAACGCCGTATTTAGGTCTAAGCCATCTTTAATGCCTGCTGATTTTATCAGC
CCTAGGTTATGATCAAACGTGATCGGAGAATCATACCACCATAGGTCGTAACACTTTAAAAGATAATATTGGTCCGT
CGGCAGGCATTGTCCAGCCAGTACCTTTTTTGGTCAGAGATTGCAGGGAAGGCAACAT

[0182] SEQ ID No.44-Mkuzi 1979 MGF 360 12L (AY261362.1:31073-32125)

[0183] TCATCTTAAATCATAGGAAAGGAAGATCATCATATTTTTTGAAGTAATTTTTTAACGCATGATCTAT
GATTTTCAGGGTCCGTGCTTTTAGGCAACGGGATGGTGGTCGGACTATAAATCTTTAGAGATAAAATGTTTTTATAA
GCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAAACATCAGCCCCCAGATCCATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAACATATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTAATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATAGATCTTGTCTTTTTCATACG

CCTCATGGAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACGCCACGTATTCAGGTGTGTATATTTTGG
TAAAAATACTGTATGGCTTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGCAATGTACTGAG
CGAAAAC TCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAAAAATTTCTATCCTCATTTTTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGAAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAATTTGTAAAATTTCTTTTTCATTCAAGGTCTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCAGGTGTGCTCCGAGCTGACAGATACCAGCCCATAGTTGATGTCCGCCCCCACTCTGCAAACAATTTTATAAGGT
TG TAGTTGTTTTCTTTACAGCCTTCACCAACGCCGTATTTAGGTCTAAGCCCTCTTTAATGCCTGCTGATTTTATG
AGCCTTAGGTTATGATCAAACGTGATCGGAGCATCATGCCACCATAGGTCATAATATTTTAAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCGGCCAACACCTTTTTGGTCAAAGATTGCAGGGAAGGCAACAT

[0184] SEQ ID No.45-Pretorisuskop/96/4 MGF 360 12L (AY261363.1:30098-31150)

[0185] TCATCTTAAATCGTAGGTAAGGAAGATCATCATATTTTTTGAAACGTAATTTTTTAACGCATGATCTAT
AATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAA
GCTTATACCCTTCCCCTAAAGCTATAGTGCCCTCTTCGAAAGCATCAGCCCCAGATCCATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGCCCCCAGGACATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATGAATCTTGTCCTTTTCATACG
CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACGCCACGTATTCAGGTGTGTATATTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTAAGTAGTAATGTACTGAG
CGAAAAC TCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTTTTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGAAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAATTTGTAAAATTTCTTCTTCATTCAAGGTCTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCAGGTGTGCTCCGTGTTGACAGATACCAGCCCATAGTTGATGTTGCCCCCACTCTGCAAACAGTTTATAAGGT
TG TAGTTGTTTTCCCTTACAGCCTTCACTAACGCCGTATTTAGGTCTAAGCCCTCTTTAATGCCTGCTGATTTTATG
AGCTTTAGGTTATGATCAAACGTGATCGGACCATCATGCCACCATAGGTCGTAACACTTTAAAAGATAATGTTGGTT
TG TGGGCACGCATTGTCCAGCCAACACCTTTTTGGTCAAGATTGCAGGGAAGGCAACAT

[0186] SEQ ID No.46-Tengani 62 MGF 360 12L (AY261364.1:24540-25592)

[0187] TCATCTTAAATCATAGGTAAGGAAGATCATCATATTTTTTGAAACGTAATTTTTTAACGCATGATCTAT
GATTTTCAGGGTCCATGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAA
GCTCATACCCTTCCCCTAAAGCTGTAGTACCCTCTTCGAAACATCAGCCCCAGATCTATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGCTAAGCATGGCCTGATTGATGTTGGCGCCCAGGACATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCCTTTTCATACG
CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACGCCACGTATTCAGGTGTGTATATTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG
CGAAAAC TCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTTTTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGAAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAATTTGTAAAATTTCTTCTTCATTCAAGGTCTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCAGGTGTGCTCCGTGTTGACAGATACCAGCCCGTAGTTGATGTCCGCCCCCACTCTGCAAACAGTTTATAAGGT
TG TAGTTGTTTTCCCTTACAGCCTTTACTAACGCCGTATTTAGGTTAAGCCCTCTTTAATACCTGCTGATTTTATG
AGCCTTAGGTTATGATCAAACGTGATCGGAGCATCATGCCACCATAGGTCATAACACTTTAAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCAGCCAACACCTTTTTGGTCAAGATTGCAGGGAAGGCAACAT

[0188] SEQ ID No.47-Warmbaths MGF 360 12L (AY261365.1:29294-30346)

[0189] TCATCTTAAATCGTAGGTAAGGAAGATCATCATATTTTTTGAACGTAATTTTTTACCGCATGATCTAT
GATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAA
GCTTATACCCTTCCCCTAAAGCTATAGTACCCTCTTCGAAAGCATCAGCCCCAGATCCATACAAAAGAACATGTTT
TCTACATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAGAACATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATAGATCTTGTCTTTTCATACG
CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCATGTATTCAGGTGTGTATATTTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGTAATGTACTGAG
CGAAAACCTCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTITTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGGAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAATTTGTAAAATTTCTTCTTCATTCAAGGTCTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCGGGTGTGCTCCGTGTTGACAGATACCAGCCCATAGTTGATGTCCGCCCCCACTCTGCAAACAGTTTTATAAGGT
TGTAAGTTGTTTTCCCTTACAGCCTTCACTAACGCCGTATTTAGGTCTAAGCCCTCTTTAATGCCTGCTGATTTTTATG
AGCTTTAGGTTATGATCAAACGTGATCGGACCATCATGCCACCATAGGTCATAACACTTTAAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAGAGATTGCAGGGAAGGCAACAT

[0190] SEQ ID No.48-Warhog MGF 360 12L (AY261366.1:26036-27088)

[0191] TCATCTTAAATCGTAGGTAAGGAAGATCATCATATTTTTTGAACGTAATTTTTTAACGCATGATCTAT
AATTTTCAGGGTCCGTGCTTTTAGGCAACGGGGTGGTGGCCGGACTATAAATCTTTAGGGATAAAATGTTCTTTATAA
GCTTATACCCTTCCCCTAAAGCTATAGTGCCCTCTTCGAAAGCATCAGCCCCAGATCCATACAAAAGAACATGTTT
TCTATATTATAGTACTGTATTGAGGTAAGCATGGCCTGATTGATGTTGGCGCCCAGGACATAGCAGTAGTACATGGT
TGAAAGGTTGTGGTCTTTGATGCAGGCGATCCGCATCATCTCTTCTATGTCCATATGGATCTTGTCTTTTCATACG
CCTCATGAAGGTCAAACACATTATTA AAAACAAAGAGCACATGTTAACCGCCACGTATTCAGGTGTGTATATTTTTGG
TAAAAATACTGTATGGCCTCTTTTCAGGTTATAGCGTATGGCTATAGCGTACCAGTATTTGAGTAGTAATGCACTGAG
CGAAAACCTCATTATTTAGCAGATCGGTTTTTTCTATTA ACTCCCTTA ACTCCCAGAAAATTTCTATCCTCATTITTA
TATTATTTACTTTTTGTAAATATCGGATTGTTGGAAAACACCTCATGGCATAAAATAATGTTACTACTAGTTTTATGA
AACTTTAGATCTATAAAAATTTGTAAAATTTCTTCTTCATTCAAGGTCTCCTTGGCACCTAGCTCTCGACAGAGGTC
CCGGGTGTGCTCCGTGTTGACAGATACCAGCCCATAGTTGATGTTCCGCCCCCACTCTGCAAACAGTTTTATAAGGT
TGTAATTGTTTTCCCTTACAGCCTTCACTAACGCCGTATTTAGGTCTAAGCCCTCTTTAATGCCTGCTGATTTTTATG
AGCTTTAGGTTATGATCAAACGTGATCGGACCATCATGCCACCATAGGTCATAACACTTTAAAAGATAATGTTGGTT
CGTGGGCACGCATTGTCCAGCCAACACCTTTTTTGGTCAGAGATTGCAGGGAAGGCAACAT

[0192] 在本发明的减毒ASFV的实施方案中, MGF 360 12L基因的表达和/或活性被破坏。
适当地, MGF 360 12L基因包含SEQ ID No. 37、38、39、40、41、42、43、44、45、46、47或48的序
列。适当地, MGF 360 12L基因包含与SEQ ID No. 37、38、39、40、41、42、43、44、45、46、47或48
具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地, MGF360 12L基因
由SEQ ID No. 37、38、39、40、41、42、43、44、45、46、47或48的序列组成。

[0193] MGF 360 13L基因序列

[0194] SEQ ID No.49-贝宁97/1MGF 360 13L (NC_044956.1:24840-25901)

[0195] CTATAATATATTATGAGAATATTC CCAAATGATGGATAAGTTTTTTGATTTATAATCTTTTAATAAACT
GCTTATTTTTTCGGGGTCCTTTAAGTTTAATGGCAAGGAAGCATCTGAACTGTAAATATCCAAAGTCAAGCTATGGC

TTAAAAAATTATAACCTTTTTGTTCCGCTATGGCACGACCCTCTTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGACGTTATAATATTGTACTGAAGTGAGCATAGCTTGGTTGATGTTGCCCCCAGGGCGTAACAGTA
ATATATTGTTAATAGATTGTTATCCTTGGCACAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTTTTCT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATAACAGGAGACATTTTAATCGCCACTCGTTAAGATCCGTA
TATTTCTCATCTAGAAAACAAATGGCGTCTTACAAACGTATTGTACTGCTTTGGCATACCAATACTTCACTAGTAA
ATCATTTAACTCGTCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAA
CAAATTTGTTTTCTAACATAGGATTATTCATAAAAAATTTTCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCCTGGTAAAAATACGGAATAATCGTTGTCCTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACGAAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTCGGCCACGATCCATACAAAGCTTGAGAGGAGCATCATGCCACCATAGGCCACAATATTTCAAATGCAGTGTTTC
ATCTATTGACAAACACTGGCTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0196] SEQ ID No.50-中国/2018/安徽XCGQ MGF 360 13L (MK128995.1:30597-31658)

[0197] CTATAGTATATTATGAGAATATTCCCAAATGATGGATAAGTTTTTTGATTTATAATCTTTTAATAAACT
GCTTATTTCTTCGGGGTCCTTTAAGTTTAGTGGCAAGGAAGCATCTGAGCTGTAAATATCCAAAGCCAAACTATGGC
TCAGAAAATTATAACCTTTTTGTTCCGCTATGGCACGACCCTCTTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGCGCGTAACAGTA
ATATATTGTTAATGGATTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGATGTTTTCT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATAACAGGAGACATTTTAATCGCCATTCATTAAGATCCGTA
TATTTCTCATCTAGAAAACAAATGGCGTCCTTACAATCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ACCATTTAACTCGTCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAA
CAAATTTGTTTTCTAAAATAGGATTATTCATAAAAAATTTTCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCCTGGTAAAAATACGGAATAATCGTTGTCCTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACCATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACGAAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTCGGCCACGATCCATACAAAGCTTGAGAGGAGCATCATGCCACCATAGGCCACAATATTTCAAATGCAGTGTTTC
ATCTATTGACAAACACTGGCTGGCTATCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0198] SEQ ID No.51-格鲁吉亚2007/1MGF 360 13L (LR743116.1:31568-32629)

[0199] CTATAGTATATTATGAGAATATTCCCAAATGATGGATAAGTTTTTTGATTTATAATCTTTTAATAAACT
GCTTATTTCTTCGGGGTCCTTTAAGTTTAGTGGCAAGGAAGCATCTGAGCTGTAAATATCCAAAGCCAAACTATGGC
TCAGAAAATTATAACCTTTTTGTTCCGCTATGGCACGACCCTCTTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGCGCGTAACAGTA
ATATATTGTTAATGGATTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGATGTTTTCT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATAACAGGAGACATTTTAATCGCCATTCATTAAGATCCGTA
TATTTCTCATCTAGAAAACAAATGGCGTCCTTACAATCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ACCATTTAACTCGTCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAA
CAAATTTGTTTTCTAAAATAGGATTATTCATAAAAAATTTTCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCCTGGTAAAAATACGGAATAATCGTTGTCCTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACCATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT

AGTTGTTTTCTTAACAGCTATTATTAATGCCACACGAAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTCGGCCACGATCCATACAAAGCTTGAGAGGAGCATCATGCCACCATAGGCCACAATATTTCAAAATGCAGTGTTCT
ATCTATTGACAAACACTGGCTGGCTATCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0200] SEQ ID No.52-Ken06.Bus MGF 360 13L (NC_044946.1:28644-29704)

[0201] TTAGAGTATTTTATGAGAGTAATCCAGAATGATGGATAAATTTTTTGATTTATAATTTTTTAATAAACT
GCTTATTTCTTCGGGATCCTTTAAGTTTAATGGCAAGGAAGCATCTGAGCTATAAATATTCAAAACCAAATATGGC
TTAAAAAATTATAACCATTTTGTCTCGCTATGGCACTACCCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
TATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGATTGATGTTGCCCCCAGGGCATAACAATA
ATATATTGTTAATAGATTGTTATCCCTGATACAAGCCAGAGATAACATTTTCATTGACGTCTATTTGGATTTTTCT
TGTGGTATATATCATGAAGCTCATATATTTTGTATAACATAGGTAACATTTTAATCACCATTTCATCAAGATCCGTA
TATTTTTTCATCCAGAAAGCAAATGGCATCTTTATGGTCGTATTGTACTGCATTGGCGTACCAATATTTCACTAGCAA
TTCGCTTAACTCGTCCGTTTCTTTATTTCTATAAGCCCGCATAGTCTTTTATAAATTAAGCGCCTTAATTGTGCAG
CAAAGTTGTTTTCTAAATTAGGATTATTTATAAATATCTCATGGCACAAAATAATACTGCCGCTAGTTTTATTATGC
ATTATCTTGTTGAAAATACAGAAAATATCGTAGTCGTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAAATCTCG
GGCGTGCTTCGTATTGATAGAAAGCAGACTATAGTTGATATATGCGCCCCACTCTGTAAATAACTTTATCATACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACAAAGGTCTATATCTTCTCCTAGGAATCCCGATTTTATGTAT
ATTCGCCCACGATCTATGTAAAGCTTGAGGGGAGCATCATGCCACCATAAGCCACAGTATTTCAAAATGTGTTTCATC
TATCGACAAACATGATGTACCGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCGACGACAT

[0202] SEQ ID No.53-肯尼亚1950MGF 360 13L (AY261360.1:34752-35812)

[0203] TTAGAGTATTTTATGAGAGTAATCCAGAATGATGGATAAATTTTTTGATTTATAATTTTTTAATAAACT
GCTTATTTCTTCGGGAACCTTTAAGTTTAATGGCAAGGAAGCATCTGAGCTATAAATATTCAAAATTAACTATGGC
ATAAAAAATTATAACCATTTTGTCTCGCTATGGCACTACCCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
TATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGGGCATAACAATA
ATATATTGTTAATAGATTGTTATCCCTGATACAAGCCAGAGATAACATTTTCATTGACGTCTATTTGGATTTTTTCT
TGTGGTATATATCATGAAGCTCATATATTTTGTATAACATAGGTAACATTTTAATCGCCATTTCATCAAGATCCGTA
TATTTTTTCATCCAGAAAGCAAATGGCATCTTTATGATCGTATTGTACTGCATTGGCGTACCAATATTTCACTAGTAA
TTCGCTTAACTCGTCCGTTTCTTTATTTCTATAAGCCCGCATAATCTTTTATAAATTAAGCGCCTTAATTGTGCAG
CAAAGTTGTTTTCTAATTTAGGATTATTTATAAATATCTCATGGCACAAAATAATACTGCCGCTAGTTTTATTATGC
ATTATTTTATTGAAAATACAGAAAATATCGTAGTCGTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAAATCTCG
GGCGTGCTTCGTATTGATAGAAAGCAGACTATAGTTGATATATGCGCCCCACTCTGTAAATAACTTTATCAGACTAT
AGTTATTTTCTTAACAGCTATTATTAATGCCACACAAAGGTCTATATCTTCTCCTAGGAATCCCGATTTTATGTAT
ATTCGTCCACGATCTATGTAAAGCTTGAGGGGAGCATCATGCCACCATAAGCCACAGTATTTCAAAATGTGTTTCATC
TATCGACAAACATGATGTACTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCGACGACAT

[0204] SEQ ID No.54-L60 MGF 360 13L (NC_044941.1:25189-26250)

[0205] CTATAATATATTATGAGAATATTCCCAAATGATGGATAAGTTTTTTTGATTTATAATCTTTTAATAAACT
GCTTATTTTTTTCGGGGTCCCTTTAAGTTTAATGGCAAGGAAGCATCTGAAGTGTAAATATCCAAAGTCAAGCTATGGC
TTAAAAAATTATAACCTTTTTTGTCCGCTATGGCACGACCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGACGTTATAATATTGTACTGAAGTGAGCATAGCTTGGTTGATGTTGCCCCCAGGGCGTAACAGTA
ATATATTGTTAATAGATTGTTATCCCTGGCACAAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTTTTCT

TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATACAGGAGACATTTTAATCGCCACTCGTTAAGATCCGTA
TATTTCTCATCTAGAAAGCAAATGGCGTTCTTACAAACGTATTGTACTGCTTTGGCATAACCAATACTTCACTAGTAA
ATCATTAACTCGTCCGTTTCTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAA
CAAATTTGTTTTCTAACATAGGATTATTCATAAAAAATTCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCCTGGTGAAAATACGGAATAATCGTTGTCCTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACGAAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTCGGCCACGATCCATACAAAGCTTGAGAGGAGCATCATGCCACCATAGGCCACAGTATTTCAAATGCAGTGTTT
ATCTATTGACAAACACTGGCTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0206] SEQ ID No.55-马拉维Li1-20/1(1983)MGF 360 13L(AY261361.1:28920-29980)

[0207] TTAGAGTATATTATGAGAGTAATCCAAATGATGGATAAATTTTTTGATTTATAATTTTTTAACAACT
GCTTATTTCTTCGGGGTCTTTAAGTTTAATGGCAAGGAAGCATCCGAGCTATAAATATTCAAACCAAATATGGC
TTAGAAAATTATAACCTTTTTGTCTCGCTATGGCACTACCTCTTCAAAGGCATTACCACCCAAATCTATACAGAAA
TATATATTACCGATGTTATAATATTGCACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGGGCATAACAGTA
ATATATTGTTAATGGATTGTTATCCCTGATACAAAGCCAGGGATAACATTTTATTAACTGCTATTTGGATTTTTCT
TGTGGTATATATCATGAAGCTCATATATTTTGTATAATATAGGTAACATTTTAATCGCCATTCTTAAGATCCGTA
TATTTCTCATCCAGAAAGCAAATGGCATCTTTATAATCGTATTGTACTGCTTTGGCGTACCAATATTTCACTAGTAA
TTCATTAACTCGTCCGTTTCTTTATTTCTATAAGCCCGCATAGTCTTTTATAAATTAAGCGCCTTAATTGTGCAG
CAAATTTGTTTTCTAAATTAGGATTATTTATAAATATCTCATGGCACAAAATAACACTGCCGCTGGTTTTATTATGC
ATTATCTTGTTGAAAATACAGAAAATATCGTAGTCCTCCAGAGTTTCTTTGGCGCCTAGCTGTCTACACAAATCTCG
GACGTGCTTCGTATTGATAGAAAGCAGACTATAGTTGATATTTGCGCCCACTCTGTAAAAAGCTTTATTAGATTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACAAAGGTCTATATCTTCTCCTAAAAATCCCGATTTTATTTGT
ATTCGGCCACGATCCATATAAAGCTTGAGAGGGGCATCATGCCACCATAAGTCACAGTATTTCAAATGTGTTTCATC
TATCGACAAACATGATGTACTGGCTACCGTCTTTTTGACGAGGGTTGTAGAGAGAGCGGCGCCGACAT

[0208] SEQ ID No.56-Mkuzi 1979MGF 360 13L(AY261362.1:32286-33347)

[0209] CTATAATATATTATGAGAATATTCCCAAATGATGGATAAGTTTTTTTGATTTATAATCTTTTAATAAACT
GCTTATTTCTTCGGGGTCTTTAAGTTTAATGGCAAGGAAGCATCTGAAGTGTAAATATCCAAAGTCAAGCTATGGC
TTAAAAAATTATAACCTTTTTGTTCGCTATGGCAGGACCTCTTCAAAGGCATTACCCCCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTGAGCATAGCTTGGTTGATGTTGCTCCCCAGGGCGTAACAGTA
ATATATTGTTAATAGATTGTTATCCTTGGCACAAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTTTCT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATACAGGAGACATTTTAATCGCCATTCTGTTAAGATCCGTA
TATTTCTCATCTAGAAAGCAAATGGCGTTCTTACAAACGTATTGTACTGCTTTGGCATAACCAATACTTCACTAGTAA
ATCATTAACTTGTCGTTTCTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAA
CAAATTTGTTTTCTAAAATAGGATTATTCATAAAAAATTCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCCTGGTGAAAATACGGAATAATCGTTGTCCTCTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCCACACGAAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTCGGCCACGATCCATACAAAGCTTGAGAGGAGCATCATGCCACCATAGGCCACAGTATTTCAAATGCAGTGTTT
ATCTATTGACAAACACTGGCTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0210] SEQ ID No.57-Pretorisuskop/96/4 MGF 360 13L (AY261363.1:31307-32368)

[0211] CTATAGTATATTATGAGAATATTTCCCAAATTATGGATAAGTTTTTTGATTTATAATCCTTTAAAAAACT
GCTTATTTCTTCGGGGTCCTTTAAGTTTAGTGGCAAGGAAGCATCTGAGCTGAAAATATCCAAAGCCAAACTATGGC
TTAGAAAATTATAACCTTTTTGTTCCGCTATGGCACGACCCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTATTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGGGCGTAACAGTA
ATATATTGTTAATGGATTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTTTCTT
TGTGGTACATCTCATGAAGCTCATATATTTTGTAAAAATACAGGAGACATTTTAATCGCCATTCATTAAGATCCGTA
TATTTCTCTTCTAGAAAGCAAATGGCGTCCTTACACTCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ATCGTTTTAACTCATCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTACAAATTAAGCCCCTTAATTGTATAG
TAAATTTGTTTTCTATATTAGGATTATTCATAAATATATCATGGCACAAAATAATACGGCCGCTGGTTTTATTGTGC
ATTATCTTGGTGAAAATACGGAACCATCGTCGCTCTTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACCTCTCG
GATGTGCTCCGTATTAATAGAAAGCAAACCTATAGTTGATATGTGCGCCCCATTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCTATATGGAGGTCTATATCCTCTCCTAAAAATCCTGATTTTATTTGT
ATTTGGCCACGATCCATACAAAGCTTGAGGGGGACATCATGCCACCATAGGCCACAGTGTTTCAGAATGCAGTGTTT
ATCTATCGACAAACACTGGCTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0212] SEQ ID No.58-Tengani 62 MGF 360 13L (AY261364.1:25753-26814)

[0213] CTATAGTATATTATGAGAATATTTCCCAAATGATGGATAAGTTTTTTGATTTATAATCCTTTAATAAACT
GCTTATTTCTTCGGGGTCCTTTAAGTTTAGTGGCAAGGAAGCATCTGAGCTGTAAATATCCAAAGCCAAACTATGGC
TCAGAAAATTATAACCTTTTTGTTCCGCTATGGCACGACCCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGCGCGTAACAGTA
ATATATTGTTAATGGGTTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGATGTTTTCTT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATACAGGAGACATTTTAATCGCCATTCATTAAGATCCGTA
TATTTCTCATCTAGAAAGCAAATGGCGTCCTTACACTCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ACCGTTTTAACTCATCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTATAAATTAAGCCCCTTAATTGTATAG
TAAATTTATCTTCTATATTAGGATTATTCATAAATATATCATGGCACAAAATAATACTGCCGCTGGTTTTATTGTGC
ATTATCTTGGTGAAAATACGGAACCATCGTCGCTCTTAGAGTTTCTTTGGCGCCTAGCTGTCTACACAACCTCTCG
GATGTGCTTCGTATTGATAGAAAGCAAACCTATAGTTGATATTTGCGCCCCACTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCTATATGGAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTTGGCCACGATCCATACAAAGCTTGAGGGGGACATCATGCCACCATAGGCCACAGTGTTTCAGAATGCAGTGTTT
ATCTATCGACAAAGACTGGTTGGCTACCGTCTTTTTGACGAGGGTCTGCAGAGAGAGCGGTAATGACAT

[0214] SEQ ID No.59-Warmbaths MGF 360 13L (AY261365.1:30498-31559)

[0215] CTATAGTATATTATGAGAATATTTCCCAAATGATGGATAAGTTTTTTGATTTATAACCCTTTAATAAACT
GCTTATTTCTTCGGGGTCCTTTAAGTTTAGTGGCAAGGAAGCATCTGAGCTGTAAATATCCAAAGCCAAACTATGGC
TTAGAAAATGATAACCTTTTTGTTCCGCTATGGCACGACCCCTCTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGGGCGTAACAGTA
ATATATTGTTAATGGATTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTATCCT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATACAGGAGACATTTTAATCGCCATTCATTAAGACCCGTA
TATTTCTCATCTAGAAAGCAAATGGCGTCCTTACACTCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ATCGTTTTAACTCATCCGTTTCTTTTATTTCTATGAGCCTCCATAGTCTTTTACAAATTAAGCCCCTTAATTGTATAG

TAAATTTGTTTTCTATATTAGGATTATTCATAAATATCTCATGGCACAAAATAATACGGCCGCTGGTTTTATTGTGC
ATTATCTTGGTGAAAATACGGAATAATATCGTTGTCTCTAGAGTTTTTTTGGCACCTAGCTGTCTACACAACCTCTCG
GATGTGTTCCGTATTGATAGAAAGCAAACCTATAGTTGATATGTGCGCCCCATTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCTACATGGAGATCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTTGGCCACGATCCATACAAAGCTTGAGGGGGACATCATGCCACCATAGGCCACAGTGTTTCAGAATGCAGTGTTTC
ATCTGTGACAAACACTGGCTGGCTACCGTTTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0216] SEQ ID No.60-Warthog MGF 360 13L (AY261366.1:27277-28338)

[0217] CTATAGTATATTATGAGAATATTCCCAAATGATGGATAAGTTTTTTTGATTTATAATCCTTTAATAAACT
GCTTATTTCTTCGGGGTCTTTAAGTTTAGTGGAAGGAAGCATCTGAGCTGTAAATATCCAAAGTCAAACCTATGGC
TTAGAAAATGATAACCTTTTTGTTCCGCTATAGCACGACCCTCTTCAAAGGCATTACCACCCAAATCTATACAGAAA
AATATATTACCGATGTTATAATATTGTACTGAAGTAAGCATAGCTTGGTTGATGTTGCCCCCAGGGCGTAACAATA
ATATATTGTTAATGGATTGTTATCCTTGGTAGAAGCCAGACATATCATGTCATGGACGTCTATTTGGACTTTTTCTT
TGTGGTACATCTCATGAAGCTCATATATTTTGTATAATACAGGAGACATTTTAATCGCCATTCATTAAGATCCGTA
TATTTCTCATCTAGAAAGCAAATGGCGTCCTTACACTCGTATTGTACTGCTTTGGCGTACCAATACTTCACTAGTAA
ATCGTTTAACTCATCCGTTTCTTTTATTTCTATGAGCCCCCATAGTCTTTTACAAATTAAGCCCCTTAATTGTATAG
TAAATTTGTTTTCTATATTAGGATTATTCATAAATATCTCATGGCACAAAATAATACGGCCGCTGGTTTTATTGTGC
ATTATCTTGGTGAAAATACGGAATAATATCGTTGTCTCTAGAGTTTCTTTGGCACCTAGCTGTCTACACAACCTCTCG
GATGTGCTCCGTATTGATAGAAAGCAAACCTATAGTTGATATGTGCGCCCCATTCTGTAAAGAGCTTTATCAGACTAT
AGTTGTTTTCTTAACAGCTATTATTAATGCTATATGGAGGTCTATATCTTCTCCTAAAAATCCTGATTTTATTTGT
ATTTGGCCACGATCCATACAAAGCTTGAGGGGGACATCATGCCACCATAGGCCACAGTGTTTCAGAATGCAGTGTTTC
ATCTGTGACAAACACTGGCTGGCTACCGTCTTTTTTGACGAGGGTCTGCAGAGAGAGCGGCAACGACAT

[0218] 在本发明的减毒ASFV的实施方案中, MGF 360 13L基因的表达和/或活性被破坏。
适当地, MGF 360 13L基因包含SEQ ID No. 49、50、51、52、53、54、55、56、57、58、59或60的序
列。适当地, MGF 360 13L基因包含与SEQ ID No. 49、50、51、52、53、54、55、56、57、58、59或60
具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地, MGF360 13L基因
由SEQ ID No. 49、50、51、52、53、54、55、56、57、58、59或60的序列组成。

[0219] MGF 360 14L基因序列

[0220] SEQ ID No.61-贝宁97/1MGF 360 14L (NC_044956.1:26073-27146)

[0221] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCATATTTTTTTGAAGT
ATATGTCTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATACCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGAGTTGTGCCCTATCAAAATCGGCG
GCCCCCAAATCAATACAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCAACCTATGACAGTAATAAATGGCCGCGTAATTTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTAATGCAAATCTCTTTTTACGACACAGCTCGTGTATGTCAAAAATGTTATTAAATAAAGGCTACAAGCTACC
CGCCAATAGAGCTGATTTTTATGCCTTTTATAAAAAATAGTGGATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGC
AAACCAAAACTTTGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAACCTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTAGGTTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTCAAGCCTCCAGTTCCGC
ACACAGCCGCTTTAGATACACGGCAGGAACACGTATAAGCCCATATTCAGGATTTGCGCCCCAATCCACAAATAAAC

GTATAAGTTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAACTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTTGCCAACGTTTGTAAGACA
ACAT

[0222] SEQ ID No.62-中国/2018/安徽XCGQ MGF 360 14L (MK128995.1:31843-32916)

[0223] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCAGATTTTTTGAAGT
ATATGTCTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATACCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGAGTTGTGCCCTATCAAAATCGGCA
GCCCCCAAATCAATACAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCAACCTATGACAGTAATAAATGGCCGCGTAATTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTGATGCAAATCTCTTTTTACGACACAACCTCGTGTATGTCAAAAATGTTATTAAAATAAAGGCTACAAGCTACC
CGCCAATAGAGGTGATTTTTATGCCTTTTATAGAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGC
AAACCAAACTTTGTTAATAGGTGGTGCGCCGTATCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAAGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGCAGAACTCCTGCACAG
GATTTTAGCCTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTTAAGCCTCCCAGTTCCGC
ACACAGCCGCTTTAGATACACGGCAGGAACACGTATAAGCCCATATTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGTTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCGAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAACTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTTGCCAACGTTTGTAAGACA
ACAT

[0224] SEQ ID No.63-格鲁吉亚2007/1MGF 360 14L (LR743116.1:32814-33887)

[0225] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCAGATTTTTTGAAGT
ATATGTCTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATACCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGAGTTGTGCCCTATCAAAATCGGCA
GCCCCCAAATCAATACAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCAACCTATGACAGTAATAAATGGCCGCGTAATTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTGATGCAAATCTCTTTTTACGACACAACCTCGTGTATGTCAAAAATGTTATTAAAATAAAGGCTACAAGCTACC
CGCCAATAGAGGTGATTTTTATGCCTTTTATAGAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGC
AAACCAAACTTTGTTAATAGGTGGTGCGCCGTATCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAAGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGCAGAACTCCTGCACAG
GATTTTAGCCTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTTAAGCCTCCCAGTTCCGC
ACACAGCCGCTTTAGATACACGGCAGGAACACGTATAAGCCCATATTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGTTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCGAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAACTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTTGCCAACGTTTGTAAGACA
ACAT

[0226] SEQ ID No.64-Ken06.Bus MGF 360 14L (NC_044946.1:29917-30990)

[0227] TTAGTCTATAACGACAATTTCTGGATGGGCTGTAAAATACTCTTCGGCTCGTTTTAGATTTTTTGACGT
ATATGTCTTTAGCATATCATATATTGCCTGGGGTTCGGTTATATTAAATACCAAGCTCGCATCACGGCTGAAAAGCT

GTTTTACTAAAAAATGTTGCTCAAGTTATACATATAAACTCTATGCGCAATGAGTCGCGCTCTATCAAAGTTAGTA
GCCCCCAAATCAATGCAGAAAAATAGGTTTAAAGTATTATTGTTATAGATAGATAGATTTCATGCCATAATCGGGACT
AGCCCCCAACATATGACAGTAATAAATGGCTGCATAATTTTCTTCCCGCAGGCAAGCAAATTTTCATCATTAGATTAG
GGCTAATGCAAATCTCTTTTTTAGAACACAGCTCATGCAAGTCAAAAATGTTATTAAAATAAAGGCTACAAGTTAGC
CGCCAATACAGCTGATTTTTATGTTTTTCGTAGAAATAGTGAATCGCTTTTGTAATAATTATGCCGTAATGCCAGGGC
AAACCAAACTTCGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATTTTTGAACGGGTATACATAACTGTGT
TTAAAGTGGTTCTAGTCACGGTTTCCATAAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTCAGATCGGCCACTTCTTTTAAAAATTTCCAGAAGACGAGATTCGGAGACAGGTGTTAAGCCTCCTAGTTCCGT
GCACAGCCGTTTTAGATGCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCCAATCCACAAACAATC
GTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCGTCAAGACAAAGATCATCCACAGAAAAACAC
TGCAAATGTTGATACGAAAAAATTTGCTTACATGTATTACATAAGTGAATAGGACCTAAATCCCACCACAAACCAAA
ACGCTGCAGCGTATAATCATAGTCACTTGAAAGATAATTGCACGCCACAACCTTTTTTGCCAACGTTTGTAAGACA
ACAT

[0228] SEQ ID No.65-肯尼亚1950MGF 360 14L (AY261360.1:36121-37194)

[0229] TTAGTCTATAACTACAATTTCTGGATGGGCTGTAAAATACTCTTCGGCTCGTTTTAGATTTTTTGACGT
ATATGTCTTTAGCATATCATATATTGCCTGGGGTTCGGTTATATTAAATACCAAGCTCGCATCACGGCTGAAAAGCT
GTTTTACTAAAAAATGTTGCTCAAGTTATACATATAAACTCTATGCGCAATGAGTCGCGCTCTATCAAAGTTAGTA
GCCCCCAAATCAATACAGAAAAATAGGTTTAAAGTATTATTGTTATAGATAGATAGATTTCATGCCATAATCGGGACT
AGCCCCCAACATATGACAGTAATAAATGGCTGCATAATTTTCTTCCCGCAGGCAAGCAAATTTTCATCATTAGATTAG
GGCTAATGCAAATCTCTTTTTTAGAACACAGCTCATGCAAGTCAAAAATATTATTAAAATAAAGGCTACAAGCCAGC
CGCCAATAGAGCTGATTTTTATGCTTTTCATAGAAATAGTGAATCGCTTTTGTAATAATTATGTCGTAATGCCAGGGC
AAACCAAACTTCGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATTTTTGAACGGGTGTACATAACGGTGT
TTAAAGTGGTTCTAGTCACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTCAGATCGGCCACTTCTTTTAAAAATTTCCAGAAGACGAGATTCGGAGACAGGTGTTAAGCCTCCTAGTTCTGT
GCACAGCCGTTTTAGATCCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCCAATCCACAAACAATC
GTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCGTCAAGACAAAGATCATCCTCAGAAAAACAC
TGCAAATGTTGATACGAAAAAATTTGCTTACATGTATTACATAAGTGAATAGGACCTAAATCCCACCACAAACCAAA
ACGCTGCAGCGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTTGCCAACGTTTGTAAGACA
ACAT

[0230] SEQ ID No.66-L60 MGF 360 14L (NC_044941.1:26422-27495)

[0231] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAAGATACTCTTCGGCTCGTTTCATATTTTTTGAAGT
ATATGTCTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATACCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGAGTTGTGCCCTATCAAATCGGCG
GCCCCCAAATCAATACAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCCAACCTATGACAGTAATAAATGGCCGCGTAATTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTAATGCAAATCTCTTTTTACGACACAGCTCGTGTATGCAAAAATGTTATTAAAATAAAGGCTACAAGCTACC
CGCCAATAGAGCTGATTTTTATGCCTTTTATAAAAAATAGTGGATAGCCTTTTGTAATAATTATGTCGTAATGCCAGGGC
AAACCAAACTTTGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAAGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG

GATTTTAGGTTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTCAAGCCTCCCAGTTCCGC
ACACAGCCGCTTTAGATACACGGCAGGAACACGTATAAGCCCATTTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGTTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAACTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACTTTTTTGGCCAACGTTTGTAAGACA
ACAT

[0232] SEQ ID No.67-马拉维Li1-20/1(1983)MGF 360 14L (AY261361.1:30193-31266)

[0233] TTAGTCTATAACTACAATTTCTGGATGGGCTGTAAAATACTCTTCGGCTTGTTTTAGATTTTTTGACGT
ATATGTATTTAGCATATCATATATTGCCTGGGGCTCAGTTAGATCTAATATCAAGCTCACATCACGGCTGAAAAGCT
GTTTTACTAAAAAAGGTTGCTCAAGTTATACATATAAACTCTACGCGCAATGAGTCGCGCCCTATCAAAGTTAGTA
GCCCCCAAATCAATGCAGAAAAATAGGTTTAAAGTATTATTGTTATAGATAGATAGATTTCATGCCATAATCAAGACT
AGCCCCTAACATATGACAGTAATAAATGGCTGCATAATTTTCTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTAATGCAAATCTCTTTTTTACAACACAGCTCATGCAAGTCAAAAATGTTGTTAAAATAAAGGCTACAAGTCAGT
CGCCAATAGAGCTGATTTTTATGCTTTTCGTAGAAAATAGTGAATAGCTTTTGTAATTTATGTCGTAATGCCAGGGC
AAACCAAAACTTTGATAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATTTTTGAACGGGTGTACATAACTGTGT
CTAAGGTGGTTCTAGTCACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTCAGATCGGCCACTTCTTTTAAAATCTCCAGAAGACGAGATTCGGATACAGGTGTTAAGCCTCCTAGTTCCAT
GCACAGCCGCTTTAGATGCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCCAATCCACAAACAATC
GTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATATGAAAAAATTTGCTTACATGTATTACATAAGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAGCGTATAATCATAATCACTTGAAAGATAATTGCATGCCACAACTTTTTTGGCCAGCGTTTGTAAGACA
ACAT

[0234] SEQ ID No.68-Mkuzi 1979MGF 360 14L (AY261362.1:33547-34620)

[0235] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAAGATACTCTTCGGCCCGTTTCATATTTTTTGAAGT
ATATGTCTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATACCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGAGTTGTGCCCTATCAAAATCGGCA
GCCCCCAAATCAATACAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCAACCTATGACAGTAATAAATGGCCGCGTAATTTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTAATGCAAATCTCTTTTTTACGACACAGCTCGTGTATGTCAAAAATGTTATTAAAATAAAGGCTACAAGCTACC
CGCCAATAGAGCTGATTTTTATGCCTTTTATAAAAAATAGTGGATAGCCTTTTGTAATTTATGTCGTAATGCCAGGGC
AAACCAAAACTTTGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAACGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTAGGTTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTTAAGCCTCCCAGTTCCGC
ACACAGCCGCTTTAGATACACGGCAGGAACACGTATAAGCCCATTTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGTTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAACTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACTTTTTTGGCCAACGTTTGTAAGACA
ACAT

[0236] SEQ ID No.69-Pretorisuskop/96/4MGF 360 14L (AY261363.1:32525-33598)

[0237] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCAGATTTTTTGAAGT
ATATGACTTTAGCCTATCATATATTTCTGGGGTTCGGTTACATCTAATGCCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGTGTTGTGCCCTATCAAAATCAGTA
GCCCCAAATCGATGCAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCTAACCTATAACAGTAATAAATGGCCGCATAATTTTTTTTTCTGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTGATGCAAATCTCTTTTTACGACACAGCTCGTGTATGTCAAAAATGTTATTTAAATAAAGGCTACAAGCTACC
CGCCAATAGAGGTGATTTTTATGCCTTTTATAGAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGC
AAACCAAACTTTGTTAATAGGAGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAACGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAG
GATTTTAGCTTGGCCACTTCTTTTAAAAATTTCCAGAAGACGGGGTTCGGTTACAGGCGTTAAGCCTCCCAGTTCCGT
GCACAGCCGCTTTAGATGCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTAATGTTTATACGAAAAAATTTGCTTACAATTGTTACACAGGTGAATAGGACCTAAATCCCACCACAAACCAAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTGGCCAACGTTTGTAAAGACA
ACAT

[0238] SEQ ID No.70-Tengani 62MGF 360 14L (AY261364.1:26983-28056)

[0239] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCAGCTCGTTTCAGATTTTTTGAAGT
ATATGACTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATGCCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAGAAAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGCGTTGTGCCCTATCAAAATCAGTA
GCCCCAAATCGATGCAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCCCCTAACCTATAACAGTAATAAATGGCCGCATAATTTTTTTTTCTGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTGATGCAAATCTCTTTTTACGACACAACCTCGTGTATGTCAAAAATGTTATTTAAATAAAGGCTACAAGCTACC
CGCCAATAGAGGTGATTTTTATGCCTTTTATAGAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGC
AAACCAAACTTTGTTAATAGGTGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAACGTGTGT
CTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGCAGAACTCCTGCACAG
GATTTTAGCCTGGCCACTTCTTTTAAAAATTTCCAGAAGACGGGATTCGGATACAGGCGTTAAGCCACCCAGTTCCGT
GCACAGCCGCTTTAGATGCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCCAATCCACAAATAAAC
GTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACAC
TGTACATGTTTATACGAAAAAATTTGCTTACAATTATTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAAA
ACGCTGCAACGTATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTGGCCAATGTTTGTAAAGACA
ACAT

[0240] SEQ ID No.71-Warmbaths MGF 360 14L (AY261365.1:31747-32820)

[0241] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCATATTTTTTGAAGT
ATATGCCTTTAGCCTATCATATATTTCTGGGGTTCGGTTACATCTAATGCCAAGGTCACATCACGGCTGAAAAGCT
GCTTTACTAAAAGAATGTTGCTCAAGTTATACATATAAGCTTTGTGCGCAATGCGTTGTGCCCTATCAAAATCAGTA
GCCCCAAATCGATGCAGAAAAACAGGTTTAAAGAATTATTGTTATAGATAGAAAGATTTCATGCCATAATCGAGACT
AGCTCCCAACCTATAACAGTAATAAATGGCCGCGTAATTTTTTTCCCGCAAGCAAGCAAATTTTCATCATCAGATTAG
GGCTAATGCAAATCTCTTTTTACGACACAGCTCGTGTATGTCAAAAATGTTATTTAAATAAAGGCTACAAGCTACC
CGCCAATAGAGGTGATTTTTATGCCTTTTATAGAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGCGC

AAACCAAACTTTGTTAATAGGTGGTGCGCCGTATCCCCCATCAACGGAATTTTTGAACAGCTGTACATAACTGTGTCTAAAGTGGTTCTAGTTATGGTTTCCAAGAGTGGGTTATAACAAAACATGTCATAACCCAGTAGAACTCCTGCACAGGATTTTAGGTTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGTGTTAAGCCTCCCAGTTCTGTGCACAGCCGCTTTAGATGCACGGTAGGAACACATATAAGTCCATATTCAGGATTTGCACCCCAATCCACAAATAAACGTATAAGCTCAAGATTATCCCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAGAGATCATCCTCAGAAAAACACTGTAAATGTTTATACGAAAAAATTTGCTTACAATTGTTACACAGGTGAATAGGACCTAAATCCCACCACAAACCAAAACGCTGCAACATATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTGGCCAACGTTTGTAAAGACAACAT

[0242] SEQ ID No.72-Warhog MGF 360 14L (AY261366.1:28495-29568)

[0243] TTAGTCTATAACTATAATTTCTGGATGGGCTGTAAGATACTCTTCGGCTCGTTTCAGATTTTTTTGAAGTATATGACTTTAGCATATCATATATTTCTGGGGTTCGGTTACATCTAATGCCAAGGTCACATCACGGCTGAAAAGCTGCTTTACTAAAAAATGTTGCTCAAGTTATACATATAAGTTTTGTGCGCAATGCGTTGTGCCCTATCAAAATCAGTAGCCCCCAATCGATGCAGAAAAACATGTTTAAAGTATTATTGTTATAGATAGAAAGATTCATGCCATAATCGAGACTAGCCCCTAACCTATAACAGTAATAAATGGCCGCATAATTTTTTTTCCGCAAGCAAGCAAATTTTCATCATCAGATTAGGGCTGATACAAATCTCTTTTTTACGACACAGCTCGTGTATGTCAAAAATGTTATTAAAATAAAGGCTACAAGCTACCGCCAATAGAGGTGATTTTTATGCCTTTTATAAAAAATAGTGAATAGCCTTTGTAAAATTATGTCGTAATGCCAGGGCAAACCAAACTTTGTTAATAGGTGGTGCGCCGTATCCCCCGTCAACGGAATGTTTGAACAGGTGTACGTAAGTGTGTCTAAAGTGGTTCTAGTTACGGTTTCCAAGAGTGGATTATGACAAAACATGTCATAACCCAGTAGAACTCCTGCACAGGATTTTAGCTTGGCCACTTCTTTTAAAATTTCCAGAAGACGGGGTTCGGATACAGGCGTTAAGCCTCCCAGTTCCGTGCACAGCCGCTTTAGATGCACGGCAGGAACACGTATAAGTCCATATTCAGGATTTGCGCCCAATCCACAAATAAACGTATAAGCTCAAGATTATCGCTCTTCACGGCCTTTACTAGCGCCGCTTCAAGACAAAGATCATCCTCAGAAAAACACTGTAAATGTTTATACGAAAAAATTTGCTTACAATTGTTACATAGGTGAATAGGACCTAAATCCCACCACAAACCAAAACGCTGCAACATATAATCATAGTCACTTGAAAGATAATTGCATGCCACAACCTTTTTGGCCAACGTTTGTAAAGACAACAT

[0244] 在本发明的减毒ASFV的实施方案中, MGF 360 14L基因的表达和/或活性被破坏。适当地, MGF 360 14L基因包含SEQ ID No.61、62、63、64、65、66、67、68、69、70、71或72的序列。适当地, MGF 360 13L基因包含与SEQ ID No.61、62、63、64、65、66、67、68、69、70、71或72具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地, MGF360 14L基因由SEQ ID No.61、62、63、64、65、66、67、68、69、70、71或72的序列组成。

[0245] MGF 505 1R基因序列

[0246] SEQ ID No.73-贝宁97/1MGF 505 1R (NC_044956.1:21971-23566)

[0247] ATGTTCTCTCTCCAGAACTTATGTGCAAAAACATTACCTGACTGTAAACTTCCTGAATTTTTTGACGATTATATATTACAAGTCTGGGATTATACTGGGAAAACCATGGAAGTATTCACGGGCAGGAAACAAGTGTGTGCTTATACAACAACATACCCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGGGCCTTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGTAACCGCTACAAGTAAATTCGTAATATGATGATCAAATCAAGGACCATCATGACATTCTGCCATTCATTGATGATCCAATCATATTTACAAATGCCATATCATGCGGCGATGCTTTTTTGATTGTATTTATATCAAGCTGTAAAATATAGTAAGTTTCGTGTTCTTCTTTATTAAATATACATTAGAGGATGATTTGCCCTCGTTCATTTACTTATTGAAAAGGCATGTGAAGATCATAATTATGAAGTTATTAAATGGATATATGAAAACCTACATGTCTGCCATATAATAGATACCTTTGACTGTGCTATTGCCATAAAGA

TCTACGTTTATATTGTTTGGGGTATACATTTATATACAACAGGATTGTACCCTATAAGTATCATCATTTAGATATTC
TCATACTTTCAAGCCTACAACCTCCTACATAAGGTGGCGGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATATAGATAATTTAGATGTTATTCTAACACAAGCTGCAACATATAACCATAGAAAAATTTTAACCTA
TTTTATTCTCAATCAACCTACGCACAAATAGAACAATGTTTGTTCGTGGCGATAAAAAACAAATCTTCCAAGAAAA
CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAAACTCATCCAAAAATCAGCCAATATGTTGCCACTTTC
AATTCAACAAATATAATAGGCATTCTGAGTATGAAGCGGAAAAAGAAGATATATTTGGATATCATATTGACAAAATT
TGTAACAAATGCTATTTTAAATAAATTTGTCTGTTTCGATGTATGGAGAGATTTTCTATAAACCCGGAAAGAATCGTCA
AAATGGCTGCGCGTATAAATAAGATGATGTTAGTGAAAAAATATCTGAACATGTTTGGAAAAATCATGCGGCTAGA
CTTAAACACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
ACACTGCTATTACCATATGCAAGGGGAAGAAATTTTATAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTCGACGTTTTTTTATAATTGTTGTATCCTAGATACGATACGATTCAAAAGCCTTCTTTTAGATTGTTTCACATATC
ATAGGTAAAAACGCTCATGATGCTACTAATATCAACATCGTGAACAAGTATATTGGCAACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTATATGCCTTAG

[0248] SEQ ID No.74-中国/2018/安徽XCGQ MGF 505 1R(MK128995.1:27736-29331)

[0249] ATGTTCTCTCTCCAGAACTTATGTGCAAAAAACATTACCTAACCGTAAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGAGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACATACCCTCATTCCCGTAAATGAAGCCCTGAGAACAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCGCCATTCATTGACGATCCAGTCATATTTACAAATGCCA
TATCATGCGGCAATGCTTTTTTGATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTACT
TTAAACATAGATTAGAGGATGATTTGCCCTTCACTCATTACTTATTGAAAAGGCATGTAAAGATCATAATTATGAA
GTTATTAAATGGATATATGAAAACCTACATATCTACAATATGATAGATACCTTTGAATGTGCTATTGCCCATAGGA
TCTACATCTATATTGTTTGGGGTATAGATTTATATATAACAGAATCGTACCCGATAAGTATCATCATTTAGATATTC
GCATGCTTTCAAGCCTACAACCTCCTACATAAGGTGGCAGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATAAAGATAATATAAATATTATTCTAACACAAGCTGCAACCTATAACCATAGAAAAATTTTAATCTA
TTTCATTCTCAATCAACCCACGCACAGATAGAACAATGTTTACTAGTGGCGATAAAAGCAAAATCTTCCAGAAAA
CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAACCTCATCAAAAAATAAGCCATTATGTTGCCACTTAC
AATTCAACAAATATAATAGGCATTCTGAGTATGCGGCGGAAAAAGAAGATATATTTAGATATCATATTGACAAAATT
TGTAACAAAAAGCTATTTTAAATAAGTTTGTCTGTTTCGATGTATGGATACATTTTCTATAAACCCGGAAAGAATCCTTA
AAATAGCCGCGCAATAAATAGGATGATGTTAGTGAAAAAATATCTGAACATGTTTGGAAAAATCATGCGGTTAGA
CTTAAATACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
TCGCTGTTATTACCATATGCAAGGGGAAGAAATCTTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTTATGATTGTTGTATCCTAGATACGATACGATTCAAAAGCCTTCTTTTAGATTGTTTCACATATC
ATAGGTAAAAACGCTCATGATGCTACCAATATCAACATCGTGAACAAGTATATCGGCAACCTGTTTGTTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATTTATTCTAAACAATACATGCCTTAG

[0250] SEQ ID No.75-格鲁吉亚2007/1MGF 505 1R(LR743116.1:28707-30302)

[0251] ATGTTCTCTCTCCAGAACTTATGTGCAAAAAACATTACCTAACCGTAAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGAGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACATACCCTCATTCCCGTAAATGAAGCCCTGAGAACAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC

TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTCATTGACGATCCAGTCATATTTACAAATGCCA
TATCATGCGGCAATGCTTTTTTGTATTGTTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTACT
TTAAACATAGATTAGAGGATGATTTGCCCTTCACTCATTACTTATTGAAAAGGCATGTAAAGATCATAATTATGAA
GTTATTAAATGGATATATGAAAACCTACATATCTACAATATGATAGATACCTTTGAATGTGCTATTGCCCATAGGA
TCTACATCTATATTGTTTGGGGTATAGATTTATATATAACAGAATCGTACCCGATAAGTATCATCATTTAGATATTC
GCATGCTTTCAAGCCTACAACCTCTACATAAGGTGGCAGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATAAAGATAATATAAATATTATTCTAACACAAGCTGCAACCTATAACCATAGAAAAATTTAATCTA
TTTCATTCTCAATCAACCCACGCACAGATAGAACAATGTTTACTAGTGGCGATAAAAGCAAAATCTTCCAGGAAAA
CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAACCTCATCAAAAAATAAGCCATTATGTTGCCACTTAC
AATTCAACAAATATAATAGGCATTCTGAGTATGCGGCGGAAAAAGAAGATATATTTAGATATCATATTGACAAAATT
TGTAaaaaaagctatTTTTAATAAGTTTGTGCTTCGATGTATGGATACATTTTCTATAAACCCGAAAGAATCCTTA
AAATAGCCGCGGAATAAATAGGATGATGTTAGTGAAAAAATATCTGAACATGTTTGAAAAATCATGCGGTAGAA
CTTAAATACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
TCGCTGTTATTACCATATGCAAGGGGAAGAAATCTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTATGATTGTTGTATCCTAGATACGATACGATTCAAAAGCCTTCTTTTAGATTGTTACATATC
ATAGGTAAAAACGCTCATGATGCTACCAATATCAACATCGTGAACAAGTATATCGGCAACCTGTTTGTTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATTTATTCTAAACAATACATGCCTTAG

[0252] SEQ ID No.76-Ken05/Tk1 MGF 505 1R (NC_044945.1:29657-31249)

[0253] ATGTTCTCTCTCCAAACCTTATGTGAAAAACCTTACCTGACTGTAACTTCCTGAATTTTTTGACGAT
TATGTATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACGATTCAACGAGCAGGAAACAACCTGTGTACTTAT
CCAACAACATAACCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGTAACCGCCACAACCTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTTATTGACGATCCAGTTATATTTACAAATGTCA
TATAATGCGGCGATGCTTTTTTAATTGTATGTTGTATCAAGCTGTAAAATATAGTAAGTTTAGCGTTCTTCTATATT
TTAAATATATATTAAGGAAAAATTTGCCCTCGTCCACTCACTCATTGAAAAAGCGTATAAATATCATAATTATGAG
GTTATTAAATGGATCTATGAAAATCTACATATCTATGATATCATAAATACTTTTAAATATGCTATTGCCCATAAAGA
TCTACGTTTATATTGTTTAGGGTATACATTTGTATATAATAGGATCGTACCCTATAAGTATTATCATTTAGATATTC
GCATCCTTTTAAGGCTACAACCTTCTACATAAGGTGACAGCCAAAGGATACTTGGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATACAAACAATATAGATATTATCCTAACACAGGCTGCAACCTATAACCATAGAAACATTTTAACCTA
TTTCATTCTCAATCAACCTACGCACAAATAGAACAATGCTTATTCGTGGCAATAAAAAACAAACGCTTCCAAAAAAA
CCTTGAATTTACTATTATCTCACCTAAACCTTTCTATCAAACTCGTCAAAAAATTAAGCCAATATGTTGTGCGTTAC
AAGTCAACAAATATCATAAGCATTCTGAGTATGCAGCAAAAAAGAAGATATATTTAGATATCATTTTGACAAAGGT
TGTAaaaaaagctgTTTTTATTAAATTTGTCATTGGATGTATGGTTACATTTTCCATAAACCCAGAAAGAATTGTCA
AAATGGCCGCGGAATAAAAAAGATGAAGTTAGTAAAAAATATATCTGAACATGTTTGAAAAATCATGCGGCTAAA
CTTAAACATCTTAAGCATGCGGTACACACGATGAAGCATCAAGAAGGAAAAAATAGACTCATGAACCTTTATCTATGA
TCACTGCTATTACCACATGCAAGGAGAAGAGATCTTAGTCTTGCAAGATTTTATGCAATCCATCATGCGCCAAAT
TGTTTCGACGTTTTTTATGATTGTTGTATCCTAGATACGATACGATTTAAAAGCCTGCTTTTAGATTGTTACATATT
ATAGCTAAAAACGCTCATGATGCTAGTATTAACATCGTGAATAAGTATATTGGCAATCTATTTGCTATGGGAGTTCT

TAGCAAAAAGAAATCTTACAAGACTATCCATCCATCTATTCTAAATATGACATACTTTAG

[0254] SEQ ID No.77-Ken06.Bus MGF 505 1R (NC_044946.1:25784-27376)

[0255] ATGTTCTCTCTCCAGAACTTATGTGCAAAAACCTTACCTGACTGTAACTTCCTGAGTTTTTTGACGAT
TATGTATTACAACCTGCTGGGCTTATACTGGGAAAATCATGGTACGATTCAACGAGCAGGAAACAACCTGTGTACTTAT
CCAACAACATAACCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAGGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGGAACCACCACAACCTTAATTCGT
AAATACGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTTATTGACGATCCAGTCATATTTACAAATGTCA
TACAATGCGGCGATGCTTTTTTAATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTCAGCGTTCTTCTATACT
TTAAATATATATTAAAGGAGAATTTGCCCCTCGTCCACTCACTTATTGAAAAGGCGTATAAATATCATAATTATGAG
GTTATTAAATGGATCTATGAAAACCTACATATCTATGATATCATAAATACTTTTAAATGTGCTATTGCCATAAAGA
TCTACGTTTATATTGTTTAGGGTATACATTTGTATATAATAGAATCGTACCCTATAAGTATTATCATTTAGATATTC
GCATCCTTTTAAGGCTACAACCTTCTACATAAGGTGACAGCCAAAGGATACTTGGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATACAAACAATATAGATATTATCCTAACACAGGCTGCAACCTATAACCATAGAAACATTTTAAACCTA
TTTCATTCTCAATCAACCTACGCACAAATAGAACAATGTTTATTCGTGGCGATAAAAACAAATGCTTCCAAGAAAA
CCTTGAATTTACTATTATCTCACCTAAATCTTCTATCAAACTCGTCAAAAAATTAAGCCAATATGTTGTCGCTTAC
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TGTAaaaaatgctgTTTTTAATAAATTTGTCATTGGATGTATGGTTACATTTTCCATAAACCCAGAAAGAATTGTCA
AAATGGCCGCGGAATAAAAAAGATGAAGTTAGTAAAAATATATCTGAACATGTTTGGAaaaaATCATGCGGTAAAA
CTTAAATATCTTAAGCATGCGGTACACACGATGAAGCATCAAGAAGGAAAAAATAGATTAATGAACCTTTATCTATGA
TCACTGTTATTACCACATGCAAGAAGAAGAGATCTTAGCCTCGCAAGATTTTATGCAATCCATCATGCGCCAAAT
TGTTTCGACGTTTTTTATGATTGTTGTATCCTAGATACGATACGATTTAAAAGCCTGCTTTTAGATTGTTACATATC
ATAGTTAAAAACGCTCATGATGCTAGTATTAACATCGTGAACAAGTATATTGGCAATCTATTTGCTATGGGAGTTCT
TAGCAAAAAGAAATCTTACAAGACTATCCATCTATCTATTCTAAGGATTACATGCTTTAG

[0256] SEQ ID No.78-肯尼亚1950MGF 505 1R (AY261360.1:31904-33496)

[0257] ATGTTTTCTCTCCAGAACTTATGTGCAAAAACCTTACCTGACCGTAACTTCCTGAATTTTTTGACGAT
TATGTATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACGATTCAACGAGCAGGAAACAACCTGTGTACTTAT
CCAACAACATAACCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCTTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGTAATCGCCACAACCTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTTATTGACGATCCAGTCATATTTACAAATGTCA
TATGATGCGGCGATGCTTTTTTAATTGTATTTTGTATCAAGCTGTAAAATATAGTAAGTTTAGCGTTCTTCTATATT
TTAAATATATATTAAAGGAGAATTTGCCCCTCGTTCATTCACTTATTGAAAAGGCGTGTGAAGATCATAATTATGAA
GTTATTAAATGGATCTATGAAAACCTACATATCTATGAAATAATGGATACCTTTAAATGTGCTATTGCCATAAAGA
TCTACATTTATATAGTTTAGGATATACATTTATATATAATAGGATCGTACCCTATAAGTATCATCATTTAGATATTC
GCATACTTTCAAGGCTACAACCTTCTACATAAGGTGACAGCCAAAGGATACTTGGACTTTATCCTAGAAACCTTAAAG
TATGATCATAATAAAGATAATATAAATATTATTCTGACACAAGCTGCAACCTATAACCATAGAAACATTTTAAACCTA
TTTCATTCTCAATCAACCTACGCGCAGATAGAACAATGCTTATTCGTGGCAATAAAAACAAACGCTTCCAAGAAAA
CCTTGAATTTACTATTATCTCACCTAAACCTTTCTATCAAACTCGTCAAAAAATTAAGCCAATATGTTGTTGCTTAC
AAGTCAACAAATATCATAAGCATTCTGAGTATGCAGCAAAAAAGAAGATATATTTAGATATCATTTTGACAAAGGT
TGTAaaaaACGCTATTTTTTATTAAATTTGTCATTGGATGTATGGTTACATTTTCCATAAACCCAGAAAGAATTGTCA

AAATGGCCGCGGAATAAAAAAGATGAAGTTAGTGAAAAATATATCTGAACATGTTTGAAAAATCATGCGGCTAAA
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TCACTGTTATTACCACATGCAAGGAGAAGAGATCTTTAGTCTTGCAAGATTTTATGCAATCCATCATGCGCCAAAAT
TGTTTCGACGTTTTTTATGATTGTTGTATCCTAGATACGATACGATTTAAAAGCCTGCTTTTAGATTGTTTCATATATC
ATAGCTAAAAACGCTCATGATGCTAGTATTAACATCGTGAATAAGTATATTGGCAATCTATTTGCTATGGGGTTCT
TAGCAAAAAAGAAATCTTACAAGACTATCCATCCATCTATTCTAAGGATTACATGCTTTAG

[0258] SEQ ID No.79-L60 MGF 505 1R (NC_044941.1:22320-23915)

[0259] ATGTTCTCTCTCCAGAACTTATGTGAAAAACATTACCTGACTGTAAACTTCCTGAATTTTTTGACGAT
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCACGGGCAGGAAACAACCTGTGTGCTTAT
ACAACAACATACCCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGGGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGTAACCGCTACAACCTTAATTCGT
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TATCATGCGGCGATGCTTTTTTATTGATTGTTTTATATCAAGCTGTAAAATATAGTAAGTTTCGTGTTCTTCTTTATT
TTAAATATACATTAGAGGATGATTTGCCCTCGTTCATTTACTTATTGAAAAGGCATGTGAAGATCATAATTATGAA
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CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAAACCTCATCCAAAAATCAGCCAATATGTTGCCACTTTC
AATTCAACAAATATAATAGGCATTCTGAGTATGAAGCGGAAAAAGAAGATATATTTGGATATCATATTGACAAAATT
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AAATGGCTGCGGTATAAAATAAGATGATGTTAGTGAAAAAATATCTGAACATGTTTGAAAAATCATGCGGCTAGA
CTTAAACACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
ACACTGCTATTACCATATGCAAGGGGAAGAAATTTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTCGACGTTTTTTATAATTGTTGTATCCTAGATACGATACGATTCAAAAGCCTTCTTTTAGATTGTTTCACATATC
ATAGGTAAAAACGCTCATGATGCTACTAATATCAACATCGTGAACAAGTATATTGGCAACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTATATGCCTTAG

[0260] SEQ ID No.80-马拉维Li1-20/1 (1983) MGF 505 1R (AY261361.1:26041-27633)

[0261] ATGTTCTCTCTCCAGAACTTATGTGAAAAACATTACCTGACTGTAAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCACGAGCAGGAAACAACCTGTGTGCTTAT
CCAGCAACATAACCTTATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGCAACCGCCCCGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTTTGCCATTCATCGACGATCCAATCATATTTACAAATGTCA
CATAATGCGGCGATGCTTTTTTAATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGTGTTCTTCTTTATT
TTAAACATAGGTTAGGGGATGATTTGCCCTCACTCATTACTTATTGAAAAGGCATGTGAAGATCATAATTATGAA
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TCTACGTCTATATTGTTTGGGTATACATTTATATATAATAGGATCGTACCCTATAAGTATCATCATTTAGATATTT
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TATGATCATAACATAAATAATATAGATATTATTCTAACACAAGCTGCAACCTATAACCATAGAAAAATTTAACCTA
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CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAAACCTCATCAAAAAATAAGCCAATATGTTGTCACTTAC
AATTCAACAAATATCATAAGCATTCTGAGTATGCGGCGAAAAAGAAGATATATTTAGATATCATTTTGACAGAGTT
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CTTAAACACCTTAAGCATGCGGTACATACGATGAAGCATCAAGAAGGAAAAAATAGACTCATGAACCTTTATCTATGA
TCACTGCTATTACCACATGCAAGGGGAAGAGATCTTTGGCCTCGCAAGATTTTATGCAATCCATCATGCACCCAAGT
TGTTTGACGTTTTTTTATGATTGCTGCATGCTAGATGCTACACGATTTAAAAGCCTGCTTTTAGATTGTCCACATATC
ATAGGTAAAAACGCTTATGATGCTGGTATCAACCTCGTGAACAAATATATTGGCAACCTATTTGCTATGGGGTTCT
TAGCAAAAAAGAAATCTTACAGGACTATCCATCTATCTATTCTAAACATGATATGTTTTAG

[0262] SEQ ID No.81-Mkuzi 1979 MGF 505 1R (AY261362.1:29425-31020)

[0263] ATGTTCTCTCTCCAGAACTTATGTGAAAAACATTACCTGATTGTAAACTTCCTGAATTTTTTGACGAT
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGGGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACATACCCTTATTTCCATAAATGAAGCCCTGAGAACAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCATGGGAGGGGAATCTTTACTATGCTATTATAGGGGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
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TATCATGCGGCGATGCTTTTTTGATTGTATTTTATATCAAGCTGTAAAAATAGTAAGTTTCGCGTTCTTCTTTATT
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TCTACGTCTATATTGTTTGGGGTATACATTTATATATAACAGGATCGTACCCAATAAGTATCATCATATAGATATTC
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CCTTGAATTTACTATTGTCCCACCTAAACCTTTCCATCAAACCTCATCAAAAAATAAGCCAATATGTTGTCACTTAC
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TGTAaaaaatgctatTTTTTAATAAATTTGTCGTTTCGATATATGGATACGTTTTCTATAAACCCGGAaaaaatcgTCA
AAATGGCCGCGCAATAAATAAGATGATGTTAGTGAAAAAATATCTGAACATATTTGAAAAATCATGCGGCTAGA
CTTGAACACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
GTACTGCTATTACCATATGCAAGGGGAAGAAATTTTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTCGACGTTTTTTATAATTGTTGTATCCTAGATACGATACGATTCAAAAGCCTTCTTTTAGATTGTTTCACATATC
ATAGGTAAAAACGCTCATGATGCTACTAATATCAACATCGTGAACAAGTATATTGACAACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATTTATTCTAAACATTATATGCCTTAG

[0264] SEQ ID No.82-Pretorisuskop/96/4 MGF 505 1R (AY261363.1:28449-30044)

[0265] ATGTTCTCTCTCCAGAACTTATGTGAAAAACATTACCTGACTGTAAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGAGCAGGAAACAACCTGTGTGCTTGT
ACAACAACATACCCTCATTCCCGTAAACGAAGCCCTGAGAATAGCAGCGTCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGAAACCTTTACTATGCTATTATAGGAGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTTCATTGACAATCCAGTCATATTTACAAATGCCA

TATAATGCGGCGATGCTTTTTTGATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTATT
TTAAATATAGGTTAGAGAATGATTTGCCCTCGCTCATTACTTGTTGAAAAGGCATGTGAAGATCATAATTATGAA
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TATGATCATAACAATGATAATTTAGATATTATTCTAACACAAGCTGTAACATATAACCATAGAAAAATTTTAAACCTA
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CCTTGAACCTTACTACTGTCTCACCTAAAGCTTTCCATCAAACTCATCAAAAAAATAAGCCAATATGTTGCCACTTAC
AATTCAACAAATATAATAGGCATTCTGAATATGAAGCGGAAAAAGAAGATATATTTAGATATCATATTGACAAAATT
TGTAATAACGCTATTTTAAATAAATATGTCGTTTCGTTGTATGGATACATTTTCCATAAACCCGGAAGAATCATCA
AAATGGCCGCGGAATAAATAAGATGTTGTAGTGAAAAAATATCTCAACATGCTTGAAAAATCATGCGGCTAGA
CTTAAACACCTTAAGCATGCGGTATACACGATGAAACATAAAGATGGGAAAAATAGACTCATGAACCTTGATCTATGA
TCACTACTATTACCATATGCAAGGGGAAGAAATCTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTATGATTGTTGTCTCCTAGATACTATACGATTTAAAAGCCTTCTTTTAGATTGTTTACACATC
ATAGGTAAAAACGCTCATGATGCTACTAATATCACTATCGTGAACAAGTATATTGGCAACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTACATGCCTTAG

[0266] SEQ ID No.83-Tengani 62 MGF 505 1R (AY261364.1:22891-24486)

[0267] ATGTTCTCTCTTCAGAACCTATGTGAAAAACATTACCTGACTGTAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAAACCATGGAACCTATCAACGAGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACATAACCTCATTCCCGTAAATGAAGCCCTAAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGAGTC
TTTTATTAGCATGGGAGGGGAACCTTTACTATGCTATTATAGGGGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAGTATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTCATTGACGATCCAGTAATATTTACAAATGCCA
TATCATGCGGCAATGCTTTTTTGATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTCTT
TTAAACATAGATTAAGGGATGATTTGCCCTTCACTCATTACTTATTGAAAAGGCATGTAAAGATCATAATTATGAA
GTAATTAAATGGATATATGAAAACCTACATATCTACAATATGATAGATACCTTTGAATGTGCTATTGCCATAAGGA
TCTACGTCTATATTGTTTGGGGTATAGATTTATATATAACAGGATCGTACCCGATAAGTATCATCATTTAGATATTC
GCATGCTTTCAAGCCTACAACCTCTGCATAAGGTGGCAGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAATAAGATAATATAAATATTATTCTAACACAAGCTGCAACCTATAACCATAGAAAAATTTTAACTTA
TTTCATTCTCAATCAACCCACGCACAGATAGAACAATGTTTACTAGTGGCGATAAAAACAAAATCTTCCAAGAAAA
CCTTGAACCTTACTACTGTCTCACCTAAACCTTTCCATCAATCTCATCAAAAAAATAAGCCATTATGTTGCCACTTAC
AATTCAACAAATATAATAGGCATTCTGAGTATGCGGCGGAAAAAGAAGATATATTTAGATATCATATTGACAAAATT
TGTAATAAAGCTATTTTAAATAAATTTGTCGTTTCGATGTATGGATACATTTTCTATAAACCCGGAAGAATCCTTA
AAATAGCCGCGGAATAAATAGGACGATGTTAGTGAAAAAATATCTGAACATGTTTGAAAAATCATGCGGTTAGA
CTTAAATACCTTAAACATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
TCGCTGTTATTACCATATGCAAGGGGAAGAAATCTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTATGATTGTTGTATCCTAGATACGATTCAAAAGCCTTCTTTTAGATTGTTTACATATC
ATAGGTAAAAACGCTCATGATGCTACCAATATCAACATCGTGAACAAGTATATCGGCAACCTGTTTGTTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTACATGCCTTAG

[0268] SEQ ID No.84-Warmbaths MGF 505 1R (AY261365.1:27651-29246)

[0269] ATGTTCTCTCTCCAGAACCTATGTGCAAAAACTTTACCTGACTGTAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGAGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACGTACCCTCATTCCCGTAAATGAAGCCCTGAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGGGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGAGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTCATTGACGATCCAGTCATATTTACAAATGCCA
TATAATCCGACGATGCTTTTTTAATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTACT
TTAAACATAGATTAGAGGATGATTTGCCCTCACTCATTACTTATTGAAAAGGCATGTGAAGATCATAATTATGAA
GTTATTAAATGGATATATGAAAACCTACATACCTACGATATAATGGATACCTTTGAATGTGCTATTGCCATAAGGA
TCTACGTCTATATTGTTTGGGGTATACATTTATATATAACAGGATCGTACCCTATGAGTATCATCATTTAGATATTC
TCATTCTTTCAAGCCTACAACCTCCTGCATAAGGTGGCAGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAACAATGATAATTTAGATATTATTCTAACACAAGCTGCAACATATAACCATAGAAAAATTTTAAACCTA
TTTCATTCTCAATTAACCTACGCACAAATAGAACAATGTTTGTTTCATGGCGATAAAAAAGAAAATCTTCCAAGAAAA
CCTTGAACCTTACTACTGTCTCACCTAACCTTTCCATCGAACTCATCAAAAAATAAGCCAATATGTTGTCACTTAC
AATTCAACAAATATAATAGGCATTCTGAGTATGAAGCGGAAAAAGAAGATATATTTAGATATCATGTTGACAAAATA
TGTAATAATACGCTATTTTTTAATAAATATGTGCTTCGATGTATGGATAGATTTTCCATAAACCCGGAAGAATCATCA
AAATGGCCGCGGAATAAATAGGATGATGTTAGTGAAAAAATATCTGAACATGTTTGAAAAATCATGCGGCTAGA
CTTAAACACCTTAAGCATGCGGTACACACGATGAAGCATAAAGATGGGAAAAATAGACTCATGAACCTTTATCTATGA
TCGCTGCTATTACCATATGCAAGGGGAAGAAATCTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTATGATTGTTGTATCCTAGATACTATACAATTCAAAAGCCTTCTTTTAGATTGTTTCACATATC
ATAGGTAAAAACGCTCATGATGCTACCAATATCAACATCGTGAACAAGTATATTGGCGACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTACATGCTTTAG

[0270] SEQ ID No.85-Warthog MGF 505 1R (AY261366.1:24387-25982)

[0271] ATGTTTTCTCTCCAGAACTTGTGTGCAAAAAACATTACCTGACTGTAACTTCCTGAATTTTTTGACGAA
TATATATTACAACCTGCTGGGATTATACTGGGAAAACCATGGAACCTATTCAACGAGCAGGAAACAACCTGTGTGCTTAT
ACAGCAACATACCCTCATTCCCGTAAACGAAGCCCTGAGAATAGCAGCATCTGAAGAAAATTATGAGATCGTGAGCC
TTTTATTAGCGTGGGAGGGGAACCTTTACTATGCTATTATAGGAGCTCTAGAGGGCAACCGCCACGACTTAATTCGT
AAATATGATGACCAAATCAAGGACCATCATGAAATTCTGCCATTCATTGACGATCCAGTCATATTTACAAATGCCA
TATCATGCGGCGATGCTTTTTTGATTGTATTTTATATCAAGCTGTAAAATATAGTAAGTTTCGCGTTCTTCTTTATT
TTAAATATAGGTTAGAGAATGATTTGCCCTCGCTCATTACTTATTAATAAGGCATGTGAAGATCATAATTATGAA
GTTATTAAATGGATATATGAAAACCTACATATCTACAATATAATGGATACCTTTGGATGTGCTATTGCCATAAGGA
TCTACGTCTATATCGTTTGGGGTATACATTTATATATAACAGGATCGTACCCTATAAGTATCATTATTTAGATGTTT
TCATTCTTTAGGCTACATCTCCTGTATAAGGTGGCAGCCAAAGGATACTTAGATTTTATCCTAGAAACCTTAAAG
TATGATCATAACAATGATAATTTAGATATTATTCTAACACAAGCTGCAACATATAACCATAGAAAAATTTTAAACCTA
TTACATTCTCAATTAACCTATGCACAAATAGAACAATGTTTGTTTCATGGCGATTAAAAAAAATCTTCCAAGAAAA
CCTTGAACCTTACTACTGTCTCACCTAAAGCTTTCCATCAAACTCATCAAAAAATAAGCCAATATGTTGCCACTTAC
AATTCAACAAATATAATAGGCATTCTGAATATGCGGCGGAAAAAGAAGATATATTTAGATATCATATTGACAAAATT
TGTAATAAAGCTATTTTTTAATAAATTTGTGCTTCGATGTATGGATACATTTTCCATAAACCCGGAAGAATCATCA
AAATGGCCGCGGAATAAATAAGATGTTGTTAGTGAAAAAATATCTGAACATGCTTGAAAAATCATGCGGCTAGA
CTTAAACACCTTAAGCATGCGGTATACACGATGAAACATAAAGATGGGAAAAATAGACTCATGAACCTTGATCTATGA

TCCTACTATTACCATATGCAAGGGAAGAAATCTTTAGCCTCGCAAGATTTTATGCAATCCATCATGCACCAAAGT
TGTTTGACGTTTTTTATGATTGTTGTCTCCTAGATACTATACGATTTAAAAACCTTCTTTTAGATTGTTTACACATC
ATAGGTAAAAACGCTCATGATGCTACTAATATCACTATCGTGAACAAGTATATTGGCAACCTGTTTGCTATGGGAGT
TCTTAGCAAAAAAGAAATCTTACAGGACTATCCATCCATCTATTCTAAACATTACATGCCTTAG

[0272] 在本发明的减毒ASFV的实施方案中, MGF 505 1R基因的表达和/或活性被破坏。适
当地, MGF 505 1R基因包含SEQ ID No. 73、74、75、76、77、78、79、80、81、82、83、84或85的序
列。适当地, MGF 505 1R基因包含与SEQ ID No. 73、74、75、76、77、78、79、80、81、82、83、84或
85具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地, MGF 505 1R基
因由SEQ ID No. 73、74、75、76、77、78、79、80、81、82、83、84或85的序列组成。

[0273] MGF 505 2R基因序列

[0274] SEQ ID No. 86- 贝宁97/1MGF 505 2R (NC_044956.1:27352-28932)

[0275] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCGATGTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCATAGGAGACGACCACATACTCATACGACG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAATCTTCATTACGCCGTCATAGGAGCCCTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTTCATTTTATCTTACCATTGATTCAAGACGCGAATACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTCTATGAGAGCGTATCTTCACGAAACCCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAGACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACTATGTACTCCTTAGGATATATTTTCCCTTTTGATAGAGGGAACACCGAAGCTACGTTGCTAACGCAACATCTCG
AGAAGACAGCGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGCAACATAGATACCGTCCTG
ACCCAAGCCGTAAAGTACAACCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
GCTTTTGTGCTGGCTGTTTCAGGAAAAGGCTTCTAAAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTATGAGTCCACCTTGGTGATAAAGATTTTGTAAAAAAA
AGAGTAAACCTGATAGATGCCATGTTGAAAAAGATGGTAAGATATTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGTCTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
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TTTAGCCAAGCTCTATGTTGCTCAAAATGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGTTTAAGCAACTAATATTAGACTGTTTAGAAATTGTTACTAAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTATTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAAGTAATTCATTATAAAACAATACAATGTAA

[0276] SEQ ID No. 87-中国/2018/安徽XCGQ MGF 505 2R

[0277] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCGATGTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCATAGGAGACGACCACATACTCATACGACG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAATCTTCATTACGCCGTCATAGGAGCCCTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTTCATTTTATCTTACCATTGATTCAAGACGCGAATACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAAAATACC

AAGAAGAGCTGTCTATGAGAGCGTATCTTCACGAAACCCCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAAACCATACATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACTATGTACTCCTTAGGATATATTTTCCCTTTTGTAGAGGGAACACCGAAGCTACGTTGCTAACGCAACATCTCA
AGAAGACAGCGGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGCAACATAGATACCGTCCTG
ACCCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
ACTTTTGTGCTGGCCGTGCAGGAAAAGGCTTCTAAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTACCGCGCTATGTGATAGAGTACGAGTCCACCTTGGTGATAAAGATTTTATTAAAAAA
AGAGTGAACCTGATAGATGCCATGTTGAAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGTCTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
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TTTAGCCAAGCTCTATGTTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGGTTTAAGCAACTAATATTAGACTGTTTAGAAATTATTACTAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTGTTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAAGTAATTCATTATAAAACAATACAATGTAA

[0278] SEQ ID No.88-格鲁吉亚2007/1MGF 505 2R (NC_044959.1:33119-34699)

[0279] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCGATGTTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCATAGGAGACGACCACATACTCATACGACG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAAATCTTCATTACGCCGTCATAGGAGCCTTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTTCATTTTATCTTACCATTGATTCAAGACGCGAATACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTCTATGAGAGCGTATCTTCACGAAACCCCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAAACCATACATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACTATGTACTCCTTAGGATATATTTTCCCTTTTGTAGAGGGAACACCGAAGCTACGTTGCTAACGCAACATCTCA
AGAAGACAGCGGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGCAACATAGATACCGTCCTG
ACCCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
ACTTTTGTGCTGGCCGTGCAGGAAAAGGCTTCTAAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTACCGCGCTATGTGATAGAGTACGAGTCCACCTTGGTGATAAAGATTTTATTAAAAAA
AGAGTGAACCTGATAGATGCCATGTTGAAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGTCTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
AAAAAATGTTAATTAAAGTCATGCACGGCATATACAAAACTTATTATACGGCGAAAGGGAAAAAGTCATGTTTTA
TTTAGCCAAGCTCTATGTTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGGTTTAAGCAACTAATATTAGACTGTTTAGAAATTATTACTAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTGTTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAAGTAATTCATTATAAAACAATACAATGTAA

[0280] SEQ ID No.89-Ken05/Tk1 MGF 505 2R (NC_044945.1:35094-36674)

[0281] ATGTTTTCCCTTCAAGACCATTGCCGAAAGCATCTTTTATTCTTCCCGATGTTTTTGGCGAGCATGTA

CTACAACGGTTAGGACTGTACTGGGGACGTCACGGCTCTCTTCAACGAATCGGGGACGATCACATACTCATACGGCG
GGACCTCATCCTTTCCACCAACGAGGCCTTAAAAATGGCGGGAGAAGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGGAGGGAATCTTCATTATGCTATCATAGGGGCTTTACAGGGTGATCAATATGACCTAATCCATAAGTAT
GAAAACCAAATCGAAGACTATCATCATATCTTACCATTGATTCAAGATGCGGAAACGTTTGAAAAATGCCACGCCTT
AGAACGTTTTTTGTGATGTTCCATGTCTGCTAGAACATGCTACAAAACACAACATGCTCCCTATTCTCCAAAAATATC
AAGAAGAGTTGTCTATAAGAGTGATCTACGCGAAACCCATTTCGAAGTAGCATGCCTATGGCAGAGGTATGATATT
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AGAAGACAGCGGCCAAGGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACCTTAAATATCGTCCTG
TTCCAAGCCGTAAAAACAATCATAGAAAACTTTTAGATTATTTTCTGCGTCAACTACCCCGTAAAAATATTGAAAA
ACTTTTGTGCTGGCTGTGCAGGAAAAAGCTTCTAAGAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCTACCTTGGTGATAAAGATTTTATTAATAA
AGAGTAAACCTAATAGACGCCGTGTTGAAAAAGACTGTAAGATATTTTCTGAGACGAAAGTAAAGACTATTATGGA
TGAGCTTTCGATTAATCCGAAAAAGTCATTAAGATGGCCATACAGAAAAATGAGAACGGATATTGTGATCCAACTT
CTTATATTTGGGAGGATGATCTAGAAAGACTTATTCGTCTTAAAAATATGGTATACACCATAAAGTATGAACATGGG
AAAAAATGTTAATGAAAGTTATTCACGGCATATACAAAACTTATTACACGATGAAAAAGAAAAAGTCATGTTTCA
TTTAGCCAAGTTCTATATTGCTCAAAACGCGGCCACCCAATTCAAGAGACATTTGTAAAGACTGTTGCAAACTGGATG
TGGCGCGTTTTAAACCGCGTTTTAAACAATAATTTAGACTGTTAGAAATTGTTACTAAAAATCTTGCTTTAGT
ATTATAGAAATTTTAGAAAACCATATTATTTCCCTATTTATGATGAAAGTTATCACTGAAGATGAAAAAACCTAGG
TTTAGAATTATTATATAAAGTAATTAGTTACAAAATGATATCATATTAA

[0282] SEQ ID No.90-Ken06.Bus MGF 505 2R (NC_044946.1:31225-32799)

[0283] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTTATTCTTCCCGATGTTTTTGCGGAGCATGTA
CTACAACAATTGGGGCTGTACTGGGAAAAACACGGCTCTCTTCAACGAATAGGGAACGATCACATACTCATACGGCG
GGATCTCATCCTTTCTATCAACGAGGCCTTAAAAATAGCGGCAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAATCTTCATTATGCCATCATAGGAGCCTTGACGGGTGACCAATATGACCTCATCCATACGTAC
GAAAACCAAATCGAAGACTATCATCATATCTTGCCATTGATTCAAGATGCGGAAACGTTTGAAAAATGCCACGCCTT
GGAACGTTTTTTGTGATGTTCCATGCCTACTAGAACATGCTACAAAACACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTTTATAAGAGTGATCTCCGCGAAACCCATTTTGAACTAGCATGCCTATGGCAGAGGTATGATATC
CTTAAATGGATAGAGCAAACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
AAGCATGTACTCTTTAGAATATATTCTCTTTTTTAATAGAGGGAACACCGATGTTGCGTTAGCAACGTTGCTAACGC
AACATCTCGAGAAGACAGCGGCCAAGGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACATAAAC
ATCGTCTCTCCCAAGCCGTAAAAACAATCATAGAAAACTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAAAA
TATTGAAAACTTTTGTGCTGGCCGTACAGGAAAGGGCTTCTAAGAAAAACATTGAACTTACTGTTGTCTTATTTAA
ACTACTCCGTGAAACGCATCAAAAACTGCTGCGCTATGTGATAGAGCATGAGTCCACACTGGTGATAAGGATTTTA
TTAAAAAAGAATAAACCTAATAGACGCCGTGTTGAAAAAGACTGTAAGATATTTTCTATGACTAAAGTGAGGAC
GATCATGGATGAGCTTTCGATTAATCCGAAAAAGTCATTAATGGCCGTGCAGAAAATGAGAACGGATATCGTGA
TCCATACTTCTTATGTTTGGGAGGATGATCTAGAAAGACTTATTCGTCTTAAAAATATGCTATACACTATAAAGTAT
GAGCATGGAATAAATGCTAATTAAGTCATTACGGCATATACAAAACTTATACGGCGAAAAAGAAAAAGTCAT
GTTTAATTTGGCCAAGTTCTATGCTGCTCAAAACGCGGCCACCCAATTCAAAGACACTTGTAAGACTGTTGCAAC

TGGATGTGGCGCGGTTTAAACAATAATTTTAGACTGTTTAGACATTATTACTAAAAAACGTGCCTCAGTATCATG
GAAATCTTAGAAAATCATATTATTTTCGCTATTTGCTATGAAAATGATGACGGAGGATGAAAAAACTTAGGTTTAGA
AATATTATATAAAGTAATTAGTTACAAAATGATATCATATTAA

[0284] SEQ ID No.91-肯尼亚1950MGF 505 2R (AY261360.1:37419-38999)

[0285] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTTATTCTTCCCGATGTTTTTGGCGAGCACGTA
CTACAACAATTGGGGCTGTACTGGGAAAAACACGGCTCTCTTCAACGAATAGGGAACGATCACATACTCATACGGCG
GGATCTCATCCTTTCTATCAACGAGGCCTTAAAAATAGCGGCAGAGGAAGGAAACAATGAAGTAGTAAAGCTTTTGT
TACTATGGAAGGGAAATCTTCATTATGCCATCATAGGAGCTTTGGAGGGTGACCAATATGACCTGATCTATACGTAT
GAAAACCAAATTGAAGACTATCATCATATCTTGCCATTGATTCAAGATGCGAAAACGTTTGAAAAATGCCACGCCTT
GGAACGTTTTTGTGATGTTCCATGCCTGCTAGAGCATGCTATAAAACACAACATGCTCCCTATTCTCCAAAAATATC
AAGAAGAACTGTTTATAAGAGTGTATCTCCGCGAAACCTATTTTGAACTAGCATGCCTATGGCAGAGGTATGATATT
CTTAAATGGATAGAGCAAACCATGCATGTTTACGATCTAAAAATTATATTTAATATTGCCATCTCCAAGAGGGATCT
AAGCATGTACTCCTTAGGATATGTTCTCCTTTTTGATAGAGGGAACACCGAAGCTACCTTGTTAACGCAACACCTCG
AGAAGACAGCGGCCAAGGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACATAAACATCGTCCTA
TCCCAAGCCGTAAATACAATCATAGGAACTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAAAATATTGAAAA
ACTTTTGTTGTTAGCCGTACAGGAAAAGGCTTCTAAGAAAACATTGAACTTACTGTTGTCTTATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCCACACTGGTGATAAGGATTTTATTAAAAAA
AGAATAAACCTAATAGACGCCGTGTTGAAAAAGACTGTAAGATATTTTTCTGAGACGAAAGTAAAGACTATTATGGA
TGAGCTTTCGATTAATCCGAAAAAGTTATTAAGATGGCCATACAGAAAATGAGAACGGATATTGTGATCCAACTT
CTTATATTTGGGAGGATGATCTAGAAAGACTTATTCGTCTTAAAAATATGGTATACACCATAAAGTATGAACATGGG
AAAAAATGTTAATGAAAGTTATTCACGGCATATACAAAACTTATTACACGATGAAAAAGAAAAAGTCATGTTTCA
TTTAGCCAAGTTCTATATTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAAGACTGTTGCAAACTGGATG
TGGCGCGGTTTAAACCGCGGTTTAAACAATAATTTTAGACTGTTTAGATATTATTACTAAAAAACGTGCCTCAAT
ATTATGGAAATCTTAGAAAATCATATTATTTTCGCTATTTGCTATGAAAATGATGACTGAAGATGAAAAAACCTAGG
TTTAGAATTATTATATAAAGTAATTAGTTACAAAATGATATCATATTAA

[0286] SEQ ID No.92-L60 MGF 505 2R (NC_044941.1:27701-29281)

[0287] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTTATTCTTCCCGATGTTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCATAGGAGACGACCACATACTCATACGACG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAAATCTTCATTACGCCGTCATAGGAGCCCTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTTATTTTATCTTACCATTGATTCAAGACGCGAATACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTCTATGAGAGCGTATCTTCACGAAACCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAGACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACTATGTACTCCTTAGGATATATTTTCCTTTTTGATAGAGGGAACACCGAAGCTACGTTGCTAACGCAACATCTCG
AGAAGACAGCGGCCAAGGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGCAACATAGATACCGTCCTG
ACCCAAGCCGTAAAGTACAACCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
GCTTTTGTGCTGGCTGTTTCAGGAAAAGGCTTCTAAAAAAAACATTGAACTTACTGTTGTACATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTATGAGTCCACCTTGGTGATAAAGATTTTGTAAAAAAA

AGAGTAAACCTGATAGATGCCATGTTGGAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGTCTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
AAAAAATGTTAATTAAGTCATGCACGGCATATACAAAACTTATTATACGGCGAAAAGGGAAAAAGTCATGTTTCA
TTTAGCCAAGCTCTATGTTGCTCAAAAATGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGTTTTAAGCAACTAATATTAGACTGTTTAGAAAATTGTTACTAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTATTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAAGTAATTCATTATAAAACAATACAATGTTAA

[0288] SEQ ID No.93-马拉维Li1-20/1 (1983) MGF 505 2R (AY261361.1:31541-33121)

[0289] ATGTTTTCCCTTCAAGATCTTTGCCGAAAGCATCTTTTTATTCTTCCCGATGTTTTGGCGAGCATGTA
CTACAACAGTTAGGACTGTACTGGAAACGTCACGGCTCTCTTCAACGCATAGGAGACGACCACATACTCATACGGCG
GGACCTCATCCTTTCCACCAACGAGGCCTTAAAAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGGAGGGAAACCTTCAATTATGCCATCATAGGGGCCCTACAGGGTGATCAATATGATCTGATCCATAAGTAT
GAAAACCAAATCGAAGACTATCATCATATCTTGCCATTGATTCAAGATGCGAAAACGTTTGAAAAATGCCACGCCTT
AGAACGTTTTTGTGATGTTCCATGTCTGCTAGAACATGCTACAAAACACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTCTATAAGAGTGTATCTTCGCGAAACCTATTCGAACTAGCATGCCTATGGCAGAGGTATGATGTT
CTTAAATGGATAGAGCAAACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
AAGCATGTACTCCTTAGGATATGTTCTCCTTTTTGATAGAGGAAACATCGAAGCTACGTTCTAACGCAACATCTCG
AGAAGACAGCGGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACCTAAATATCGTCCTG
TCCCAAGCCGTAAATACAATCATAGAAAACCTTTGGATTATTTCTGCGTCAACTACCTCGTAAAAATATTGAAAA
ACTTTTGTGCTGGCCGTGCAGGAAAAGGCTTCTAAAAAAACATTGAACCTACTGTTGTCACACTTAACTACTCCG
TGAAACACATCAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCTACCTTGGTGATAAACTTTTATTGAAAAA
AGAGTAAACCTGATAGACGCCGTGTTGGAAAAGAATGTAAGATATTTTTCTGCGATTAAAGTGAGGACTATTATGGA
TGAGCTTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCCATACAGAAAATGAGAACGGATATTGTGATTCAGACTT
CTTATATTTGGGAGGATGATCTAGAAAGACTTATTCGTCTTAAAAATATGGTATACACCATAAAGTATGAACATGGG
AAAAAATGTTAATTAAGTTATTACGGCATATACAAAACTTATTATACGGCGAAAAGAAAAAGTCATGTTTCA
TTTAGCCAACTCTATGTTGCTCAAAAACGCGGCCACCCAATTCAGGGACATTTGTAAGGACTGTTGCAAACTGGATG
TGGCGCGTTTTAAACCGCGTTTTAAACAATAATTTTAGACTGTTTAGAAAATGGTTACTAAAAATCTTGCTTTAGT
ATTATAGAAATCTTAGAAAACATATTATTTCCCTATTTGTGATGAAAGTCATCACTGAAGAAGAAAAAACCTATG
TTTAGAACTATTATATAAAGTAATTAGTTACAAAACGATATAATGTTAA

[0290] SEQ ID No.94-Mkuzi 1979MGF 505 2R (AY261362.1:34826-36406)

[0291] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTTATTCTTCCCGATGTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCATAGGAGACGACCACATACTCATACGACG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAAGATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAAATCTTCATTACGCCGTCATAGGAGCCTTGACGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTTCATTTTATCTTACCATTGATTCAAGACGCGAATACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAAAATACC
AAGAAGAGCTGTCTATGAGAGCGTATCTTCACGAAACCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAGACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT

GACTATGTA CTCTAGGATATATTTTCCTTTTGTAGAGGGAACACCGAAGCTACGTTGCTAACGCAACATCTCG
AGAAGACAGCGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGCAACATAGATACCGTCCTG
ACCCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
ACTTTTGTGCTGGCTGTTTCAGGAAAAGGCTTCTAAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTATGAGTCCACCTTGGTGATAAAGATTTTGTAAAAAA
AGAGTAAACCTGATAGATGCCATGTTGGAAAAGATGGTAAGATATTTTTCTGCGACAAAAGTGAGGACGATCATGGA
TGAGCTTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGTTTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
AAAAAATGTTAATTAAAGTCATGCACGGCATATACAAAACTTATTATACGGCGAAAGGGAAAAAGTCATGTTTCA
TTTAGCCAAGCTCTATGTTGCTCAAAATGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGTTTTAAGCAACTAATATTAGACTGTTTAGAAATTGTTACTAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTATTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAAGTAATTCATTATAAAACAATACAATGTAA

[0292] SEQ ID No.95-Pretorisuskop/96/4 MGF 505 2R (AY261363.1:33795-35374)

[0293] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCAGTGTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCGTAGGAGACGACCACATCCTCATACGGCG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAAGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAAATCTTCATTACGCCATCATAGGAGCCTTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAACCAAATCGGCGACTTTTCATCTTATCTTACCATTGATTCAAGATGCGAAAACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAGAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAACATACC
AAGAAGAGCTGTCTATGAGAGCATATCTTCGCGAAACCCCTATTTGAACTAGCGTGCCTGTGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAAACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACGATGTATTCTTAGGATATATTCTTCTTTTGTAGAGAGAACACCGAAGCTACGTTGTTAACACAACATCTCG
AGAAGACAGCGCCAAAGGGCTCCTCTACTTTGTGCTAGAAACGTTAAATACGGCGGTAACATAGATATCGTCCTG
ACTCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
GCTTTTGTGCTGGCCGTGCAGGAAAAGGCTTCTAAAAAACATTGAACTTACTGTTGTCCCATCTAACTACTCCG
TGAAACGTATCAAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCCACCTTGGTGATAAAGATTTTATAAAAAA
AGAGTAAACCTGATAGATGCCATGTTGGAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTTGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGACTTACTCGTCTTAAAAATATGGTATACACCATAAAGTACGAACATGGG
AAAAAATGTTAATTAAAGTCATGCACGGCATATACAAAACTTATTATACGACGAAAGAGAAAAGGTCATGTTTCA
TTTAGCCAAGCTCTATGTTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTTAAACCGCGTTTTAAGCAACTAATGTTAGACTGTTTAGAAATTGTTACTAAAAATCTTGCTATAGT
ATCCTGGAAATCTTAGAAAAACATATTATTTCCCTATTTACTATGAAAGTTATGACTGAAGAGGAAAAAACCTATG
TTTAGAAATATTATATAAGTAA

[0294] SEQ ID No.96-Tengani 62 MGF 505 2R (AY261364.1:28261-29830)

[0295] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCAGTGTTTTGGCGAGCATGTA
CTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCGTAGGAGACGACCACATACTCATACGGCG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAGGAAGGAAACAATGAAGTAGTAAAGCTCTTGT

TACTGTGGAAGGGAAATCTTCATTACGCCGTCATAGGAGCCTTGCAGGGTGATCAATATGACCTGATCCATAAGTAT
GAAAACCAAATCGGCGACTTTCATCTTATCTTACCATTGATTCAAGACGCGAAAACGTTTGAAAAATGCCATGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAAACATGCTACAAAATACAACATGCTCCCTGTTCTCCAAAAATACC
AAGAAGAGCTGTCCATGAGAGCATATCTTTGCGAAACCCCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAAACCATGCATGTTTACGACCTAAAGATTATGTTTAATATTGCCATCTCCAAGAGGGATCT
GACTATGTACTCCTTAGGATATATTTTCCCTTTTGTAGAGGGAACACCGAAGCTACGTTGCTAACGCAATATCTCG
AGAAGACAGCGGCCAAAGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACATAGATATTGTCCTG
ACCCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAACATATTGAAAA
GCTTTTGTGCTGGCCGTGCAGGAAAAGGCTTCTAAAAAAACATTGAACTTACTGTTGTCACATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCCACCTTGGTGATAAAGATTTTATTAAAAAA
AGAGTAAACCTGATAGATGCCATGTTGAAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTTGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACGGATATCGTAATCCATACTT
CTTATGTATGGGAGGATGATCTAGAACGACTTACTCGTCTTAAAGATATGGTATACACCGTAAAGTACGAACATGGG
AAAAAATGTTAATTAAGTCATACACGGCATATACAAAACTTATTATACGGCGAAAAAGAAAAGGTCATGTTTCA
TTTAGCCAAGCTCTATGTTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTAAACCGCGGTTTAAAGCAACTAATGTTAGACTGTTAGAAAATTGTTACTAAAAATCTTGCTATAGT
ATTCTGGAATCTTAGAAAAACATATGATTTCCCTATTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATG
TTTAGAAATATTATATAAGTAA

[0296] SEQ ID No.97-Warmbaths MGF 505 2R (AY261365.1:33029-34597)

[0297] ATGTTTTCCCTTCAAGACCTTTGCCGAAAGCATCTTTTATTCTTCCCGATGTTTTTGGCGAGCATGTA
TTACAACGATTAGGACTGTATTGGAGATGTCACGGCTCCCTTCAACGCGTAGGAGACGACCACATACTCATACGGCG
GGATCTCATCCTTTCCACCAACGAGGCCTTAAGAATGGCGGGAGAAGAAGGAAACAATGAAGTAGTAAAGCTCTTGT
TACTGTGGAAGGGAAATCTTCATTACGCCATCATAGGAGCCTTGCAGGGTGATCAATATGACCTAATCCATAAGTAT
GAAAACCAAATCGGCGACTTTCATCTTATCTTACCATTGATTCAAGATGCGAAAACGTTTGAAAAATGCCACGCTTT
AGAACGTTTTTGTGGTGTTTCATGTCTGCTAAAAACATGCTACAAAATACAACATGCTCCCTATTCTCCAAACATACC
AAGAAGAGCTGTCTATGAGAGTATATCTTCGCGAAACCCCTATTTGAACTAGCATGCCTATGGCAGAGGTATGATGTC
CTTAAATGGATAGAGCAAACCATGCATGTTTACGACCTAAAGGTTATGTTTAATATTGCCATCTCCAAGAGAGATCT
GACTATGTATTCTTAGGATATATTCTTCTTTTGTAGAGAGAACACCGAAGCTACGTTGCTAACGCAACATCTCG
AGAAAACAGCGGCCAAGGGGCTCCTCCACTTTGTGCTAGAAACGTTAAATACGGCGGTAACATAGATATCGTCCTG
TCCAAGCCGTAAAGTACAATCATAGAAAACCTTTTAGATTATTTTCTGCGTCAACTACCTCGTAAAAATATTGAAAA
ACTTTTGTGCTGGCTGTTTCAAGAAAAGGCTTCTAAAAAAACATTGAACTTACTGTTGTCCATTTAACTACTCCG
TGAAACGCATCAAAAAACTGCTGCGCTATGTGATAGAGTACGAGTCCACCTTGGTGATAAAGATTTTATTAAAAAA
AGAGTAAACCTGATAGATGCCATGTTGAAAAAGATGGTAAGATATTTTTCTGCGACGAAAGTGAGGACGATCATGGA
TGAGCTTTTCGATTAGTCCGGAAGAGTCATTAAGATGGCTATACAGAAAATGAGAACAGATATCGTAATCCATACTT
CTTATGTTTGGGAGGATGATCTAGAACGACTTACTCGTCTTAAAAATATGGTATACGCCATAAAGTATGAACATGGG
AAAAAATGTTAATGAAAGTCATGCACGGCATATACAAAACTTATTATACGGCGAAAGAGAAAAGGTCATGTTTCA
TTTAGCCAAGCTCTATGTTGCTCAAAACGCGGCCACCCAATTCAGAGACATTTGTAAGGACTGTTACAACTGGATG
TGGCACGGTTTAAAGCAACTAACGTTAACTGTTTAGAAAATTACTAAAAATCTTGCTATAGTATCCTGGAATC
CTAGAAAAACATATTATTTCCCTATTTACTATGAAAGTTATGACTGAAGAAGAAAAAACCTATGTTTAGAAATATT

ATATAAGTAATTCATTATAATACAATACAATGTAA

[0298] 在实施方案中,本发明的减毒ASFV包含MGF 505 2R的功能形式。适当地,MGF 505 2R的功能形式包含SEQ ID No.86、87、88、89、90、91、92、93、94、95、96或97的序列。适当地,MGF 505 2R的功能形式包含与SEQ ID No.86、87、88、89、90、91、92、93、94、95、96或97具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地,MGF 5052R的功能形式由SEQ ID No.86、87、88、89、90、91、92、93、94、95、96或97的序列组成。

[0299] MGF 505 3R基因序列

[0300] SEQ ID No.98-贝宁97/1MGF 505 3R

[0301] ATGTCCTCTTCCCTTCAGGAACCTTTGTCGAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTTGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTAGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGACCTGGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAAACATTTGAAAAATGTCA
TGAGTTAAACAACCCCTGTTCTCTTAAATGCTTATTCAAGCATGCTGTGATACATGACATGCTGCCGATTCTTCAAA
AATATACATACTTTCTGGATGGGTGGGAGTATTGCAACCAGATGCTGTTTCAACTGGCATGTAGTAAAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACATCTCTTTTCACTATTGCGATTAGCAACAG
AGACCTGCACCTGTATTCCCTGGGCCACTTAATCATTCTTGAGAGAATGCAGTCCTGTGGACAAGACCCACGTTTT
TACTAAATCATTTCTGCGAGACGTTTCAATAAAAGGGCTTCTCCCTTTTGTACTGAAAACCATAGAATATGGTGGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAATACTTCGAAACCGGGAATG
CTAA

[0302] SEQ ID No.99-中国/2018/安徽XCGQ MGF 505 3R

[0303] ATGTCCTCTTCTTTCAGGAACCTTTGTCGAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTTGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCCCTAGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGACCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAAACATTCGAAAGATGTCA
TGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATAAATGACATGCTGCCGATTCTTCAAA
AATATACAGACTATCTGGATAGGTGGGAGTATTGCAGCCAGATGCTGTTTCAACTGGCATGTAGTAAAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCGTCGGCAAAGTTACATCTCTTTTACCATTGCGATTAGCAACAG
AGACCTACAGCTGTATTCTCTGGGCTACTCAATTATCCTTGAGAATTTGTACTCCTGTGGACAGGACCCCAAGTTTT
TACTAAATCATTTCTGCGAGACGTTTCAATAAAAGGGCTTCTACCCTTTGTAATCAAAACCATAGAATATGGTGGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAATACTTCGAAACCTGGGAAAG
CTAG

[0304] SEQ ID No.100-格鲁吉亚2007/1MGF 505 3R

[0305] ATGTCCTCTTCTTTCAGGAACCTTTGTCGAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTTGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCCCTAGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGACCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAAACATTCGAAAGATGTCA

TGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATAAATGACATGCTGCCGATTCTTCAAA
AATATACAGACTATCTGGATAGGTGGGAGTATTGCAGCCAGATGCTGTTTCAACTGGCATGTAGTAAAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCGTCGGCAAAGTTACATCTCTTTTCACCATTGCGATTAGCAACAG
AGACCTACAGCTGTATTCTCTGGGCTACTCAATTATCCTTGAGAATTTGTACTCCTGTGGACAGGACCCCAAGTTTT
TACTAAATCATTTCTGCGAGACGTTTCAATAAAAAGGGCTTCTACCCCTTTGTAATCAAAACCATAGAATATGGTGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCTGGGAAAG
CTAG

[0306] SEQ ID No.101-Ken05/Tk1 MGF 505 3R

[0307] ATGTCCTCTTCCCTTCAGGAACTTTGCCGAAAAAACTTACCCGACTACATACTTCCAGAGTTCTTTGAC
GACTATGTGTTGCAACTATTAGGACTACACTGGCAAGATCATGGTTCTCTTCAACGTACCGGAAAGAATCAGGTACT
TGTTCAACAGGAACCCATTCATATCAATGAAGCACTAAAAGTGGCAGCATCAGAGGGAACTTTGAAATCGTAGAAC
TGTTGTTGTCATGGAAGGCAGACCCCCGCTACGCTGTCGTAGGAGCGCTAGAAAGCAAATACTATGACCTCGTTTAC
AAGTATTACAACCTAGTTGAAGACCGCCATGATATGTTGCCGCTGATCCAAAATTCAGAAACGTTTCGAAAGATGTCA
TGAGTTAAACAACTGTTCTCTTAAATGCTTATTCAAGCATGCTGTAATATATGACAAGCTGCCGATTCTACAAAAAT
ATGCAGACTATTTGGACGGGTGGCCGTATTGCAACCAGATGCTGTTTCGAGTTGGCATGTAAAAAACAAAAATATAAC
ATGGTTGTGTGGATAGAGGGAGTCTGGGCGTCGGCAACTTCACAATCTTTTCACAATTGCGATTATCAAAAGGGA
CCTACAGCTGTATTCCCTGGGCTACTCCATCATCCTTGAGAGAATGTATTCCTGTGGATACGACCCACGTTTTTAC
TAAATCACTATCTGCGAGTGGTTTCAACAAAAGGGCTTCTGCCCTTTGTACTGAAAACCATAGAATATGGTGGAAGC
AAAGAGATAGCCTTAACTTTGGCTAAAAAATATCAGCATGAAACTATTTTGAGATACTTCGAAACCAGGAAATCCCA
GGAGTGCTAA

[0308] SEQ ID No.102-Ken06.Bus MGF 505 3R

[0309] ATGTCCTCTTCCCTTCAGGAACTTTGCCGAAAAAACTTACCCGACCACATACTTCCAGAGTTCTTTGAC
GACTATATATTGCAACTATTAGGACTGCACTGGCAAGATCATGGTTCTCTTCAGCGTACCGAGAAGAATCAGGTACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTAAAAGTGGCAGCATCAGAAGGAACTACGAAATAGTAGAGC
TGTTGTTGTCATGGAAGGCAGACCCCCGATACGCTGTCGTAGGAGCGCTAGAAAGCAAATACTATGACCTCGTTTAC
AAATATTACGACCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATCCAAAATTCGGAAACATTTCGAAAGATGTCA
TGAGTTGAACAATTGTTCTCTTAAATGCTTATTCAAGCATGCTGTGATATATGACAAGCTGCCGATTCTTCAAAAAAT
ATGCAAGCTATCTGGATGGGTGGCCGTATTGCAACCAGATGCTGTTTCGAGTTGGCATGTAAAAAACAAAAATATAAC
ATGGCTGTATGGATAGAGGGAGTCTGGGCGTCGGCAACTTCACAATCTTTTCACGATTGCGATTATCAAAAGAGA
CCTACAGCTGTATTCCCTGGGCTACTCAATGATTCTTGAGAAAATGTACTCCTGTGGATACGACCCACGTTTTTAC
TAAATCATTATCTGCGAATCGTTTCAACAAAAGGGGCTTCTGCCCTTTGTGCTGAAAACCATAGAATATGGTGGAAGC
AAAGAGATAGCCATCACTTTGGCTAAAAAGTATCAGCATGAAAATATTTTGAGATACTTCGAAACCAGGAAAACCCA
AGAGTGCTAA

[0310] SEQ ID No.103-肯尼亚1950MGF 505 3R

[0311] ATGTCCTCTTCCCTTCAGGAACTTTGCCGAAAAAACTTACCCGACGACATACTTCCAGAGTTCTTTGAC
GACTATGTGTTGCAACTATTAGGACTACACTGGCAAGATCATGGTTCTCTTCAACGTACCGGAAAGAATCAGGTACT
TGTTCAACAGGAACCCATTCATATTAATGAAGCACTAAAAGTGGCAGCATCAGAGGGAACTTTGAAATCGTAGAAC
TGTTGTTGTCATGGAAGGCAGATCCCCGCTACGCTGTCGTAGGAGCGCTAGAAAGCAAATACTATGACCTCGTTTAC
AAGTATTACAACCTAATTGAAGACCGCCATGATATGTTGCCGCTGATCCAAAATTCAGAAACGTTTCGAAAGATGTCA

TGAGTTAAACAACTGTTCTCTTAAATGCTTATTCAAGCATGCTGTGATATATGACAAGCTGCCGATTCTACAAAAT
ATGCAGACTATTTGGACGGGTGGCCGATTGCAACCAGATGCTGTTGAGTTGGCATGTAAAAACAAAATATAAC
ATGGTTGTGTGGATAGAGGGAGTCTGGGCGTCGGCAACTTCACAATCTTTTCACGATTGCGATTATCAAAAGGGA
CCTACAGCTGTATTCCCTGGGCTACTCCATCATCCTTGAGAGAATGTACTCCTGTGGATACGACCCACGTTTTTAC
TAAATCACTATCTGCGAGTGGTTTCAACAAAAGGGCTTCTGCCTTTTGTACTGAAAACCATAGAATATGGTGGAAGC
AAAGAGATAGCCATCACTTTGGCTAAAAAGTATCAGCATGAACTATTTTGAGATACTTCGAAACCAGGAAATCCCA
GGAGTGCTAA

[0312] SEQ ID No.104-L60 MGF 505 3R

[0313] ATGTCCTCTTCCCTTCAGGAACCTTTGTGCAAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTTGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTAGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGACCTGGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAACATTTGAAAAATGTCA
TGAGTTAAACAACCCCTGTTCTCTTAAATGCTTATTCAAGCATGCTGTGATACATGACATGCTGCCGATTCTTCAA
AATATACATACTTTCTGGATGGGTGGGAGTATTGCAACCAGATGCTGTTTCAACTGGCATGTAGTAAAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACATCTCTTTTCACTATTGCGATTAGCAACAG
AGACCTGCACCTGTATTCCCTGGGCCACTTAATCATTCTTGAGAGAATGCAGTCCTGTGGACAAGACCCACGTTTT
TACTAAATCATTCTCTGCGAGACGTTTCAATAAAAGGGCTTCTCCCTTTTGTACTGAAAACCATAGAATATGGTGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCGGGAATG
CTAA

[0314] SEQ ID No.105-马拉维Lil-20/1/1983MGF 505 3R

[0315] ATGTCCCTTCAGGAACCTTTGCCGAAAAACCTGCCGACTGCGAACTTCCAGAGTTCTTTGACGACTAT
GTATTGCAACTGTTAGGATTGCACTGGCAAGATCATGGTTCCTTCAGCGTACCGGGAAGAATCAGGTACTTGTTCA
ACAGGAACCCATCCATATCAATGAAGCACTAAAAAGTGCGGCATCAGAAGGGAACATGAAATCGTAGAGCTGCTGT
TGTCATGGGAGGCAGATCCCCGCTACGCTGTCGTAGGAGCCCTAGAAAGCAATTACTATGACCTGGTTCACAAATAT
TATGACCAAGTTAAAGACTGCCATGATATGCTACCACTGATCCAAAATCCGGAATGTTTCAAAAAATGTCATGAGTT
AAACAACACCTGTTCTCTTAAATGCTTATTCAAACATGCTGTGATACATGACATGCTGCCGATTCTTCAAAAATATT
CAGACTATTTGGATGGGTGGCAGTATTGCAATCAGATACTGTTTCAATTGGCATGTAAAGACAAAAATATAATATG
GTTGTGTGGATAGAGGGAGTTCTAGGCGTCGGCAACTTTAAAATTCTTTTACCATTGCCATTAACAACAGAGATCT
ACAGCTGTATTCTCTGGGTACTTAATCATTCTTGAAAGATTGTACTCCTGTGGACAAGACCCACGTTTTTACTAA
ACCATTTCTACGAGACGTTTCAATGAAGGGGCTTCTGCCCTTTGTACTGAAAACCATAGAATTTGGTGGAAGTAAG
GAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAAGTATTTGAAACCGAAGAAATGCTAA

[0316] SEQ ID No.106-Mkuzi 1979MGF 505 3R

[0317] ATGTCCTCTTCCCTTCAGGAACCTTTGTGCAAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTTGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTAGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGACCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAACATTTGAAAAATGTCA
TGAGTTAAACAACCCCTGTTCTCTTAAATGCTTATTCAAGCATGCTGTGATACATGACATGCTGCCGATTCTTCAA

AATATACATACTTTCTGGATGGGTGGGAGTATTGCAGCCAGATGCTGTTTGAATTGGCATGTAGTAAAAAAATAC
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACATCTCTTTTCACTATTGCGATTAGCAACAG
AGACCTGCACCTGTATTCCCTGGGCCACTTAATCATTCTTGAGAGAATGCAGTCCTGTGGACAAGACCCCAAGTTTT
TACTAAATCATTCTTGTGCGAGACGTTTCAATAAAAAGGGCTTCTCCCCTTTGTACTGAAAACCATAGAATATGGTGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCGGGAATG
CTAA

[0318] SEQ ID No.107-NHV MGF 505 3R

[0319] ATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACATCTCTTTTCACTATTGCGATTAGC
AACAGAGACCTGCACCTGTATTCCCTGGGCCACTTAATCATTCTTGAGAGAATGCAGTCCTGTGGACAAGACCCAC
GTTTTTACTAAATCATTCTTGTGCGAGACGTTTCAATAAAAAGGGCTTCTCCCCTTTGTACTGAAAACCATAGAATATG
GTGGAAGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCGGG
AAATGCTAA

[0320] SEQ ID No.108-OURT 88/3MGF 505 3R

[0321] ATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACATCTCTTTTCACTATTGCGATTAGC
AACAGAGACCTGCACCTGTATTCCCTGGGCCACTTAATCATTCTTGAGAGAATGCAGTCCTGTGGACAAGACCCAC
GTTTTTACTAAATCATTCTTGTGCGAGACGTTTCAATAAAAAGGGCTTCTCCCCTTTGTACTGAAAACCATAGAATATG
GTGGAAGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCGGG
AAATGCTAA

[0322] SEQ ID No.109-Pretorisuskop/96/4MGF 505 3R

[0323] ATGTCTTCTTCCCTTCAGGAACCTTGTGCGAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTGTAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCTCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAATATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTCGAAAGCAAATACTATGACCTGGTTCAC
AAATACTATGGCCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAACATTGAAAAATGTCA
TGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATGAATGACATGCTGCCGATTCTTGAAA
AATATACAGACTATCTGGATAGGTGGGAGTATTGCAGCCAGATGCTGTTTGAATTGGCATGCAGAAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTATGCGTCGGCAAAGTTACGTCTCTTTTACCATTGCGATTAGCAACAG
AGACCTACAGCTGTATTCTCTGGGCTACTCAATTATTCTTGAGAAAATGTACTCCTGTGACAGGACCCACGTTTT
TACTAAATCATTCTTGTGCGAGACGTTTCGATAAAAAGGGCTTCTGCCCTTTGTACTGAAAACCATAGAATATGGTGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCTGGGAAAG
CTAG

[0324] SEQ ID No.110-Tengani 62MGF 505 3R

[0325] ATGTCCTCTTCCCTTCAGGAACCTTGGCGAAAAAGCTGCCTGACTGCATCCTTCCAGAGTTTTTC
GACGACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCTCTTCAGCGTATCGAGAAGAACCAGAT
ACTTGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAATATGAAATCGTAG
AGCTGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTCGAAAGCAAATACTATGACCTGGTT
CACAAATACTATGACCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAACATTGAAAAGTG
TCATGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATAAATGACATGCTGCCGATTCTTC
AAAAATATACAGACTATCTGGATAGGTGGGAGTATTGTAGCCAGATGCTGTTTGAATTGGCATGTAGAAAAAAAG

TATGAGATGGTTGTGTGGATAGAGGGAGCTCTGGGCGTCGGCAAAGTTACATCTCTTTTCACCATTGCGATTAGCAA
CAGAGACCTGCAGCTGTATTCTCTGGGCTACTCAATGATTCTTGAGAAATTGTACTCCTGTGGACAGGACCCACGT
TTTTACTAAATCATTTCTGCGAGACGTTTCGATAAAGGGGCTTCTGCCCTTTGTACTCAAAACCATAGAATATGGT
GGAAGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACTTGGGA
AAGCTAG

[0326] SEQ ID No.111-Warmbaths MGF 505 3R

[0327] ATGTCCTCTTCCCTTCAGGAACCTTTGTGCAAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTCGAC
GACTATGTATTGCAACTGTTAGGACTGCACTGGCAAGATCATGGTTCTCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTCGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGGCCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAAACATTGAAAAATGTCA
TGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATGAATGACATGCTGCCGATTCTTGAAA
AATATACAGACTATCTGGATAGGTGGGAGTATTGCAGCCAGATGCTGTTTCAATTGGCATGTAGAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCATCGGCAAAGTTACGCCTCTTTTCACCATTGCGATTAGCAACAG
AGACCTACAGCTGTATTCTCTGGGCTACTCAATTATTCTTGAGAGAATGTATTCCTGTGAACAGGATCCCACGTTTT
TACTAAATCATTTCTGCGAGACGTTTCGATAAAGGGGCTTCTGCCCTTTGTACTGAAAACCATAGAATATGGTGGGA
AGCAAAGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACATGGGAAAG
CTAA

[0328] SEQ ID No.112-Warthog MGF 505 3R

[0329] ATGTCCTCTTCCCTTCAGGAACCTTTGCCGAAAAAGCTGCCTGACTGCATACTTCCAGAGTTTTTCGAC
GACTATGTATTGCAACTGTTAGGATTGCATTGGCAAGATCATGGTTCTCTTCAGCGTATCGAGAAGAACCAGATACT
TGTTCAACAGGAACCCATCCATATCAATGAAGCACTCAAAGTAGCAGCATCGGAAGGGAACATGAAATCGTAGAGC
TGTTGTTGTCATGGGAGGCAGATCCCCGCTACGCCGTCGTAGGAGCTCTCGAAAGCAAATACTATGACCTGGTTTAC
AAATACTATGGCCAAGTTAAAGACTGCCATGATATCTTGCCGCTGATTCAAAATCCGGAAACATTTGAAAAGTGTCA
TGAGTTAAACAGCACCTGTTCACTGAAATGCTTATTCAAGCATGCTGTGATGAATGACATGCTGCCGATTCTTGAAA
AATATACAGACTATCTGGATAGGTGGGAGTATTGCAGCCAGATGCTGTTTCAATTGGCATGTAGAAAAAATAT
GAGATGGTTGTGTGGATAGAGGGAGTTCTAGGCGTCGGCAAAGTTACGTCTCTTTTCACCATTGCGATTAGCAACAG
AGACCTACAGCTGTATTCTCTGGGCTTCTCAATTATTCTTGAGAAATTGTACTCCTGTGGACAGGACCCACGTTTT
TACTAAATCATTTCTGCGAGACGTTTCGATAAAGGGGCTTCTGCCCTTTGTACTCAAAACCATAGAATATGGTGGGA
AGCAAGGAGATAGCCATAACTCTGGCTAAAAAATATCAGCATAAACATATTTTGAAATACTTCGAAACCTGGGAAAG
CTAG

[0330] 在实施方案中,本发明的减毒ASFV包含MGF 505 3R的功能形式。适当地, MGF 505 3R的功能形式包含SEQ ID No.98、99、100、101、102、103、104、105、106、107、108、109、110、111或112的序列。适当地, MGF 505 3R的功能形式包含与SEQ ID No.98、99、100、101、102、103、104、105、106、107、108、109、110、111或112具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地, MGF 505 3R的功能形式由SEQ ID No.98、99、100、101、102、103、104、105、106、107、108、109、110、111或112的序列组成。在实施方案中,本发明提供了包含来自贝宁97/1毒株的以下序列的减毒ASFV:

[0331] (i) SEQ ID No.11 (MGF 360 10L) 和/或SEQ ID No.24 (MGF 360 11L), 以及

- [0332] (ii) SEQ ID No.86 (MGF 505 2R) 和/或SEQ ID No.98 (MGF 505 3R)。
- [0333] 在实施方案中,本发明提供了包含来自中国/2018/安徽XCGQ毒株的以下序列的减毒ASFV:
- [0334] (i) SEQ ID No.12 (MGF 360 10L) 和/或SEQ ID No.25 (MGF 360 11L), 以及
- [0335] (ii) SEQ ID No.87 (MGF 505 2R) 和/或SEQ ID No.99 (MGF 505 3R)。
- [0336] 在实施方案中,本发明提供了包含来自格鲁吉亚2007/1毒株的以下序列的减毒ASFV:
- [0337] (i) SEQ ID No.13 (MGF 360 10L) 和/或SEQ ID No.26 (MGF 360 11L), 以及
- [0338] (ii) SEQ ID No.88 (MGF 505 2R) 和/或SEQ ID No.100 (MGF 505 3R)。
- [0339] 在实施方案中,本发明提供了包含来自Ken05/Tk1毒株的以下序列的减毒ASFV:
- [0340] (i) SEQ ID No.14 (MGF 360 10L) 和/或SEQ ID No.27 (MGF 360 11L), 以及
- [0341] (ii) SEQ ID No.89 (MGF 505 2R) 和/或SEQ ID No.101 (MGF 505 3R)。
- [0342] 在实施方案中,本发明提供了包含来自Ken06.Bus毒株的以下序列的减毒ASFV:
- [0343] (i) SEQ ID No.15 (MGF 360 10L) 和/或SEQ ID No.28 (MGF 360 11L), 以及
- [0344] (ii) SEQ ID No.90 (MGF 505 2R) 和/或SEQ ID No.102 (MGF 505 3R)。
- [0345] 在实施方案中,本发明提供了包含来自肯尼亚1950毒株的以下序列的减毒ASFV:
- [0346] (i) SEQ ID No.16 (MGF 360 10L) 和/或SEQ ID No.29 (MGF 360 11L), 以及
- [0347] (ii) SEQ ID No.91 (MGF 505 2R) 和/或SEQ ID No.103 (MGF 505 3R)。
- [0348] 在实施方案中,本发明提供了包含来自L60毒株的以下序列的减毒ASFV:
- [0349] (i) SEQ ID No.17 (MGF 360 10L) 和/或SEQ ID No.30 (MGF 360 11L), 以及
- [0350] (ii) SEQ ID No.92 (MGF 505 2R) 和/或SEQ ID No.104 (MGF 505 3R)。
- [0351] 在实施方案中,本发明提供了包含来自马拉维Li-20/1毒株的以下序列的减毒ASFV:
- [0352] (i) SEQ ID No.18 (MGF 360 10L) 和/或SEQ ID No.31 (MGF 360 11L), 以及
- [0353] (ii) SEQ ID No.93 (MGF 505 2R) 和/或SEQ ID No.105 (MGF 505 3R)。
- [0354] 在实施方案中,本发明提供了包含来自Mkuzi 1979毒株的以下序列的减毒ASFV:
- [0355] (i) SEQ ID No.19 (MGF 360 10L) 和/或SEQ ID No.32 (MGF 360 11L), 以及
- [0356] (ii) SEQ ID No.94 (MGF 505 2R) 和/或SEQ ID No.106 (MGF 505 3R)。
- [0357] 在实施方案中,本发明提供了包含来自Pretorisuskop/96/4毒株的以下序列的减毒ASFV:
- [0358] (i) SEQ ID No.20 (MGF 360 10L) 和/或SEQ ID No.33 (MGF 360 11L), 以及
- [0359] (ii) SEQ ID No.95 (MGF 505 2R) 和/或SEQ ID No.109 (MGF 505 3R)。
- [0360] 在实施方案中,本发明提供了包含来自Tengani 62毒株的以下序列的减毒ASFV:
- [0361] (i) SEQ ID No.21 (MGF 360 10L) 和/或SEQ ID No.34 (MGF 360 11L), 以及
- [0362] (ii) SEQ ID No.96 (MGF 505 2R) 和/或SEQ ID No.110 (MGF 505 3R)。
- [0363] 在实施方案中,本发明提供了包含来自Warmbaths毒株的以下序列的减毒ASFV:
- [0364] (i) SEQ ID No.22 (MGF 360 10L) 和/或SEQ ID No.35 (MGF 360 11L), 以及
- [0365] (ii) SEQ ID No.97 (MGF 505 2R) 和/或SEQ ID No.111 (MGF 505 3R)。
- [0366] 在实施方案中,本发明提供了包含来自Warthog毒株的以下序列的减毒ASFV:

[0367] (i) SEQ ID No.23 (MGF 360 10L) 和/或SEQ ID No.36 (MGF 360 11L), 以及

[0368] (ii) SEQ ID No.112 (MGF 505 3R)。

[0369] 以下给出来自不同毒株的这些基因的翻译产物(即蛋白序列):

[0370] SEQ ID No.1-格鲁吉亚2007/1MGF 360 10L蛋白

[0371] MFPSLQSFQAKKVLARQQVSI EYHVILERCGLWWYKAPISLDCKHMLIKLPSFADGLDLNTALMLATKEN
NYQLIKLFT EWGADIN YGLICANTPPVREFCWELGAKYRVDKKKIMHMF FKL IHPGTTSSNI ILCLKLFNDNPFPAY
VIIREIRSSIIYWKLR LVEDTDILSNMSDGDMLTIYCFIVALQDNLREAI SYVYQHF KYLNTWWLICALCFNKLFDL
HNLYEKEKIRMDVDEMMRM ACTKDNNFLTIYYCFLLGANINSAMLACVRFYNMDNLF FCI DLGADAFEEAKALAEQR
NYYLISHHLSLDIYSADSSLLTLKEADPNKIYHLLKNYKLK SMLA

[0372] SEQ ID No.2-格鲁吉亚2007/1MGF 360 11L蛋白

[0373] MLPSLQSLTKKVL AGQCIPVDQYHVLKCCGLWWHNGPIMLHRRNKLFIRSTCFSQGIELNIGLMKAVK
ENNHDLIKLFTEWGADIN YGMICALTENTRDLC ELGAKEYLEREYILKIFD TTRDKTSSNI IFCHEVFSNNPNLR
IIDNLDLRGEIMWELRGLMEITFMLDHDDSFSTVLTKYWYAI AVDYDLKDAIRYFYQKYPR LHRWRLMCALFYNNVF
DLHEL YEIERVRMDIDEMMHIA CIQDYSYSAIYYCFIMGANINQAMLVSIQNYNLGNLFFCIDLGADAFEEGKALAE
QKENYLIAHALSLKHYPVISLLSIVTDPEKINCMLKNYHSINMGIFLDYEQR

[0374] SEQ ID No.7-格鲁吉亚2007/1MGF 505 2R蛋白

[0375] MFSLQDLCKRHLFILPDVFG EHVLRQLGLYWRCHGSLQRIGDDHILIRRDILSTNEALRMAGEEGNNE
VVKLLLLWKGNLHYAVIGALQGDQYDLIHKYENQIGDFHFI LPLIQDANTFEKCHALERFCGVSCLLKHATKYNMLP
ILQKYQEELSMRAYLHETLFELACLWQRYDVLK WIEQTIHVYDLKIMFNIAISK RDLTMYSLGYIFLFRGNTEATL
LTQHLKKTAAKGLLHFVLETLKYGGNIDTVLTQAVKYNHRKLLDYFLRQLPRKHIEKLLLLAVQEKASKKTLNLLS
HLNYSVKRIKKLPRYVIEYESTLVIKILLKKRVNLIDAMLEK MVRYFSATKVRTIMDELSISPERVIKMAIQMRTD
IVIHTSYVWEDDLERLTRLKNMVYTIKYE HGKKMLIKVMHGIYKNLLYGEREKVMFYLA KLYVAQNAATQFRDICKD
CYKLDVARFKPRFKQLILDCLEIITKSCYSILEILEKHIISLFTMKVMTEEEKNLCLEILYKVIHYKTIQC

[0376] SEQ ID No.8-格鲁吉亚2007/1MGF 505 3R蛋白

[0377] MSSSLQELCRKKLPDCILPEFFDDYVLQLLGLHWQDHGSLQRIEKNQILVQQEPIHINEALKVAASEGN
YEIVELLLSWEADPRYAVVGALESKYDYLVYKYDQVKDCHDILPLIQNPETFERCHELNSTCSLKCLFKHAVINDM
LPILQKYTDYLD RWEYCSQMLFELACSKKKYEMVWVIEGVLGVGKVTSLFTIAISNRDLQLYSLGYSIILENLYSCG
QDPKFLLNHFLRDVSIKGLLPFVIKTIEYGGSK EIAITLAKKYQHKHILKYFETWES

[0378] MGF 360 12L蛋白序列

[0379] SEQ ID No.113-贝宁97/1MGF 360 12L蛋白

[0380] MLPSLQSLTKKVL AGQCVPTNQHYLLKYYDLWYNA PITFDHNLRLIKSSGIKEGLDLNTALVKAVRE
NNYSLIKLFT EWGADIN YGLVSVNTEHTRDLCQELGAKEILNEEEILQIFIDLKFHKTSSNI ILCHEVFSNNPILQ
KVNNLKLRIE IFWELRELIEKTDLLNNEFLLSTLLLKYWYAI AVRYSLKEAIQYFYQKYTHMNTWRLTCALCFNNV
FDLHEAYEKDKIHMDIEEMMRIACIKDHNLS TMYCYMLGANINQAMLT SIQYNNIENMFFCMDLGADVFEEGTTA
LGEGYELIKNILSLKIYSPTTIPLPKSTDPEIIDHALKNYFSKNMMIFLSYDLR*

[0381] SEQ ID No.114-中国/2018/安徽XCGQ MGF 360 12L蛋白

[0382] MLPSLQSLTKKVL AGQCVPTNQHYLLKCYDLWWHDAPITFDHNLRLIKSAGIKEGLNLNTALVKAVRE
NNYNLIK LFAEWGADIN YGLVSVNTEHTWDLCRELGAKETLNEEEILQIFIDLKFHKTSSNI ILCHEVFSNNPILQ
KVNNIKMRIE IFWELRELIVKTDLLNNEFSLSTLLLKYWYAI AIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV

FDLHEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYVLGANINQAMLSSIQYYNIENMFFCIDLGADVFEEGTTA
LGEGYELIKNILSLKIYSPATTPLPKSTDPEIIDHALKNYVSKNMMIFLTYDLR*

[0383] SEQ ID No.3-格鲁吉亚2007/1MGF 360 12L蛋白

[0384] MLPSLQSLTKKVLAGQCVPTNQHYLLKCYDLWWHDAPITFDHNLRLIKSAGIKEGLNLTALVKAVREN
NYNLIKLFTEWGADINYGLVSVNTEHTWDLCRELGAKETLNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQKV
NNIKMRIEIFWELRELIVKTDLLNNEFSLSTLLLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNVFDL
HEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYVLGANINQAMLSSIQYYNIENMFFCIDLGADVFEEGTTALGEG
YELIKNILSLKIYSPATTPLPKSTDPEIIDHALKNYVSKNMMIFLTYDLR

[0385] SEQ ID No.115-Ken06.Bus MGF 360 12L蛋白

[0386] MLPSLQSLTKKVLARQCLPEDQHYLLKCYDLWWNNAPITFDHNLRLIKLAGIQEGLDNMALVKAVKE
NNYSLIKLFTTEWGANINYGLISVNTEHTWDLCRELGAKKTLNEGDILQIFIDLKFYKTSSNIILCHEVFSNLLK
RVNNLKMRIEIFWELREIEKTDLLNNEFSLNTLLLKYWYAIIVRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKICMDLEEMMRIACIKDHNLSMYYCYMLGANINQAMLTSIQYYNIENIFFCMDLGADAFEEGMAL
VGQEGYEPIRNILSLKIYSPATTPLPKSTDPEIIDHALKNYFSKNMMVFLTYDLR*

[0387] SEQ ID No.116-肯尼亚1950MGF 360 12L蛋白

[0388] MLPSLQSLTKKVLARQCLPEDQHYLLKCYDLWWNNAPITFDHNLRLIKSAGIQEGLDNMALVKAVKE
NNYSLIKLFTTEWGANINYGLISVNTEHTWDLCRELGAKKTLNEGDILQIFIDLKFHKTSSNIILCHEVFSNLLK
KVNNLKMRIEIFWELREIEKTDLLNNEFSLNTLLLKYWYAIIVRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKICMDLEEMMRIACIKDHSLSMYYCYMLGANINQAMLTSIQYYNIENIFFCMDLGADAFEEGMAL
VGQEGYEPIRNILSLKIYSPATTPLPKSTDPEIIDHELNKYFSKNMMVFLTYDLR*

[0389] SEQ ID No.117-L60 MGF 360 12L蛋白

[0390] MLPSLQSLTKKVLAGQCVPTNQHYLLKYYDLWWYNAPITFDHNLRLIKSSGIEGLDNLTALVKAVRE
NNYSLIKLFTTEWGADINYGLVSVNTEHTRDLCQELGAKEILNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNLKLRIEIFWELRELIEKTDLLNNEFLLSTLLLKYWYAIIVRYSLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYMLGANINQAMLTSIQYYNIENMFFCMDLGADVFEEGTTA
LGEGYELIKNILSLKIYSPTTIPLPKSTDPEIIDHALKNYFSKNMMIFLSYDLR*

[0391] SEQ ID No.118-马拉维Lil-20/1MGF 360 12L蛋白

[0392] MLPSLQSLTKKVLAGQCLPTDQYLLKCYDLWWYDSPITFDHNLGLIKSAGIKDGLDNLTALVKAVRE
NNYSLIKLFTTEWGADINYGLVSVNTEHTRDLCRELGAKETLNEEEILRIFIDLKFYKTSSNIILCHEVFSNNPLLQ
KVNNLKMRIEIFWELRELIEKTDLLNNEFSLNTLLLKYWYAIIVRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIYMDLEEMMRVACIKDHNLSMYYCYVLGANINQAMLASIQYYNIENMFFCMDLGADVFEENMPV
GEGYELIRNILSLKIYSPSTAPLPKNTDPEIIDHVLKNYKSKNMMTFLSYDLR*

[0393] SEQ ID No.119-Mkuzi 1979MGF 360 12L蛋白

[0394] MLPSLQSLTKKVLAGQCVPTNQHYLLKYYDLWWHDAPITFDHNLRLIKSAGIKEGLDNLTALVKAVKE
NNYSLIKLFAEWGADINYGLVSVSSEHTWDLCRELGAKETLNEKEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNIKMRIEIFWELRELIEKTDLLNNEFSLSTLLLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIYMDIEEMMRIACIKDHNLSMYYCYMLGANINQAMLTSIQYYNIENMFFCMDLGADVFEEGTTA
LGEGYELIKNILSLKIYSPTTIPLPKSTDPEIIDHALKNYFSKNMMIFLSYDLR*

[0395] SEQ ID No.120-Pretorisuskop/96/4MGF 360 12L蛋白

[0396] MLPSLQSLTKKVLAGQCVPTNQHYLLKCYDLWWHDGPITFDHNLKLIKISAGIKEGLDLNTALVKAVRE
NNYNLIKLF AEWGANINYGLVSVNTEHTWDLCRELGAKETLNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNIKMRIEIFWELRELIEKTDLLNEFSLSTLLLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYVLGGNINQAMLTISIYYNIENMFFCMDLGADAFEEGTIA
LGEGYKLIKNI LS LKIYSPATTPLPKSTDPEIIDHALKNYVSKNMMIFLTYDLR*

[0397] SEQ ID No.121-Tengani 62MGF 360 12L蛋白

[0398] MLPSLQSLTKKVLAGQCVPTNQHYLLKCYDLWWHDAPITFDHNLRLIKSAGIKEGLNLNTALVKAVRE
NNYNLIKLF AEWGANINYGLVSVNTEHTWDLCRELGAKETLNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNIKMRIEIFWELRELIEKTDLLNEFSLSTLLLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYVLGANINQAMLTISIYYNIENMFFCIDLGADVFEEGTTA
LGEGYELIKNI LS LKIYSPATTPLPKSMDPEIIDHALKNYVSKNMMIFLTYDLR*

[0399] SEQ ID No.122-Warmbaths MGF 360 12L蛋白

[0400] MLPSLQSLTKKVLAGQCVPTNQHYLLKCYDLWWHDGPITFDHNLKLIKISAGIKEGLDLNTALVKAVRE
NNYNLIKLF AEWGANINYGLVSVNTEHTRDLCRELGAKETLNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNIKMRIEIFWELRELIEKTDLLNEFSLSTLLLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIYMDIEEMMRIACIKDHNLSMYYCYVLGANINQAMLTISIYYNVENMFFCMDLGADAFEEGTIA
LGEGYKLIKNI LS LKIYSPATTPLPKSTDPEIIDHAVKNYVSKNMMIFLTYDLR*

[0401] SEQ ID No.123-Warthog MGF 360 12L蛋白

[0402] MLPSLQSLTKKVLAGQCVPTNQHYLLKCYDLWWHDGPITFDHNLKLIKISAGIKEGLDLNTALVKAVRE
NNYNLIKLF AEWGANINYGLVSVNTEHTRDLCRELGAKETLNEEEILQIFIDLKFHKTSSNIILCHEVFSNNPILQ
KVNNIKMRIEIFWELRELIEKTDLLNEFSLSALLKYWYAIIRYNLKEAIQYFYQKYTHLNTWRLTCALCFNNV
FDLHEAYEKDKIHMDIEEMMRIACIKDHNLSMYYCYVLGANINQAMLTISIYYNIENMFFCMDLGADAFEEGTIA
LGEGYKLIKNI LS LKIYSPATTPLPKSTDPEIIDHALKNYVSKNMMIFLTYDLR*

[0403] MGF 360 13L蛋白序列

[0404] SEQ ID No.124-贝宁97/1MGF 360 13L蛋白

[0405] MSLPLSLQTLVKKTVASQCLSIDEHCILKYCGLWWHDAPLKLCDRGRIGRIQIKSGFLGEDIDLRLVALII
AVKENNYSLIKLFTEWGANINYSLLSINTKHIRELCRQLGAKETLEDNDIFRIFTRIMHNKTSIGSIILCHEIFMNN
PMLNKFVILQRLGIYKRLWGLIEIKETDELNDLLVKYWYAKAVQYVCKNAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKKVQIDVHDMICLACAKDNNLLTIYYCYALGGNINQAMLTISVQYYNVGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLTLDIYSSDASLPLNLKDPEKISSLLKDYKSKNLSIIWEYSHNIL*

[0406] SEQ ID No.125-中国/2018/安徽XCGQ MGF 360 13L蛋白

[0407] MSLPLSLQTLVKKTIASQCLSIDEHCILKYCGLWWHDAPLKLCDRGRIGRIQIKSGFLGEDIDLRLVALII
AVKENNYSLIKLFTEWGANINYGLLSINTKHIRELCRQLGAKETLEDNDIFRIFTRIMHNKTSIGSIILCHEIFMNN
PILENKFVILQRLGIYKRLWGLIEIKETDELNGLLVKYWYAKAVQYDCKDAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKENIQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTISVQYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLALDIYSSDASLPLNLKDPEEISSLLKDYKSKNLSIIWEYSHNIL*

[0408] SEQ ID No.4-格鲁吉亚2007/1MGF 360 13L蛋白

[0409] MSLPLSLQTLVKKTIASQCLSIDEHCILKYCGLWWHDAPLKLCDRGRIGRIQIKSGFLGEDIDLRLVALIIA
VKENNYSLIKLFTEWGANINYGLLSINTKHIRELCRQLGAKETLEDNDIFRIFTRIMHNKTSIGSIILCHEIFMNNPI

LENKFVIQLRGLIYKRLWGLIEIKETDELNGLLVKYWYAKAVQYDCKDAICFLDEKYTDLNEWRLKCLLYNKIYEL
HEMYHKENIQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTsvQYYNIGNIFFCIDLGGNAFEEGRAIAEQK
GYNFLSHSLALDIYSSDASLPLNLKDPEEISSLLKDYKSKNLSIWEYSH

[0410] NIL

[0411] SEQ ID No.126-Ken06.Bus MGF 360 13L蛋白

[0412] MSSPLSLQTLVKKTVAGTSCLSIDEHILKYCGLWWHDAPLKLYIDRGRIYIKSGFLGEDIDLCVALIIA
VKENNYs

[0413] MIKLFTEWGAYINYSLLSINTKHARDLCRQLGAKETLDDYDIFCIFNKIMHNKTSGSIILCHEIFINN
PNLENNFAAQLRRLIYKRLCGLIEIKETDESELLVKYWYANAVQYDHKDAICFLDEKYTDLDEW*LKCYLCYNKI
YELHDIYHKEKIQIDVNEMLSLACIRDNNLLTIYYCYALGGNINQAMLTsvQYYNIGNIYFCIDLGGNAFEEGSAI
ARQNGYNFLSHSLVLNIYSSDASLPLNLKDPEEISSLLKNYKSKNLSIILDYSHKIL*

[0414] SEQ ID No.127-肯尼亚1950MGF 360 13L蛋白

[0415] MSSPLSLQTLVKKTVASTSCLSIDEHILKYCGLWWHDAPLKLYIDRGRIYIKSGFLGEDIDLCVALII
AVKENNYSLIKLFTEWGAYINYSLLSINTKHARDLCRQLGAKETLDDYDIFCIFNKIMHNKTSGSIILCHEIFINN
PKLENNFAAQLRRLIYKRLCGLIEIKETDESELLVKYWYANAVQYDHKDAICFLDEKYTDLDEWRLKCYLCYNKI
YELHDIYHKKKIQIDVNEMLSLACIRDNNLLTIYYCYALGGNINQAMLTsvQYYNIGNIYFCIDLGGNAFEEGSAI
ARQNGYNFLCHSLILNIYSSDASLPLNLKVPEEISSLLKNYKSKNLSIILDYSHKIL*

[0416] SEQ ID No.128-L60 MGF 360 13L蛋白

[0417] MSLPLSLQTLVKKTVASQCCLSIDEHCILKYCGLWWHDAPLKLCMDRGRIQIKSGFLGEDIDLRVALII
AVKENNYSLIKLFTEWGANINYSLLSINTKHIRELCRQLGAKETLEDNDIFRIFTRIMHNKTSGSIILCHEIFMNN
PMLNKFVIQLRGLIYKRLWGLIEIKETDELNDLLVKYWYAKAVQYVCKNAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKKKVQIDVHDMICLACAKDNNLLTIYYCYALGGNINQAMLTsvQYYNVGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLTLDIYSSDASLPLNLKDPEKISSLLKDYKSKNLSIWEYSHNIL*

[0418] SEQ ID No.129-马拉维Li1-20/1 (1983)MGF 360 13L蛋白

[0419] MSAPLSLQTLVKKTVASTSCLSIDEHILKYCDLWWHDAPLKLYMDRGRIQIKSGFLGEDIDLCVALII
AVKENNYNLIKLFTELGANINYSLLSINTKHVRDLRCRQLGAKETLEDYDIFCIFNKIMHNKTSGSVILCHEIFINN
PNLENKFAAQLRRLIYKRLCGLIEIKETDESELLVKYWYAKAVQYDYKDAICFLDEKYTDLNEWRLKCYLYNKI
YELHDIYHKEKIQIDVNEMLSLACIRDNNPLTIYYCYALGGNINQAMLTsvQYYNIGNIYFCIDLGGNAFEEGSAI
ARQKGYNFLSHSLVLNIYSSDASLPLNLKDPEEISSLLKNYKSKNLSIILDYSHNIL*

[0420] SEQ ID No.130-Mkuzi 1979MGF 360 13L蛋白

[0421] MSLPLSLQTLVKKTVASQCCLSIDEHCILKYCGLWWHDAPLKLCMDRGRIQIKSGFLGEDIDLRVALII
AVKENNYSLIKLFTEWGANINYSLLSINTKHIRELCRQLGAKETLEDNDIFRIFTRIMHNKTSGSIILCHEIFMNN
PILENKFVIQLRGLIYKRLWGLIEIKETDKLNDLLVKYWYAKAVQYVCKNAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKKKVQIDVHDMICLACAKDNNLLTIYYCYALGSNINQAMLTsvQYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLTLDIYSSDASLPLNLKDPEEISSLLKDYKSKNLSIWEYSHNIL*

[0422] SEQ ID No.131-Pretorisuskop/96/4MGF 360 13L蛋白

[0423] MSLPLSLQTLVKKTVASQCCLSIDEHCILKHCGLWWHDVPLKLCMDRGQIQIKSGFLGEDIDLHIALII
AVKENNYSLIKLFTEWGAHINYSLLSINTEHIRELCRQLGAKETLEDDVFRIFTKIMHNKTSGRILCHDIFMNN
PNIENKFTIQLRGLICKRLWGLIEIKETDELNDLLVKYWYAKAVQYECKDAICFLEEKYTDLNEWRLKCLLYFNKI

YELHEMYHKEKVQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTISIYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLALDIYSSDASPLNLKDPEEISSLLKDYKSKNLSIIWEYSHNIL*

[0424] SEQ ID No.132-Tengani 62MGF 360 13L蛋白

[0425] MSLPLSLQTLVKKTVANQSLSIDEHCILKHCGLWWHDVPLKLCMDRGQIIKSGFLGEDIDLHIALII
AVKENNYSLIKLFTEWGANINYSLLSINTKHIRELCRQLGAKETLEDDIFRIFTKIMHNKTSGSIILCHDIFMNN
PNIEDKFTIQLRGLIYKRLWGLIEIKETDELNGLLVKYWYAKAVQYECKDAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKENIQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTISVQYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYNFLSHSLALDIYSSDASPLNLKDPEEISSLLKDYKSKNLSIIWEYSHNIL*

[0426] SEQ ID No.133-Warmbaths MGF 360 13L蛋白

[0427] MSLPLSLQTLVKKTVASQCLSTDEHCILKHCGLWWHDVPLKLCMDRGQIIKSGFLGEDIDLHVALII
AVKENNYSLIKLFTEWGAHINYSLLSINTEHIRELCRQLGAKKTLEDNDIFRIFTKIMHNKTSGRILCHEIFMNN
PNIENKFTIQLRGLICKRLWRLIEIKETDELNDLLVKYWYAKAVQYECKDAICFLDEKYTGLNEWRLKCLLYNKI
YELHEMYHKDKVQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTISVQYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYHFLSHSLALDIYSSDASPLNLKDPEEISSLLKGYKSKNLSIIWEYSHNIL*

[0428] SEQ ID No.134-Warhog MGF 360 13L蛋白

[0429] MSLPLSLQTLVKKTVASQCLSTDEHCILKHCGLWWHDVPLKLCMDRGQIIKSGFLGEDIDLHIALII
AVKENNYSLIKLFTEWGAHINYSLLSINTEHIRELCRQLGAKETLEDNDIFRIFTKIMHNKTSGRILCHEIFMNN
PNIENKFTIQLRGLICKRLWGLIEIKETDELNDLLVKYWYAKAVQYECKDAICFLDEKYTDLNEWRLKCLLYNKI
YELHEMYHKEKVQIDVHDMICLASTKDNNPLTIYYCYALGGNINQAMLTISVQYYNIGNIFFCIDLGGNAFEEGRAI
AEQKGYHFLSHSLTLDIYSSDASPLNLKDPEEISSLLKDYKSKNLSIIWEYSHNIL*

[0430] MGF 360 14L蛋白序列

[0431] SEQ ID No.135-贝宁97/1MGF 360 14L蛋白

[0432] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWWDLGPIHLCNNCKQVFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVYLKRLCAELGGLTPVSEPRILLEILKEVANLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNQLYWRVACSLYFNNIFDI
HELCREKEICISPNLMMKFACREKNYAAIYYCHRLGASLDYGMNLSIYNNNTLNMFFCIDLGAADFDRQLIAHK
AYMYNLSNIFLVKQLFSRDVTLVLDVTEPQEIIDMLKTYTSKNMKRAEEYLTAHPEIIVID*

[0433] SEQ ID No.136-中国/2018/安徽XCGQ MGF 360 14L蛋白

[0434] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWWDLGPIHLCNNCKQVFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVYLKRLCAELGGLTPVSEPRILLEILKEVARLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNHLYWRVACSLYFNNIFDI
HELCREKEICISPNLMMKFACREKNYAAIYYCHRLGASLDYGMNLSIYNNNTLNMFFCIDLGAADFDRQLIAHK
AYMYNLSNIFLVKQLFSRDVTLVLDVTEPQEIIDMLKTYTSKNLKRABEYLTAHPEIIVID*

[0435] SEQ ID No.5-格鲁吉亚2007/1MGF 360 14L蛋白

[0436] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWWDLGPIHLCNNCKQVFSYKHLQCFSEDDLCLEAALVKA
VKSDNLELIRLFVDWGANPEYGLIRVPAVYLKRLCAELGGLTPVSEPRILLEILKEVARLKSCAGVLLGYDMFCHNPL
LETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNHLYWRVACSLYFNNIFDIHEL
CREKEICISPNLMMKFACREKNYAAIYYCHRLGASLDYGMNLSIYNNNTLNMFFCIDLGAADFDRQLIAHKAYMY
NLSNIFLVKQLFSRDVTLVLDVTEPQEIIDMLKTYTSKNLKRABEYLTAHPEIIVID

[0437] SEQ ID No.137-Ken06.Bus MGF 360 14L蛋白

[0438] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNTCKQIFSYQHLQCFSDDLCLDAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVHLKRLCTELGGLTPVSESRLLEILKEVADLKSCAGVLLGYDMFCHN
PLMETVTRTTLTNTVMYTRSKIPLTGDTAHLTKFWFALALRHNFTKAIHYFYEKHKNQLYWRLTCSLYFNNIFDL
HELCSKKEICISPNLMMKFACLREENYAAIYYCHMLGASPDYGMNLSIYNNNTLNLFFCIDLGATNFDRARLIAHR
VYMYNLSNIFLVKQLFSRDASLVLNITEPQAIYDMLKTYTSKNLKRAEEYFTAHP EIVVID*

[0439] SEQ ID No.138-肯尼亚1950MGF 360 14L蛋白

[0440] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNTCKQIFSYQHLQCFSEDDLCLDAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVDLKRLCTELGGLTPVSESRLLEILKEVADLKSCAGVLLGYDMFCHN
PLLETVTRTTLTNTVMYTRSKIPLTGDTAHLTKFWFALALRHNFTKAIHYFYEKHKNQLYWRLACSLYFNNIFDL
HELCSKKEICISPNLMMKFACLREENYAAIYYCHMLGASPDYGMNLSIYNNNTLNLFFCIDLGATNFDRARLIAHR
VYMYNLSNIFLVKQLFSRDASLVLNITEPQAIYDMLKTYTSKNLKRAEEYFTAHP EIVVID*

[0441] SEQ ID No.139-L60 MGF 360 14L蛋白

[0442] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNNCKQVFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVYLKRLCAELGGLTPVSEPRLEILKEVANLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNQLYWRVACSLYFNNIFDI
HELCKEKEICISPNLMMKFACLREKNYAAIYYCHRLGASLDYGMNLSIYNNNTLNMFFCIDLGAADFRAQLIAHK
AYMYNLSNIFLVKQLFSRDVTLVLDVTEPQEIIDMLKTYTSKNMKRAEEYLT AHP EIVVID*

[0443] SEQ ID No.140-马拉维Li1-20/1MGF 360 14L蛋白

[0444] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNTCKQIFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVHLKRLCMELGGLTPVSESRLLEILKEVADLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVMYTRSKIPLTGDTAHLTKFWFALALRHNFTKAIHYFYEKHKNQLYWRLTCSLYFNNIFDL
HELCKEKEICISPNLMMKFACLREENYAAIYYCHMLGASLDYGMNLSIYNNNTLNLFFCIDLGATNFDRARLIARR
VYMYNLSNIFLVKQLFSRDVSLILDTEPQAIYDMLNTYTSKNLKQAEYFTAHP EIVVID*

[0445] SEQ ID No.141-Mkuzi 1979MGF 360 14L蛋白

[0446] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNNCKQVFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVYLKRLCAELGGLTPVSEPRLEILKEVANLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNQLYWRVACSLYFNNIFDI
HELCKEKEICISPNLMMKFACLREKNYAAIYYCHRLGASLDYGMNLSIYNNNTLNMFFCIDLGAADFRAQLIAHK
AYMYNLSNIFLVKQLFSRDVTLVLDVTEPQEIIDMLKTYTSKNMKRAEEYLT AHP EIVVID*

[0447] SEQ ID No.142-Pretorisuskop/96/4MGF 360 14L蛋白

[0448] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNNCKQIFSYKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVHLKRLCTELGGLTPVTEPRLEILKEVAKLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHLTKFWFALALRHNFTKAIHYFYKRHNQLYWRVACSLYFNNIFDI
HELCKEKEICISPNLMMKFACLQKKNYAAIYYCYRLGASLDYGMNLSIYNNNTLNMFFCIDLGATDFDRAQHIAHK
AYMYNLSNIFLVKQLFSRDVTLALDVTEPQEIIDRLKSYTSKNLKRAEEYLT AHP EIVVID*

[0449] SEQ ID No.143-Tengani 62MGF 360 14L蛋白

[0450] MSLSLQTLAKKVACNYLSSDYDYTLQRFGLWDLGPIHLCNNCKQIFSYKHVQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVHLKRLCTELGGLTPVSESRLLEILKEVARLKSCAGVLLGYDMFCHN

PLLETVTRTTLDTVTYTCSNIPLTGDTAHHLLTKFWFALALRHNFTKAIHYFYKRHKHNLHYWRVACSLYFNNIFDI
HELCREKEICISPNLMMKFACLQKKNYAAIYYCYRLGASLDYGMNLSIYNNNTLNMFFCIDLGATDFDRAQRIAHK
AYMYNLSNIFLVKQLFSRDVTALDVTEPQEIIDMLKSYTSKNLKRAEEYLTAHPEIIVID*

[0451] SEQ ID No.144-Warmbaths MGF 360 14L蛋白

[0452] MSLSLQTLAKKVACNYLSSDYDMLQRFGLWDLGPIHLCNNCKQIFSYPKHLQCFSEDDLCLEAALVK
AVKRDNLELIRLFVDWGANPEYGLICVPTVHLKRLCTELGGLTPVSEPRLLEILKEVANLKSCAGVLLGYDMFCYN
PLLETITRTTLDTVMYSCSKIPLMGDTAHHLLTKFWFALALRHNFTKAIHYFYKRHKHNLHYWRVACSLYFNNIFDI
HELCREKEICISPNLMMKFACLRKKNYAAIYYCYRLGASLDYGMNLSIYNNNSLNLFFCIDLGATDFDRAQRIAHK
AYMYNLSNILLVKQLFSRDVTALDVTEPQEIIDRLKAYTSKNMKRAEEYLTAHPEIIVID*

[0453] SEQ ID No.145-Warthog MGF 360 14L蛋白

[0454] MSLSLQTLAKKVACNYLSSDYDMLQRFGLWDLGPIHLCNNCKQIFSYPKHLQCFSEDDLCLEAALVK
AVKSDNLELIRLFVDWGANPEYGLIRVPAVHLKRLCTELGGLTPVSEPRLLEILKEVAKLKSCAGVLLGYDMFCHN
PLLETVTRTTLDTVTYTCSNIPLTGDTAHHLLTKFWFALALRHNFTKAIHYFYKRHKHNLHYWRVACSLYFNNIFDI
HELCREKEICISPNLMMKFACLRKKNYAAIYYCYRLGASLDYGMNLSIYNNNTLNMFFCIDLGATDFDRAQRIAHK
TYMYNLSNIFLVKQLFSRDVTALDVTEPQEIIDMLKSYTSKNLKRAEEYLTAHPEIIVID*

[0455] MGF 505 1R蛋白序列

[0456] SEQ ID No.146-贝宁97/1MGF 505 1R蛋白

[0457] MFSLQNLCKRTLDPCKLPEFFDDYILQLLGLYWENHGTIQRAGNNCVLIQQHTLIPVNEALRIAASEE
NYEIVGLLLAWEGNLYYAIIGALEGNRYNLRKYDDQIKDHHDILPFIDDPVIFHKCHIMRRCFFDCILYQAVKYS
KFRVLLYFKYTLEDDLPLVHLLIEKACEDHNYEVIKWIYENLHVCHIIDTFDCAIAHKDLRLYCLGYTFIYNRIVP
YKYHHLDIRMLSSLQLLHKVAAKGYLDFILETLKYDHNIDNLDVILTQAATYNHRKILTYFIPQSTYAEQIEQCLFV
AIKTKSSKKTNLNLLSHLNLISIKLIQKISQYVATFNSTNIIIGILSMKRKKKIYLDIILTKFVKNAIFNKFVVRCE
RFSINPERIVKMAARINKMMLVKKISEHVWKNHAARLKLKHAVHTMKHKDGKNRLMNFYEHCHYHMQGEEIFSL
ARFYAIIHAPKLFDFVFNCCILDTIRFKSLLLDLCSHIIIGKNAHDATNINIVNKYIGNLFGVLSKKEILQDYP
YSKHYMP*

[0458] SEQ ID No.147-中国/2018/安徽XCGQ MGF 505 1R蛋白

[0459] MFSLQNLCKRTLPNRKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLIQQHTLIPVNEALRTAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHDILIRKYDDQIKDHHEILPFIDDPVIFHKCHIMRQCFFDCILYQAVKYS
KFRVLLYFKHREDDLPTFTHLLIEKACKDHNYEVIKWIYENLHIYNMIDTFECAIAHKDLHLYCLGYRFIYNRIVP
DKYHHLDIRMLSSLQLLHKVAAKGYLDFILETLKYDHNKDNIINILQAATYNHRKILYFIPQSTHAQIEQCLLV
AIKAKSSRKTNLNLNLSINLIKISHYVATYNSTNIIIGILSMRRKKKIYLDIILTKFVKNAIFNKFVVRCE
TFSINPERILKIAARINRMMLVKKISEHVWKNHARLKLKHAVHTMKHKDGKNRLMNFYDRCYHMQGEEIFSL
ARFYAIIHAPKLFDFVYDCCILDTIRFKSLLLDLCSHIIIGKNAHDATNINIVNKYIGNLFGVLSKKEILQDYP
YSKQYMP*

[0460] SEQ ID No.6-格鲁吉亚2007/1MGF 505 1R蛋白

[0461] MFSLQNLCKRTLPNRKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLIQQHTLIPVNEALRTAASEE
YEIVSLLLAWEGNLYYAIIGALEGNRHDILIRKYDDQIKDHHEILPFIDDPVIFHKCHIMRQCFFDCILYQAVKYSKF
RVLLYFKHREDDLPTFTHLLIEKACKDHNYEVIKWIYENLHIYNMIDTFECAIAHKDLHLYCLGYRFIYNRIVPDKY
HHLDIRMLSSLQLLHKVAAKGYLDFILETLKYDHNKDNIINILQAATYNHRKILYFIPQSTHAQIEQCLLVAIKA

KSSRKTNLNLLSHLNLNLSINLIKISHYVATYNSTNIIGILSMRRKKKIYLDIILTKFVKKAIFNKFVVR CMDTFSIN
PERILKIAARINRMMLVKKISEHVWKNHAVRLKYLKHAVHTMKHKDGKNRLMNFYDRCYYHMQGEEIFSLARFYAI
HHAPKLFDFVYDCCILDTIRFKSLLLDCSHIIGKNAHDATNINIVNKYIGNLFVFMGVLSKKEILQDYPYSISKQYMP
[0462] SEQ ID No.148-Ken05/Tk1 MGF 505 1R蛋白

[0463] MFSLQNLCKRTLDPCKLPEFFDDYVLQLLGLYWENHGTTIQRAGNNCVLIQQHNLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHNLIRKYDDQIKDHHEILPFIDDPVIFHKCHIMRRCFFNCMLYQAVKYS
KFSVLLYFKYILKENLPLVHSLIEKAYKYHNYEVIKWIYENLHIYDIINTFKYIAIAHKDLRLYCLGYTFVYNRIVP
YKYYHLDIRILLRLQLLHKVTAKGYLDFILETLKYDHNTNNIDIILTQAATYNHRNILTYPQSTYQIEQCLFV
AIKTNASKKTLNLLSHLNLNLSIKLVKKLSQYVVAYKSTNIISILSMQKKKIYLDIILTKVVKNAVFIFKFIGCMV
TFSINPERIVKMAARIKKMKLVKNISEHVWKNHAAKLKHLKHAVHTMKHQEGKNRLMNFYDHCYYHMQGEEIFSL
ARFYAIHHAPKLFDFVYDCCILDTIRFKSLLLDCSHIIAKNAHDASINIVNKYIGNLFAMGVLSKKEILQDYPYSIY
SKYDIL*

[0464] SEQ ID No.149-Ken06.Bus MGF 505 1R蛋白

[0465] MFSLQNLCKRTLDPCKLPEFFDDYVLQLLGLYWENHGTTIQRAGNNCVLIQQHNLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNHNLIRKYDDQIKDHHEILPFIDDPVIFHKCHTMRRCFFNCILYQAVKYS
KFSVLLYFKYILKENLPLVHSLIEKAYKYHNYEVIKWIYENLHIYDIINTFKCAIAHKDLRLYCLGYTFVYNRIVP
YKYYHLDIRILLRLQLLHKVTAKGYLDFILETLKYDHNTNNIDIILTQAATYNHRNILTYPQSTYQIEQCLFV
AIKTNASKKTLNLLSHLNLNLSIKLVKKLSQYVVAYKSTNIISILSRQKKKIYLDIILTKVVKNAVFNFVIGCMV
TFSINPERIVKMAARIKKMKLVKNISEHVWKNHAVKLKYLKHAVHTMKHQEGKNRLMNFYDHCYYHMQEEEIFSL
ARFYAIHHAPKLFDFVYDCCILDTIRFKSLLLDCSHIIVKNAHDASINIVNKYIGNLFAMGVLSKKEILQDYPYSIY
SKDYML*

[0466] SEQ ID No.150-肯尼亚1950MGF 505 1R蛋白

[0467] MFSLQNLCKRTLDPDRKLPEFFDDYVLQLLGLYWENHGTTIQRAGNNCVLIQQHNLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHNLIRKYDDQIKDHHEILPFIDDPVIFHKCHMMRRCFFNCILYQAVKYS
KFSVLLYFKYILKENLPLVHSLIEKACEDHNYEVIKWIYENLHIYEIMDTFKCAIAHKDLHLYSGLYTFIYNRIVP
YKYHHLDIRILSRLQLLHKVTAKGYLDFILETLKYDHNDNINIILTQAATYNHRNILTYPQSTYQIEQCLFV
AIKTNASKKTLNLLSHLNLNLSIKLVKKLSQYVVAYKSTNIISILSMQKKKIYLDIILTKVVKNAIFIFKFIGCMV
TFSINPERIVKMAARIKKMKLVKNISEHVWKNHAAKLKHLKHAVHTMKHQEGKNRLMNFYDHCYYHMQGEEIFSL
ARFYAIHHAPKLFDFVYDCCILDTIRFKSLLLDCSYIIAKNAHDASINIVNKYIGNLFAMGVLSKKEILQDYPYSIY
SKDYML*

[0468] SEQ ID No.151-L60 MGF 505 1R蛋白

[0469] MFSLQNLCKRTLDPCKLPEFFDDYILQLLGLYWENHGTTIQRAGNNCVLIQQHTLIPVNEALRIAASEE
NYEIVGLLLAWEGNLYYAIIGALEGNRYNLIRKYDDQIKDHHDILPFIDDPPIIFHKCHIMRRCFFDCILYQAVKYS
KFRVLLYFKYTLEDDLPLVHLLIEKACEDHNYEVIKWIYENLHVCHIIDTFDCAIAHKDLRLYCLGYTFIYNRIVP
YKYHHLDILILSSLQLLHKVAAKGYLDFILETLKYDHNIDNLDVILTQAATYNHRKILTYPQSTYQIEQCLFV
AIKTKSSKTLNLLSHLNLNLSIKLIQKISQYVATFNSTNIIGILSMKRKKKIYLDIILTKFVKNAIFNKFVVR CME
RFSINPERIVKMAARINKMMLVKKISEHVWKNHAARLKHLKHAVHTMKHKDGKNRLMNFYEHYYHMQGEEIFSL
ARFYAIHHAPKLFDFVYNCCILDTIRFKSLLLDCSHIIGKNAHDATNINIVNKYIGNLFAMGVLSKKEILQDYPYSI
YSKHYMP*

[0470] SEQ ID No.152-马拉维Lil-20/1 (1983) MGF 505 1R蛋白

[0471] MFSLQNLCKRKTLPDCKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLIQQHNLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRPDLIRKYDDQIKDHHEILPFIDDPPIIFHKCHIMRRCFFNCILYQAVKYS
KFRVLLYFKHRLGDDLPLTHLLIEKACEDHNYEVIKWIYENLHSYNIMDTFECAIAHKDLRLYCLGYTFIYNRIVP
YKYHHLDICILSSLQLLHKVAAKGYLDFILETLKYDHNINNIIDILTQAATYNHRKILTYFIPQLTYAQIEQCLLV
AIKTKASKKTLNLLLSHLNLSIKLIKISQYVVTYNSTNIISILSMRRKKKIYLDIILTEFVKNAIFNKFVVR CMD
TFSINPERIVKMAARINRMMLVKNISERVWKNHAVKLKHLKHAVHTMKHQEGKNRLMNFYDHCYHYMQGEEIFGL
ARFYAIHHAPKLFDFVYDCCMLDATRFKSLLLDCPHIIGKNAYDAGINLVNKYIGNLFAMGVLSKKEILQDYP SIY
SKHDMF*

[0472] SEQ ID No.153-Mkuzi1979 MGF 505 1R蛋白

[0473] MFSLQNLCKRKTLPDCKLPEFFDDYILQLLGLYWENHGTIQRAGNNCVLIQQHTLIPINEALRTAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHDLIRKYDDQIKDHHEILPFIDDPVIFHKCHIMRRCFFDCILYQAVKYS
KFRVLLYFKYRLEDDLPLTHLLIEKACENHNYEVIKWIYENLHIYNMIDTFECAIAHKDLRLYCLGYTFIYNRIVP
NKYHHIDILILSSLQLLHKVAAKGYLDFILETLKYDHNNDNLDIILTQAATYNHRKILTYFIPQSTY AQIEQCLMV
AIKTKSSKTLNLLLSHLNLSIKLIKISQYVVTYNSTNIIGILSMKRKKKIYLDILLTKFVKNAIFNKFVVRYMD
TFSINPEKIVKMAARINKMMLVKKISEHIWKNHAARLEHLKHAVHTMKHKDGKNRLMNFYIEYCYHYMQGEEIFSL
ARFYAIHHAPKLFDFVYNCCILDTIRFKSLLLDCSIIGKNAHDATNINIVNKYIDNLFAMGVLSKKEILQDYP SI
YSKHYMP*

[0474] SEQ ID No.154-Pretorisuskop/96/4MGF 505 1R蛋白

[0475] MFSLQNLCKRKTLPDCKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLVQQHTLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHDLIRKYDDQIKDHHEILPFIDNPVIFHKCHIMRRCFFDCILYQAVKYS
KFRVLLYFKYRLENDLPLAHLLEKACEDHNYEVIKWL YENLHIYNIMETFECAIAHKDLRLYRLGYTFIYNRIVP
YKYHYLDVLILSGLHLLYKVAAGYLDFILETLKYDHNNDNLDIILTQAVTYNHRKILTYFIPQLTYAQIEQCLFM
AIKKKSSKTLNLLLSHLKLSIKLIKISQYVATYNSTNIIGILNMKRKKKIYLDIILTKFVKY AIFNKYVVR CMD
TFSINPERI IKMAARINKMLLVKKISQHAWKNHAARLKHLKHAVYTMKHKDGKNRLMNL IYDHYHYMQGEEIFSL
ARFYAIHHAPKLFDFVYDCCLLDTIRFKSLLLDCSIIGKNAHDATNITIVNKYIGNLFAMGVLSKKEILQDYP SI
YSKHYMP*

[0476] SEQ ID No.155-Tengani 62MGF 505 1R蛋白

[0477] MFSLQNLCKRKTLPDCKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLIQQHNLIPVNEALRIAASEE
NYEIVSLLLAWEGNLYYAIIGALEGNRHDLIRKYDDQIKDHHEILPFIDDPVIFHKCHIMRQCFFDCILYQAVKYS
KFRVLLSFKHRLRDDLPFTHLLIEKACKDHNYEVIKWIYENLHIYNMIDTFECAIAHKDLRLYCLGYRFIYNRIVP
DKYHHLDIRMLSSLQLLHKVAAKGYLDFILETLKYDHNKDNINIILTQAATYNHRKILTYFIPQSTHAQIEQCLLV
AIKTKSSKTLNLLLSHLNLSINLIKISHYVATYNSTNIIGILSMRRKKKIYLDIILTKFVKKAIFNKFVVR CMD
TFSINPERILKIAARINRTMLVKKISEHVWKNHAVRLKYLKHAVHTMKHKDGKNRLMNFYIDRCYHYMQGEEIFSL
ARFYAIHHAPKLFDFVYDCCILDTIRFKSLLLDCSIIGKNAHDATNINIVNKYIGNLFV MGVLSKKEILQDYP SI
YSKHYMP*

[0478] SEQ ID No.156-Warmbaths MGF 505 1R蛋白

[0479] MFSLQNLCKRKTLPDCKLPEFFDEYILQLLGLYWENHGTIQRAGNNCVLIQQRTLIPVNEALRIAASEE
NYEIVGLLLAWEGNLYYAIIGALEGNRHDLIRKYDDQIKDHHEILPFIDDPVIFHKCHIIRRCFFNCILYQAVKYS

KFRVLLYFKHRLEDDLPLTHLLIEKACEDHNYEVIKWIYENLHTYDIMDTFECAIAHKDLRLYCLGYTFIYNRIVP
YEHHLDLILSSQLLHKVAAKGYLDFILETLKYDHNNDNLDIILTQAATYNHRKILTYFIPQLTYAQIEQCLFM
AIKRKSSKKTNLNLLSHLTLSELIKISQYVVTYNSTNIGILSMKRKKKIYLDIMLT KYVKYAI FNKYVVR CMD
RFSINPERIIKMAARINRMMLVKKISEHVWKNHAARLKHLLKHAVHTMKHKDGKNRLMNFYDRCYYHMQGEEIFSL
ARFYAIIHHAPKLFDFYDCCILDITQFKSLLLDCSIIGKNAHDATNINIVNKYIGDLFAMGVLSKKEILQDYP
YSKHYML*

[0480] SEQ ID No.157-Warhog MGF 505 1R蛋白MFSLQNLCKRKTLPDCKLPEFFDEYILQLLGLY
WENHGTIQRAGNNCVLIQQHTLIPVNEALRIAASEENYEIVSLLLAWEGNLYYAIIGALEGNRHDLIRKYDDQIKD
HHEILPFIDDPVIFHKCHIMRRCFFDCILYQAVKYSKFRVLLYFKYRLNDLPLAHLLIKACEDHNYEVIKWIYE
NLHIYNIMDTFGCAIAHKDLRLYRLGYTFIYNRIVPYKYHYLDVILSGLHLLYKVAAGYLDFILETLKYDHNND
NLDIILTQAATYNHRKILTYIPQLTYAQIEQCLFMAIKKKSSKKTNLNLLSHLKLKSIKKISQYVATYNSTNI
IGILNMRRKKKIYLDIILTKFVKKAIFNKFVVR CMDTFSINPERIIKMAARINKMLLVKKISEHAWKNHAARLKH
KHAVYTMKHKDGKNRLMNIYDHYYYHMQGEEIFSLARFYAIIHHAPKLFDFYDCCLLDITRFKNLLDCSHIIGK
NAHDATNITIVNKYIGNLFAMGVLSKKEILQDYP
YSKHYMP*

[0481] 非洲猪瘟病毒格鲁吉亚2007/1致病性分离株的完整基因组在Genbank Locus:
FR682468.1中给出。非洲猪瘟病毒贝宁97/1致病性分离株的完整基因组在Genbank Locus:
AM712239.1中给出。完整的BA71分离株基因组编码151个开放阅读框(ORF),贝宁97/1分离
株编码157个ORF,OURT88/3分离株编码151个ORF。

[0482] IRF3和NF- κ B活性的抑制

[0483] MGF基因MGF360-10L、11L、12L、13L和14L、MGF 505-1R、2R、3R、4R和5R以及MGF110-
1L抑制转录因子干扰素调节因子3 (IRF3) 和NF- κ B的活性,如本文的实施例2所证明(参见图
1A和1B)。MGF360-12L通过抑制IRF3和NF- κ B激活靶基因转录的能力特异性地抑制其活性
(参见图1C和1D)。

[0484] IRF3和NF- κ B是控制作为宿主先天免疫系统对病毒感染的反应的一部分的干扰素
和促炎细胞因子的表达的转录因子。MGF基因对IRF3和NF- κ B的抑制导致由感染ASFV的细胞
产生的I型干扰素 (IFN) 和促炎细胞因子的量减少。MGF基因的表达使ASFV能够规避宿主先
天免疫应答,从而有利于病毒复制并破坏适应性应答的进展。

[0485] MGF基因抑制IRF3和/或NF- κ B活性的能力可以使用萤光素酶报告基因测定来测
量,如本文实施例2中所述。例如,为了评估给定的MGF基因是否可以抑制IRF3或NF- κ B活性,
可以使MGF基因在包含处于由IRF3或NF- κ B激活的启动子控制下的萤光素酶报告基因的细
胞中表达,从而以分别激活IRF3或NF- κ B的方式刺激细胞,然后测量萤光素酶活性。可以使
用此类萤光素酶报告基因测定来评估MGF基因的修饰或突变形式抑制IRF3和/或NF- κ B活
性的能力。

[0486] K145R基因

[0487] K145R基因是晚期基因。

[0488] 以下给出了来自不同ASFV毒株的K145R基因的基因(即核苷酸)序列。SEQ ID
No.158-贝宁97/1K145R(NC_044956.1:58961-59398)

[0489] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT

ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACTGCTCCCTCTGAAGAAAAGACTAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0490] SEQ ID No.159-中国/2018/安徽XCGQ K145R (MK128995.1:64748-65185)

[0491] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGTCATCCCTTTCTTTTTAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTAATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGGCTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGACTAACCA
TCTTCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0492] SEQ ID No.160-格鲁吉亚2007/1K145R (NC_044959.1:64734-65171)

[0493] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGTCATCCCTTTCTTTTTAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTAATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGGCTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGACTAACCA
TCTTCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0494] SEQ ID No.161-Ken05/Tk1 K145R (NC_044945.1:65442-65879)

[0495] ATGGATCATTATCTTAAAAAATTACAGGATATTTATAAGAAGCTTGAGGGTCACCCCTTTCTTTTTAGT
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAAGCCTTGGCCTCGACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTGTTAACTATATTTAAAGCGAGTAAACAAGAGT
ATTTATGTCTGTTGATTAATCCTAAACTAGTCACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGGCTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACATCGCTCCCTCTGAAGAAAAGGCCAATCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0496] SEQ ID No.162-Ken06.Bus K145R (NC_044946.1:61226-61663)

[0497] ATGGATCATTATCTTAAAAAATTACAGGATATTTATAAGAAGCTTGAGGGTCACCCCTTTCTTTTTAGT
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAAGCCTTGGCCTCGACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTGTTAACTATATTTAAAGCGAGTAAACAAGAGT
ATTTATGTCTGTTGATTAATCCTAAACTAGTCACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGGCTAAAAACCTTTCTATATAAGTCCTAATAAGTATAATAATTTTTTACATCGCTCCCTCTGAAGAAAAGGCCAATCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0498] SEQ ID No.163-肯尼亚1950K145R (AY261360.1:68066-68503)

[0499] ATGGATCATTATCTTAAAAAATTACAGGATATTTATAAGAAGCTTGAGGGTCACCCCTTTCTTTTTAGT
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAAGCCTTGGCCTCGACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTGTTAACTATATTTAAAGCGAGTAAACAAGAGT
ATTTATGTCTGTTGATTAATCCTAAACTAGTCACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGGCTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACATCGCTCCCTCTGAAGAAAAGGCCAATCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0500] SEQ ID No.164-L60 K145R (NC_044941.1:59310-59747)

[0501] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTATAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACTGCTCCCTCTGAAGAAAAGACTAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0502] SEQ ID No.165-马拉维Li1-20/1 (1983) K145R (AY261361.1:62661-63098)

[0503] ATGGATCATTATCTTAAAAAATTAGAGGATATTTATAAAAAAGCTTGAGGGTCATCCCTTTCTTTTATAGT
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGTTAAACCAAGCCTTGGCCTCAACGCAGCTTTATCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATCAATCCTAAACTAGTTACGAAGTTTTTAAAAATAACGAGTTTTAAAATTTACATTAATTTTC
AGGCTGAAAACCTTTTTATATAAGTCCTAATAATATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGGCCAATCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0504] SEQ ID No.166-Mkuzi 1979K145R (AY261362.1:66481-66921)

[0505] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTATAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCTATAGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGACCAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0506] SEQ ID No.167-Pretorisuskop/96/4K145R (AY261363.1:65440-65877)

[0507] ATGGATCATTATCTTAAAAAATTACAAGAAATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTATAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTATCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTCACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGACCAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0508] SEQ ID No.168-Tengani 62K145R (AY261364.1:60111-60548)

[0509] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGTCATCCCTTTCTTTTATAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTTACACCGCTCCCTCTGAAGAAAAGACTAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAAGAATCCTAA

[0510] SEQ ID No.169-Warmbaths K145R (AY261365.1:64642-65082)

[0511] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTATAGC
CCGTCGAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCTATAGGGTTTATTAAGTATATTTAAACGAGTAAACAAGAGT

ATTTATGCCTGTTGATTAATCCTAAACTCGTTACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTACACCGCTCCCTCTGAAGAAAAGACCAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAGAAGAATCCTAA

[0512] SEQ ID No.170-Warhog K145R (AY261366.1:61399-61836)

[0513] ATGGATCATTATCTTAAAAAATTACAAGATATTTATACGAAGCTCGAGGGCCATCCCTTTCTTTTTAGC
CCGTGCAAAACCAATGAAAAAGAGTTTATTACTCTGCTAAACCAGGCCTTGGCCTCAACGCAGCTTTACCGCAGCAT
ACAACAGCTGTTTTTAACGATGTATAAGCTAGATCCCATTGGGTTTATTAAGTATATTTAAAACGAGTAAACAAGAGT
ATTTATGCCTGTTGATTAATCCTAAACTCGTCACTAAGTTTTTAAAAATAACGAGCTTTAAAATTTACATTAATTTTC
AGACTGAAAACCTTTTTATATAAGTCCTAATAAGTATAATAATTTTTACACCGCTCCCTCTGAAGAAAAGACCAACCA
TCTCCTAAAAGAAGAAAAAACTTGGGCAAAGATTGTTGAAGAAGGAGGAGAGAAGAATCCTAA

[0514] 在实施方案中,本发明的减毒ASFV缺乏K145R基因的功能形式。适当地,K145R基因包含SEQ ID No.158、159、160、161、162、163、164、165、166、167、168、169或170的序列。适当地,K145R基因包含与SEQ ID No.158、159、160、161、162、163、164、165、166、167、168、169或170具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地,K145R基因由SEQ ID No.158、159、160、161、162、163、164、165、166、167、168、169或170的序列组成。

[0515] 下表3列出了来自不同ASFV毒株的K145R蛋白的登录号。

[0516] 表3

毒株	K145R蛋白登录号
BA71V	Q07385
PretoriuskopPr4/1996	P0CA50
Warhog	P0CA51
马拉维-Lil/20	P0CA49
肯尼亚1950	P0CA48
格鲁吉亚2007/1	E0WM19
葡萄牙/OURT88/1988	A9JLR1
E75	D4I5N9
贝宁97/1	A9JKZ8

[0518] 来自不同ASFV毒株的K145R蛋白的氨基酸序列如下所示。

[0519] SEQ ID No.171-贝宁97/1K145R蛋白

[0520] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRFKTFYISPNKYNNFYTAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0521] SEQ ID No.172-中国/2018/安徽XCGQ蛋白

[0522] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRFKTFYISPNKYNNFYTAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0523] SEQ ID No.9-格鲁吉亚2007/1K145R蛋白

[0524] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYIK
TSKQEYLCLLINPKLVTKFLKITSFKIYINFRFKTFYISPNKYNNFYTAPSEEKTNHLLKEEKTWAKIVEEGGEES

[0525] SEQ ID No.173-Ken05/Tk1 K145R蛋白

[0526] MDHYLKKLQDIYKKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFVNYI
KASKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKANHLLKEEKTWAKIVEEGGE
ES*

[0527] SEQ ID No.174-Ken06.Bus K145R蛋白

[0528] MDHYLKKLQDIYKKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFVNYI
KASKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKANHLLKEEKTWAKIVEEGGE
ES*

[0529] SEQ ID No.175-肯尼亚1950K145R蛋白

[0530] MDHYLKKLQDIYKKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFVNYI
KASKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKANHLLKEEKTWAKIVEEGGE
ES*

[0531] SEQ ID No.176-L60 K145R蛋白

[0532] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0533] SEQ ID No.177-马拉维Lil-20/1 (1983) K145R蛋白

[0534] MDHYLKKLEDIYKKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKANHLLKEEKTWAKIVEEGGE
ES*

[0535] SEQ ID No.178-Mkuzi 1979K145R蛋白

[0536] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0537] SEQ ID No.179-Pretorisuskop/96/4K145R蛋白

[0538] MDHYLKKLQEIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0539] SEQ ID No.180-Tengani 62K145R蛋白

[0540] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0541] SEQ ID No.181-Warmbaths K145R蛋白

[0542] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE
ES*

[0543] SEQ ID No.182-Warthog K145R蛋白

[0544] MDHYLKKLQDIYTKLEGHPFLFSPSKTNEKEFITLLNQALASTQLYRSIQQFLFTMYKLDPIGFINYI
KTSKQEYLCLLINPKLVTKFLKITSFKIYINFRLKTFYISPNKYNNFYIAPSEEKTNHLLKEEKTWAKIVEEGGE

ES*

[0545] K145R抑制宿主内质网(ER)应激反应(Barber 2015Stress modulators encoded by African swine fever virus;PhD thesis,St Georges,伦敦大学,2016)。这种反应是由未折叠蛋白的积累引起的,并且可能在病毒感染期间由于产生大量病毒蛋白而被激活。ER应激导致转录因子CCAAT增强子结合蛋白同源蛋白(CHOP)的表达增加及其在细胞核中的积累。CHOP活性最终导致细胞凋亡,从而限制病毒复制。

[0546] K145R功能可以通过以下方法进行测试,包括使用针对CHOP的抗体的免疫荧光并在诱导ER应激后评估其在细胞核中的存在,以及萤光素酶报告基因测定,其中萤光素酶基因在CHOP启动子的控制下。

[0547] B125R基因

[0548] 以下给出了来自不同ASFV毒株的B125R基因的基因(即核苷酸)序列。SEQ ID No.183-贝宁97/1B125R(NC_044956.1:100206-100583)

[0549] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTTAAAATTATTGACACGCTCTTGCTAGCAGAAAAAAAACCTTTTGGTGTATGAATTGCCTGCCCTTTTGACTTTTCCTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGCCTCGAGGAGCGCGGGTTTACTGTCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACTTGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0550] SEQ ID No.184-中国/2018/安徽XCGQ B125R(MK128995.1:105587-105964)

[0551] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTTAAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCTTTTGACTTTTCCTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGCCTCGAGGAGCGCGGGTTTACTGTCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACCTTGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0552] SEQ ID No.185-格鲁吉亚2007/1B125R(NC_044959.1:105570-105947)

[0553] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTTAAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCTTTTGACTTTTCCTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGCCTCGAGGAGCGCGGGTTTACTGTCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACCTTGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0554] SEQ ID No.186-Ken05/Tk1 B125R(NC_044945.1:106516-106893)

[0555] ATGGCGGTTTATGCGAAGGACCTTGATAATAACAAAGAGTTAAACCAAAAATTGATCAACGATCAGCTTAAAATCATTGACACGCTTTTGCTAGCAGAAAAAAAACCTTTTGGTGTACGAACTACCTGCCATTTTGACTTTTCCTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATTTACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGATTTACTGTCAAAATATGTATGAAGGGAGACCGCGCCCTTCTTTTCATCACCTTGAAAAAATACAATCCATTGAGATCAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCGTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0556] SEQ ID No.187-Ken06.Bus B125R (NC_044946.1:102432-102809)

[0557] ATGGCGGTTTATGCGAAGGACCTTGATAATAACAAAGAGTTAAACCAAAAATTGATCAACGATCAGCTT
AAAATTATTGACACGCTTTTGCTGGCAGAAAAAAAACCTTTTGGTGTACGAACTACCTGCCCATTTGACTTTTC
CTCCGGCGACCCCTTTGGGCAGTCAGCGCGACATTTACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGATTTACTG
TCAAAATATGTATGAAGGGAGACCGCGCCCTTCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATCAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCGTTTTATTGTAAATTTTAGAGTCTAGATG
A

[0558] SEQ ID No.188-肯尼亚1950B125R (AY261360.1:109401-109778)

[0559] ATGGCGGTTTATGCGAAGGACCTTGATAATAACAAAGAGTTAAACCAAAAATTGATCAACGATCAGCTT
AAAATCATTGACACGCTTTTGCTAGCAGAAAAAAAACCTTTTGGTGTACGAACTACCTGCCCATTTGACTTTTC
CTCCGGCGACCCCTTTGGGCAGTCAGCGCGACATTTACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGATTTACTG
TCAAAATATGTATGAAGGGAGACCGCGCCCTTCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATCAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCGTTTTATTGTAAATTTTAGAGTCTAGATG
A

[0560] SEQ ID No.189-L60 B125R (NC_044941.1:100308-100685)

[0561] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTAGCAGAAAAAAAACCTTTTGGTGTATGAATTGCCTGCCCCTTTGACTTTTC
CTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGCCTCGAGGAGCGCGGGTTTACTG
TCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACTTGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTAGAGTCTAGATG
A

[0562] SEQ ID No.190-马拉维Li1-20/1 (1983) B125R (AY261361.1:103937-104314)

[0563] ATGGCAGTTTATGCGAAAGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAACTT
AAAATTATTGACACGCTGTTGCTGGCAGAAAAAAAACCTTTTGGTGCATGAACTACCTGCCCCTATGACTTTTC
CTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGATTTACTG
TCAAAATTTGTATGAAAGGAGATCGCGCCCTTCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGATGAAGAGAAAAGCATTTTATTGTAAATTTTAGAGTCTAGATG
A

[0564] SEQ ID No.191-Mkuzi 1979B125R (AY261362.1:107379-107756)

[0565] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTAGCAGAAAAAAAACCTTTTGGTGTATGAATTGCCTGCCCCTTTGACTTTTC
CTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGCCTCGAGGAGCGCGGGTTTACTG
TCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACTTGAAAAAATACAATCCATTGAGATAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTAGAGTCTAGATG
A

[0566] SEQ ID No.192-Pretorisuskop/96/4B125R (AY261363.1:106504-106881)

[0567] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCCTTTGACTTTTC
CTCCGGCGACCCCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGGTTTACTG

TCAAAATATGTATGAAAGGGGATCGCGCCCTCCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATAAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0568] SEQ ID No.193-Tengani 62B125R (AY261364.1:100837-101214)

[0569] ATGGCGGTGTATGCGAAGGACCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCTTTTACTTTTC
CTCCGGCGACCTTTGGCCAGTCAGCGTGACATATACTATGCCATCATAAAAAGTCTTGAGGAGCGCGGGTTTACTG
TCAAAATATGTATGAAAGGGGATCGTGCCCTCCTTTTCATCACCTGGAAAAAATACAATCCATTGAAATAAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAATCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0570] SEQ ID No.194-Warmbaths B125R (AY261365.1:105532-105909)

[0571] ATGGCGGTTTATGCGAAGGATCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCTTTTACTTTTC
CTCCGGCGACCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGGTTTACTG
TCAAAATATGTATGAAAGGGGATCGCGCCCTCCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATAAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0572] SEQ ID No.195-Warhog B125R (AY261366.1:102258-102635)

[0573] ATGGCGGTTTATGCGAAGGACCTTGATAATAACAAAGAGTTAAACCAAAAATTAATTAACGATCAGCTT
AAAATTATTGACACGCTCTTGCTGGCAGAAAAAAAACCTTTTGGTGTATGAACTACCTGCCCTTTTACTTTTC
CTCCGGCGACCTTTGGCCAGTCAGCGCGACATATACTATGCCATCATAAAAAGTCTCGAGGAGCGCGGGTTTACTG
TCAAAATATGTATGAAAGGGGATCGCGCCCTCCTTTTCATCACCTGGAAAAAATACAATCCATTGAGATAAAACAAA
AAAGAAGAATATCTGCGCATGCACTTCATACAAGACGAAGAGAAAAGCATTTTATTGTAAATTTTATAGAGTCTAGATG
A

[0574] 在实施方案中,本发明的减毒ASFV缺乏B125R基因的功能形式。适当地,B125R基因包含SEQ ID No.183、184、185、186、187、188、189、190、191、192、193、194或195的序列。适当地,B125R基因包含与SEQ ID No.183、184、185、186、187、188、189、190、191、192、193、194或195具有至少70%、至少80%、至少90%或至少95%的同一性的序列。适当地,B125R基因由SEQ ID No.183、184、185、186、187、188、189、190、191、192、193、194或195的序列组成。

[0575] 下表4列出了来自不同ASFV毒株的B125R蛋白的登录号。

[0576] 表4

[0577]

毒株	B125R蛋白登录号
BA71V	Q65171
PretoriuskopPr4/1996	POCA34
Warhog	POCA35
格鲁吉亚2007/1	EOWMM1
葡萄牙/OURT88/1988	A9JLX0
E75	D4I5S1
贝宁97/1	A9JL41

[0578] 来自不同ASFV毒株的B125R蛋白的氨基酸序列如下所示。

[0579] SEQ ID No.196-贝宁97/1B125R蛋白

[0580] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0581] SEQ ID No.197-中国/2018/安徽XCGQ B125R蛋白

[0582] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0583] SEQ ID No.10-格鲁吉亚2007/1B125R蛋白

[0584] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0585] SEQ ID No.198-Ken05/Tk1 B125R蛋白

[0586] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAHFDFSSGDPLGSQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0587] SEQ ID No.199-Ken06.Bus B125R蛋白

[0588] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAHFDFSSGDPLGSQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0589] SEQ ID No.200-肯尼亚1950B125R蛋白

[0590] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAHFDFSSGDPLGSQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0591] SEQ ID No.201-L60 B125R蛋白

[0592] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0593] SEQ ID No.202-马拉维Li1-20/1B125R蛋白

[0594] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVHELPAHYDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0595] SEQ ID No.203-Mkuzi 1979B125R蛋白

[0596] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0597] SEQ ID No.204-Pretorisuskop/96/4B125R蛋白

[0598] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0599] SEQ ID No.205-Tengani 62B125R蛋白

[0600] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKSFYCKFLES*

[0601] SEQ ID No.206-Warmbaths B125R蛋白

[0602] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL
EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0603] SEQ ID No.207-Warthog B125R蛋白

[0604] MAVYAKDLNKKELNQKLINDQLKIIDTLLLAEKKNFLVYELPAPFDFSSGDPLASQRDIYYAIKSL

EERGFTVKICMKGDRALLFITWKKIQSIEINKKEEYLRMHFIQDEEKAFYCKFLES*

[0605] B125R被鉴定为在受感染的野猪细胞 (WSL-R) 中表达最丰富的病毒蛋白之一 (Kaßler等人2018Sci.Rep.8:1471)。

[0606] 如图11所示,可以在细胞表面检测到B125R表达,表明B125R可能暴露于抗体并可能诱导强烈的抗体反应。

[0607] 表达和活性

[0608] 本发明一个实施方案的减毒非洲猪瘟 (ASF) 病毒破坏了以下基因的表达和/或活性:

[0609] MGF 360基因12L、13L和14L;以及

[0610] MGF 505基因1R。

[0611] 这些基因在本文中可称为“被破坏的基因”。

[0612] 表达

[0613] 在实施方案中,本发明提供了减毒非洲猪瘟 (ASF) 病毒,其中以下基因的表达被破坏:

[0614] 多基因家族 (MGF) 360 12L、13L和14L,以及

[0615] MGF 505 1R。

[0616] 关于基因的术语“表达”是指ASF病毒产生基因产物如RNA和/或蛋白质的能力。基因表达的破坏意味着基因产物的产生减少。基因的表达可以降低至少50%、至少60%、至少70%、至少80%、至少90%和/或至少95%。基因的表达可以降低到基因产物如RNA和/或蛋白质的产生被完全消除(即基因产物根本不产生)的程度。相对于未被破坏时的基因表达,基因表达的破坏减少基因的表达。例如,相较于基因的野生型形式,突变基因可以具有降低的表达。

[0617] 表达被破坏的基因可能无法完全转录和翻译。基因的转录可以减少至少50%、至少60%、至少70%、至少80%、至少90%和/或至少95%。基因的转录可以被消除(即基因可以不转录)。基因的翻译可以减少至少50%、至少60%、至少70%、至少80%、至少90%和/或至少95%。基因的翻译可以被消除。基因可以转录但不翻译。基因可以转录和翻译,但蛋白质过快降解而无法发挥其功能。基因可以转录和翻译,但蛋白质可以没有功能。

[0618] 基因表达可以通过本领域已知的技术来测量。例如,可以如通过使用定量聚合酶链式反应(qPCR)来量化从基因转录的mRNA量。替代性地或另外地,可以如通过使用蛋白质印迹法或质谱法来定量蛋白质的量。

[0619] 活性

[0620] 在实施方案中,本发明提供了减毒非洲猪瘟 (ASF) 病毒,其中以下基因的活性被破坏:

[0621] 多基因家族 (MGF) 360 12L、13L和14L,以及

[0622] MGF 505 1R。

[0623] 关于基因的术语“活性”是指基因执行其功能的能力。不同的基因具有不同的活性,即它们实现不同的功能。给定的基因可以具有多种活性;基因活性的破坏是指一种或多种这些活性的破坏。基因的一种或多种活性可以被破坏,而一种或多种其他活性不被破坏。相对于未被破坏时的基因活性,基因活性的破坏降低基因的活性。例如,相较于基因的野生

型形式,突变基因可以具有降低的活性。基因活性可以降低到基因活性完全消除的程度。

[0624] 根据本发明的减毒ASFV可以包含被破坏基因的非功能形式。

[0625] 基因表达的破坏也可以破坏该基因的活性,因为基因产物量的减少意味着基因不能有效地执行其活性的一种或多种。

[0626] 在实施方案中,被破坏的基因的活性是该基因抑制IRF3和/或NF κ B活性的能力。在实施方案中,本发明提供了减毒非洲猪瘟(ASF)病毒,其中以下基因抑制IRF3和/或NF κ B活性的能力被破坏:

[0627] 多基因家族(MGF) 360 12L、13L和14L,以及

[0628] MGF 505 1R。

[0629] 在实施方案中,本发明提供减毒ASF病毒,其中MGF 360 12L、13L和14L以及MGF 505 1R基因抑制IRF3活性的能力被破坏。在实施方案中,本发明提供减毒ASF病毒,其中MGF 360 12L、13L和14L以及MGF 505 1R基因抑制NF κ B活性的能力被破坏。MGF 360 12L、13L和14L和/或MGF505 1R抑制IRF3和/或NF κ B活性的能力可以使用如本文所述的萤光素酶报告基因测定来测量。

[0630] 抑制IRF3和/或NF κ B活性的能力的破坏意味着抑制IRF3和/或NF κ B活性的能力降低。换言之,本发明的减毒ASF病毒中的MGF基因形式对IRF3和/或NF κ B活性的抑制低于相同MGF基因的野生型形式。抑制IRF3和/或NF κ B活性的能力可以降低至少50%、至少60%、至少70%、至少80%或至少90%。在实施方案中,可以消除MGF基因抑制IRF3和/或NF κ B活性的能力,即MGF基因不抑制IRF3和/或NF κ B活性。在这种情况下,IRF3和/或NF κ B的活性将与不存在MGF基因时一样高。抑制作用的降低意味着IRF3和/或NF κ B活性高于野生型形式MGF基因下的活性。IRF3和/或NF κ B活性可以是野生型形式MGF基因下的活性的两倍高,如三倍高、四倍高、五倍高或六倍高。

[0631] IRF3和NF κ B是激活各种基因转录的转录因子,控制作为宿主对病毒感染的先天免疫系统应答的一部分的干扰素和促炎细胞因子的表达。IRF3和/或NF κ B活性的抑制意味着降低其靶基因表达的激活。IRF3和/或NF κ B靶基因表达的激活程度可以使用萤光素酶报告基因测定来测量,其中IRF3可激活启动子或NF κ B可激活启动子与萤光素酶报告基因连接。

[0632] 适当地,MGF 360 12L抑制IRF3活性的能力被破坏。适当地,MGF 360 13L抑制IRF3活性的能力被破坏。适当地,MGF 360 14L抑制IRF3活性的能力被破坏。适当地,MGF 505 1R抑制IRF3活性的能力被破坏。适当地,MGF 360 12L抑制NF κ B活性的能力被破坏。适当地,MGF 360 13L抑制NF κ B活性的能力被破坏。适当地,MGF 360 14L抑制NF κ B活性的能力被破坏。适当地,MGF 505 1R抑制NF κ B活性的能力被破坏。

[0633] IRF3和NF κ B通过与靶标DNA结合并激活转录来发挥作用。MGF基因可以通过抑制IRF3和/或NF κ B激活转录的能力来抑制IRF3和/或NF κ B活性。在实施方案中,MGF 360 12L抑制通过IRF3和/或NF κ B的转录激活的能力被破坏。适当地,MGF 360 12L抑制通过IRF3的转录激活的能力被破坏。适当地,MGF 360 12L抑制通过NF κ B的转录激活的能力被破坏。

[0634] 破坏表达和/或活性的突变

[0635] 基因的表达和/或活性通过使ASFV基因组突变,即通过使ASFV基因组的核苷酸序列突变来破坏。“突变”是指ASFV基因组的核苷酸序列相对于已知ASFV基因型的变化。突变包括将一个或多个核苷酸改变为不同的核苷酸(即取代)、添加核苷酸、缺失核苷酸和/或这

些的组合。

[0636] 在实施方案中,本发明的减毒ASF病毒包含破坏以下基因的表达和/或活性的突变:

[0637] MGF 360基因12L、13L和14L;以及

[0638] MGF 505基因1R。

[0639] 基因的表达和/或活性可以通过破坏基因转录成mRNA来破坏,即通过减少基因转录如完全消除基因转录来破坏。基因的表达和/或活性可以通过破坏mRNA翻译成蛋白质来破坏。在实施方案中,减毒ASF病毒包含降低基因转录和/或翻译的突变。在实施方案中,减毒ASF病毒包含导致基因不转录和/或翻译(即完全消除转录和/或翻译)的突变。

[0640] 基因的表达和/或活性可以通过使与基因相关的非编码序列如启动子突变来破坏。在实施方案中,减毒ASF病毒包含一个或多个被破坏基因的启动子中的突变。

[0641] 基因的表达和/或活性可以通过使一个或多个被破坏基因的编码序列突变来破坏。

[0642] 基因的功能形式

[0643] 本发明的减毒ASFV包含以下基因的功能形式:

[0644] (i) MGF 360 10L和/或11L,以及

[0645] (ii) MGF 505 2R和/或3R。

[0646] 适当地,本发明的减毒ASFV包含MGF 360 10L和11L的功能形式。适当地,本发明的减毒ASFV包含MGF 505 2R和3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L以及MGF 505 2R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L以及MGF 505 3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 11L以及MGF 505 2R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 11L以及MGF 505 3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L以及MGF 505 2R和3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 11L以及MGF 505 2R和3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L和11L以及MGF 505 2R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L和11L以及MGF 505 3R的功能形式。适当地,本发明的减毒ASFV包含MGF 360 10L和11L以及MGF 505 2R和3R的功能形式。

[0647] 在实施方案中,本发明的减毒ASFV包含缺乏K145R基因的功能形式和/或缺乏B125R基因的功能形式的DIVA突变。

[0648] 在另一方面,本发明提供了缺乏K145R基因和/或B125R基因的功能形式的减毒ASFV。

[0649] 表述基因的“功能形式”是指其表达和活性未被破坏的基因。换言之,基因的功能形式不以破坏基因表达或基因活性的方式发生突变。基因的功能形式可以不包含任何突变。基因的功能形式的编码序列可以是完整且不间断的。基因的功能形式可以完全转录和翻译。

[0650] MGF基因的功能可以指其抑制IRF3和/或NF κ B活性的能力。MGF基因的功能形式可以抑制IRF3和/或NF κ B活性。在实施方案中,本发明的减毒ASFV包含抑制IRF3和/或NF κ B活性的以下基因的形式:

[0651] (i) MGF 360 10L和/或11L,以及

[0652] (ii) MGF 505 2R和/或3R。

[0653] MGF 360 10L和/或11L以及MGF 505 2R和/或3R抑制IRF3和/或NF κ B活性的能力可以使用如本文所述的萤光素酶报告基因测定来测量。

[0654] 基因的功能形式可以对应于野生型ASFV分离株中的基因。基因的功能形式可以对应于强毒ASFV毒株中的基因。基因的功能形式的序列可以与野生型ASFV分离株或强毒ASFV毒株中的基因序列相同。基因的功能形式的序列可以与衍生出本发明的减毒ASFV的野生型ASFV分离株中的基因序列相同。基因的功能形式可以是野生型ASFV分离株中基因的天然变体。

[0655] 基因的功能形式可以包含突变。但是,突变不应破坏基因的表达或活性。换言之,突变不应影响基因的功能。基因的功能形式可以包含一个或多个同义突变(即不改变基因编码的蛋白质的氨基酸序列的突变)。基因的功能形式可以包含一个或多个沉默突变,该沉默突变可以是同义的或非同义的。基因的功能形式可以包含不破坏基因的表达或活性的缺失。基因的功能形式可以包含一种或多种不破坏基因的表达或活性的单核苷酸多态性(SNP)。

[0656] 基因的功能形式的缺乏

[0657] 缺乏基因的功能形式的减毒ASFV可以不表达该基因,即该基因可能无法正确转录和翻译。基因可以不转录。基因可以转录但不翻译。基因可以转录和翻译,但蛋白质过快降解而无法发挥其功能。基因可以转录和翻译,但蛋白质可以没有功能。

[0658] 基因表达可以通过本领域已知的技术来测量。例如,可以如通过使用定量聚合酶链式反应(qPCR)来量化从基因转录的mRNA量。替代性地或另外地,可以如通过使用蛋白质印迹法或质谱法来定量蛋白质的量。

[0659] 缺乏基因的功能形式的减毒ASFV可以包含导致ASFV不表达该基因的突变。突变可以是如本文所述的缺失。突变可以是如本文所述的中断。

[0660] K145R基因的功能形式的缺乏可以意味着K145R基因抑制宿主内质网(ER)应激反应的能力降低。K145R功能可以通过以下方法进行测试,包括使用针对CHOP的抗体的免疫荧光并在诱导ER应激后评估其在细胞核中的存在,以及萤光素酶报告基因测定,其中萤光素酶基因在CHOP启动子的控制下。

[0661] DIVA突变

[0662] 在实施方案中,本发明的减毒ASFV包含区分感染和免疫动物(DIVA)的突变。适当地,DIVA突变缺乏K145R基因的功能形式和/或缺乏B125R基因的功能形式。

[0663] 在实施方案中,本发明提供了减毒ASFV,其中以下基因的表达和/或活性被破坏:

[0664] 多基因家族(MGF) 360 12L、13L和14L,以及

[0665] MGF 505 1R;

[0666] 该ASFV包含以下基因的功能形式:

[0667] (i) MGF 360 10L和/或11L,以及

[0668] (ii) MGF 505 2R和/或3R;

[0669] 并且该ASFV包含DIVA突变。

[0670] 在实施方案中,本发明提供了减毒ASFV,其中以下基因的表达和/或活性被破坏:

[0671] 多基因家族(MGF) 360 12L、13L和14L,以及

[0672] MGF 505 1R;

[0673] 该ASFV包含以下基因的功能形式:

[0674] (i) MGF 360 10L和/或11L,以及

[0675] (ii) MGF 505 2R和/或3R;

[0676] 并且该ASFV缺乏K145R基因和/或B125R基因的功能形式。

[0677] 在另一方面,本发明提供了缺乏K145R基因和/或B125R基因的功能形式的减毒ASFV。适当地,本发明的减毒ASFV缺乏K145R基因的功能形式。适当地,本发明的减毒ASFV缺乏B125R基因的功能形式。

[0678] 在另一方面,本发明提供了缺乏DP148R基因的功能形式并包含DIVA突变的减毒ASFV。在实施方案中,本发明的减毒ASFV缺乏以下基因的功能形式:

[0679] (i) DP148R;和

[0680] (ii) K145R和/或B125R。

[0681] 在实施方案中,本发明的减毒ASFV可以缺乏DP148R基因和K145R基因的功能形式。在实施方案中,本发明的减毒ASFV可以缺乏DP148R基因和B125R基因的功能形式。适当地,DP148R基因部分或完全缺失。适当地,K145R基因部分或完全缺失。适当地,B125R基因部分或完全缺失。在减毒ASFV的实施方案中,以下基因完全缺失:DP148R和K145R。在减毒ASFV的实施方案中,以下基因完全缺失:DP148R和B125R。

[0682] 缺失

[0683] 在本发明的减毒ASFV中,基因的表达和/或活性可以通过缺失而被破坏。换言之,基因的表达和/或活性可以通过作为缺失的突变而被破坏。

[0684] 本发明的减毒ASFV可以通过缺失而缺少基因的功能形式。换言之,导致ASFV缺乏基因功能形式的突变可以是缺失。

[0685] “缺失”是指去除部分ASFV基因组核苷酸序列。缺失可以是连续的,或者可以包含多个序列片段的缺失。缺失可以以本文所述的任何方式破坏基因的表达和/或活性。缺失可以导致ASFV以本文所述的任何方式缺乏基因的功能形式。

[0686] 缺失可以破坏基因转录成mRNA。例如,缺失基因的启动子会破坏转录。缺失可以破坏mRNA翻译为蛋白质。例如,缺失启动密码子会破坏翻译。基因的表达和/或活性可以通过缺失与基因相关的非编码序列如启动子而被破坏。

[0687] 基因的表达和/或活性可以通过缺失基因的编码序列而被破坏。通过缺失基因的编码序列,可以使ASFV缺乏基因的功能形式。编码序列的缺失可以是部分的(即编码序列的部分缺失)。缺失可以例如去除基因编码序列的至少50%、60%、70%、80%或90%。缺失可以是完全的,在这种情况下,与野生型分离株的相应基因组相比,该基因的编码序列100%不存在。

[0688] 编码序列的缺失可以是连续的,或者可以包含编码序列的多个部分的缺失。缺失应去除足够量的编码序列使得缺失破坏基因的表达和/或活性,即不再从基因产生功能性基因产物如蛋白质。表述“基因缺失”(如“部分缺失”)是指缺失足够量的编码序列,从而破坏基因的表达和/或活性。需要缺失以破坏基因的表达和/或活性的编码序列的量可以非常少。例如,仅缺失起始密码子(ATG)可能足以破坏基因的表达和/或活性以使病毒减毒。

[0689] 可以使用本领域已知技术进行基因的部分和全部缺失,如通过Cre-LoxP和Flp-

FRT系统的条件靶向,或通过使用工程化核酸酶如大范围核酸酶、锌指核酸酶(ZFN)、转录激活因子样效应核酸酶(TALEN)和CRISPR-Cas系统中的Cas诱导双链断裂(DSB)和修复。DSB修复可用于通过提供包含与DSB任一侧的序列同源的序列中的期望突变核苷酸序列的载体来引入所期望的突变。这导致期望的突变插入到DSB的位点。可以对上述核酸酶进行工程改造,以在基因组内的特定位点诱导DSB。例如,可以通过组合已知的蛋白质单元以识别感兴趣的基因或基因组区域内的靶识别序列而容易地生成嵌合大范围核酸酶。ZFN也可以设计以靶向特定序列,例如将具有已知特异性的锌指单元组合以结合DNA的特定区域。TALEN是通过将核酸酶结构域与DNA结合TALE(转录激活因子样效应物)结构域融合而设计的人工限制酶。TALE结构域是识别单个核苷酸的氨基酸重复序列的串联阵列,可以设计以靶向DNA的特定区域。CRISPR-Cas系统由Cas(CRISPR相关蛋白)核酸酶和CRISPR(成簇规则间隔短回文重复序列)RNA序列组成,该序列指导Cas蛋白识别和切割与CRISPR序列互补的特定DNA链。因此,单链引导RNA(sgRNA)可以设计以结合DNA的特定区域并引导Cas引入DSB。因此,只要已知基因的核苷酸(例如DNA或cDNA)序列,就可以利用已知的核酸酶系统将部分或全部缺失引入基因。

[0690] 在本发明的减毒ASF病毒的实施方案中,以下基因可以至少部分缺失:

[0691] MGF 360基因12L、13L和14L;以及

[0692] MGF 505基因1R。

[0693] 一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因可以至少部分缺失。一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因的编码序列可以至少部分缺失。

[0694] 在本发明的减毒ASF病毒的实施方案中,以下基因可以完全缺失:

[0695] MGF 360基因12L、13L和14L;以及

[0696] MGF 505基因1R。

[0697] 一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因可以完全缺失。一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因的编码序列可以完全缺失。

[0698] 在实施方案中,本发明的减毒ASFV缺乏K145R基因和/或B125R基因的功能形式。基因可以全部或部分缺失。基因的编码序列可以全部或部分缺失。适当地,K145R基因编码序列全部或部分缺失。适当地,B125R基因编码序列全部或部分缺失。

[0699] 在实施方案中,本发明的减毒ASFV缺乏K145R基因和/或B125R基因的功能形式。K145R基因和/或B125R基因可以全部或部分缺失。基因的编码序列可以部分或完全缺失。适当地,K145R基因编码序列部分或完全缺失。适当地,B125R基因编码序列部分或完全缺失。

[0700] 在本发明的减毒ASFV的实施方案中,以下基因可以至少部分缺失:

[0701] MGF 360基因12L、13L和14L;

[0702] MGF 505基因1R;以及

[0703] K145R基因和/或B125R基因。

[0704] 一个或多个(如两个或多个、三个或多个、四个或多个、五个或多个或全部六个)基因可以至少部分缺失。基因中的一个或多个(如两个或多个、三个或多个、四个或多个、五个或多个或全部六个)的编码序列可以至少部分缺失。

[0705] 在本发明的减毒ASFV的实施方案中,以下基因可以完全缺失:

[0706] MGF 360基因12L、13L和14L;

[0707] MGF 505基因1R;以及

[0708] K145R基因和/或B125R基因。

[0709] 一个或多个(如两个或多个、三个或多个、四个或多个、五个或多个或全部六个)基因可以完全缺失。一个或多个(如两个或多个、三个或多个、四个或多个、五个或多个或所有六个)基因的编码序列可以完全缺失。

[0710] 中断

[0711] 基因的表达和/或活性可以通过基因的中断而被破坏。换言之,破坏基因的表达和/或活性的突变可以是中断基因的突变。

[0712] 本发明的减毒ASFV可以通过基因的中断而缺失基因的功能形式。换言之,导致ASFV缺乏基因的功能形式的突变可以是中断基因的突变。

[0713] 在本发明的减毒ASFV的实施方案中,以下基因可以被中断:

[0714] MGF 360基因12L、13L和14L;以及

[0715] MGF 505基因1R。

[0716] 一个或多个(如两个或多个、三个或多个、或全部四个)基因可以被中断。

[0717] 在本发明的减毒ASF病毒的另一个实施方案中,K145R基因和/或B125R基因可以被中断。适当地,K145R基因可以被中断。适当地,DP148R基因可以被中断。

[0718] 在本发明的减毒ASFV的实施方案中,以下基因可以被中断:

[0719] MGF 360基因12L、13L和14L;

[0720] MGF 505基因1R;以及

[0721] K145R基因和/或B125R基因。

[0722] 一个或多个(如两个或多个、三个或多个、四个或多个、五个或多个或所有六个)基因可以被中断。

[0723] “中断”是指突变改变了基因的编码序列,使得功能性基因产物如蛋白质不再产生。本文可以使用术语“中断”来指代中断基因的突变。突变应以破坏基因的表达和/或活性的方式中断编码序列,即不再从基因产生功能性基因产物如蛋白质。

[0724] 中断可以完全消除基因产物的产生。例如,在基因产物是蛋白质的情况下,中断可以使mRNA变得无意义,导致mRNA被降解而蛋白质不翻译,从而消除了蛋白质的产生。中断可以改变产生的基因产物。中断可以导致基因不转录和/或翻译。

[0725] 中断可以是点突变(即单个核苷酸的取代、插入或缺失)。中断可以是缺失。基因可以包含导致基因中断的多个突变。

[0726] 中断可以是移码突变。移码导致移码下游的密码子被读为不同的氨基酸。产生的蛋白质可以是非功能性的。

[0727] 中断可以是起始密码子的突变。起始密码子通常是ATG。起始密码子的突变(例如,一个、两个或三个核苷酸的点突变)意味着翻译不会从该密码子开始。翻译可以在更下游的后续起始密码子处开始。如果后续的起始密码子在框内,则产生的蛋白质形式是N端截短的,因此可能是无功能的。如果后续的起始密码子不在框内,则会产生完全不同的或无义的蛋白质,其将是无功能的。如果没有后续的起始密码子,则翻译完全被消除,不会产生蛋白

质。

[0728] 中断可以是终止密码子 (TAG、TAA或TGA) 的突变。终止密码子的突变 (也称为非终止突变) 导致mRNA继续翻译成不应翻译的序列。由于其长度过长, 所得蛋白可能是非功能的。

[0729] 突变组合

[0730] 可以将本文所述的破坏基因表达和/或活性的突变组合在本发明的减毒ASFV中。换言之, 本发明的减毒ASFV中的每个被破坏的基因 (MGF 360基因12L、13L和14L, MGF 505基因1R) 可以通过与任何其他基因相同类型的突变或通过与任何其他基因不同类型的突变被破坏。

[0731] 在本发明的减毒ASFV的实施方案中, 一个或多个被破坏的基因可以通过启动子序列的突变而被破坏, 而一个或多个其他被破坏的基因可以通过编码序列的部分缺失而被破坏, 而一个或多个其他基因可以通过编码序列的完全缺失而被破坏, 而一个或多个其他基因可以通过基因的中断而被破坏。

[0732] 疫苗/药物组合物

[0733] 本发明还提供了包含本发明的减毒ASF病毒的疫苗。

[0734] 如本文所用, 术语“疫苗”是指当施用于受试者时诱导或刺激保护性免疫应答的制剂。疫苗可以使生物体对特定疾病 (在本例中为ASF) 免疫。因此, 本发明的疫苗在受试者中诱导免疫应答, 该免疫应答对随后的ASF病毒攻击具有保护性。包含本发明的减毒ASFV的疫苗可以能够诱导针对多种ASF病毒基因型的交叉保护性免疫应答。在实施方案中, 包含单一基因型的本发明的减毒ASFV的疫苗可以能够诱导针对多种ASF病毒基因型的交叉保护性免疫应答。

[0735] 疫苗可以包含多种减毒ASF病毒。多种减毒ASF病毒可以对应于多种不同的分离株, 例如高毒力或未知毒力的不同分离株。这样的疫苗可以能够诱导针对多种ASF病毒基因型的交叉保护性免疫应答。

[0736] 疫苗可以用于预防非洲猪瘟。因此本发明提供了用于治疗 and/或预防受试者的非洲猪瘟的本发明的疫苗。

[0737] 本发明还提供了包含一种或多种本发明的减毒ASF病毒的药物组合物。该药物组合物可用于治疗非洲猪瘟。

[0738] 疫苗或药物组合物可以包含一种或多种本发明的减毒ASF病毒和任选的一种或多种佐剂、赋形剂、载剂和稀释剂。药用赋形剂、载剂或稀释剂的选择可以根据预期的施用途和标准药学实践来选择。药物组合物可以包含作为载剂、赋形剂或稀释剂 (或除此之外) 的任何合适的粘合剂、润滑剂、助悬剂、包衣剂、增溶剂和其他载剂。药物组合物通常在制造和储存条件下应该是无菌和稳定的。用于肠胃外施用的制剂包括但不限于混悬剂、溶液、油性或水性载体中的乳剂、糊剂和可植入的缓释或生物降解制剂。可以使用无毒的肠胃外可接受的稀释剂或溶剂来制备无菌可注射制剂。本发明的药物组合物可以包括药学上可接受的分散剂、润湿剂、悬浮剂、等渗剂、包衣剂、抗菌剂和抗真菌剂、载剂、赋形剂、盐或稳定剂, 它们在所采用的剂量和浓度下对受试者是无毒的。优选地, 这样的组合物可以进一步包含药学上可接受的载剂或赋形剂, 用于治疗与给定方法和/或施用部位 (例如对于肠胃外 (例如皮下、皮内或静脉内注射) 或鞘内施用) 相容的疾病。

[0739] 疫苗或药物组合物可以包含有效量的一种或多种本发明的减毒ASF病毒。

[0740] 在实施方案中,本发明提供了本发明的减毒ASF病毒,其在施用于受试者时诱导免疫应答,该免疫应答对随后的强毒ASF病毒攻击具有保护性。在实施方案中,本发明提供了本发明的减毒ASF病毒,其在施用于受试者时诱导免疫应答,该免疫反应对随后用与疫苗的减毒ASF病毒不同基因型的强毒ASF病毒攻击具有保护性。

[0741] 预防/治疗方法

[0742] 本发明还提供了通过向受试者施用有效量的本发明的减毒病毒、疫苗或药物组合物来预防和/或治疗受试者中的ASF的方法。

[0743] 术语“预防”旨在指避免、延迟、阻止或阻碍ASF的感染。疫苗可以例如预防或降低感染性ASFV进入细胞的可能性。

[0744] 术语“治疗”旨在指减少或减轻现有ASF感染的至少一种症状。

[0745] 受试者可以是易受ASF感染的任何动物。ASF易感动物包括家猪、疣猪、丛林猪和蜚。

[0746] 根据本发明的疫苗接种对象可以是家猪。

[0747] 施用

[0748] 本发明的疫苗可以通过任何方便的途径施用,如通过肌肉注射。其他合适的施途径包括鼻内、经口、皮下、透皮和阴道(例如在人工授精期间)。在一个实施方案中,口服施用包括将疫苗添加到动物饲料或饮水中。在另一个实施方案中,可以将疫苗添加到野生动物的诱饵中,例如适用于山猪、野猪、丛林猪或疣猪的诱饵。

[0749] 猪免疫的剂量可以低于每头猪 10^4HAD_{50} 或 TCID_{50} 。例如,剂量可以在 10^2 - 10^3HAD_{50} 或 TCID_{50} 之间。剂量可以是每头猪约 10^2HAD_{50} 或 TCID_{50} 。剂量可以由兽医在合理的兽医判断范围内确定。

[0750] 疫苗可以遵循初免加强方案施用。例如,在第一次接种后,受试者可以在一段时间(如约7、14、21或28天)后接受第二次加强施用。通常,加强施用的剂量高于初次施用。加强剂量可以是每头猪约 10^2 、 10^3 或 10^4HAD_{50} 或 TCID_{50} 重组减毒病毒。

[0751] 减毒病毒的制备方法

[0752] 本发明还进一步提供了使ASF病毒减毒的方法,该方法包括破坏以下基因的表达和/或活性的步骤:

[0753] MGF 360基因12L、13L和14L;以及

[0754] MGF 505基因1R,

[0755] 同时保留以下基因的功能:

[0756] (i) MGF 360 10L和/或11L,以及

[0757] (ii) MGF 505 2R和/或3R。

[0758] 基因表达和/或活性的破坏可以通过以本文所述的任何方式使ASFV基因组突变来实现。

[0759] 以下基因可以部分或完全缺失:

[0760] MGF 360基因12L、13L和14L;以及

[0761] MGF 505基因1R。

[0762] 一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因可以至少部分

或完全缺失。一个或多个(如两个或多个、三个或多个或所有四个)被破坏的基因的编码序列可以至少部分或完全缺失。

[0763] 以下基因可以被中断:

[0764] MGF 360基因12L、13L和14L;以及

[0765] MGF 505基因1R。

[0766] 一个或多个(如两个或多个、三个或多个或所有四个)基因可以被中断。

[0767] 用于病毒基因突变的方法是本领域已知的。具体而言,用于缺失病毒基因的方法是本领域已知的。例如,可以使用同源重组,其中产生相关基因缺失的转移载体并用于转染病毒感染的细胞。然后可以选择表达新序列部分的重组病毒。可以使用类似的程序来中断基因表达,例如通过缺失ATG起始密码子。

[0768] “保留基因的功能”是指基因的表达和活性在减毒过程中不受影响。产生的减毒病毒应表达基因的功能形式。适当地,功能将被保留的基因没有被减毒方法改变。适当地,功能将被保留的基因的序列没有被减毒方法改变。

[0769] 在本发明的一些实施方案中,使ASF病毒减毒的方法可以包括保留MGF 360 10L和MGF 505 2R的功能。在一些实施方案中,该方法可以包括保留MGF 360 11L以及MGF 505 2R的功能。在一些实施方案中,该方法可以包括保留MGF 360 10L以及MGF 505 3R的功能。在一些实施方案中,该方法可以包括保留MGF 360 11L以及MGF 505 3R的功能。在一些实施方案中,该方法可以包括保留MGF 360 10L和11L以及MGF 505 2R的功能。在一些实施方案中,该方法可以包括保留MGF 360 10L和11L以及MGF 505 3R的功能。在一些实施方案中,该方法可以包括保留MGF 360 10L以及MGF 505 2R和3R的功能。在一些实施方案中,该方法可以包括保留MGF 360 11L以及MGF 505 2R和3R的功能。在一些实施方案中,该方法可以包括保留MGF 360 10L和11L以及MGF 505 2R和3R的功能。

[0770] 本公开不受本文公开的示例性方法和材料的限制,并且与本文所述的那些相似或等效的任何方法和材料都可以用于本公开的实施方案的实践或测试。数字范围包括限定范围的数字。除非另有说明,否则任何核酸序列均以5'至3'方向从左到右书写;氨基酸序列分别以氨基到羧基的方向从左到右书写。

[0771] 必须注意,如本文和所附权利要求中使用的,单数形式“一个”、“一种”和“该”包括复数指示,除非上下文另有明确规定。

[0772] 如本发明所用的术语“包含”,“包括”和“含有”与“包括”、“包含”或者“包括”、“包含”同义,并且是包容性或开放式的,并且不排除额外的、未列举的成员、元素或方法步骤。术语“包括”、“包含”和“含有”还包括术语“由...组成”。

[0773] 本文所讨论的出版物仅针对其在本申请的提交日期之前的公开而提供。本文中的任何内容均不应被解释为承认此类出版物构成所附权利要求的现有技术。

[0774] 现将通过实施例进一步描述本发明,这些实施例旨在帮助本领域的普通技术人员实施本发明并且不以任何方式限制本发明的范围。

实施例

[0775] 实施例1-MGF基因抑制转录因子IRF3和NF- κ B的活性

[0776] 使用萤光素酶报告基因测定法测试了MGF基因对干扰素调节因子3 (IRF3) 和NF- κ B

活性的影响。IRF-3和NF- κ B是控制作为宿主先天免疫系统对病毒感染的应答的一部分的干扰素和促炎细胞因子的表达的转录因子。

[0777] HEK293T细胞用在IRF3特异性激活的启动子控制下的萤光素酶报告基因转染。细胞还用表达MGF基因 (MGF360-10L、11L、12L、13L或14L、MGF 505-1R、2R、3R、4R或5R,或MGF110-1L) 的质粒、空载体 (作为阴性对照) 或表达CSFV Npro (已知的IRF3抑制蛋白,作为阳性对照) 的质粒转染。然后用仙台病毒 (SeV) 刺激细胞以活化IRF3。刺激后萤光素酶的水平提供了MGF调节通过IRF-3和NF- κ B控制的信号传导级联的能力的量度。如图1A所示,用SeV刺激后的萤光素酶表达水平在用空载体转染的细胞中高,但在用IRF3抑制剂或任何MGF基因转染的细胞中低。因此,这些数据表明,所有测试的MGF基因都抑制IRF3活性。

[0778] 进行了等效的实验来测试MGF基因对NF- κ B表达的影响。在该实验中,细胞用在NF- κ B特异性激活的启动子控制下的萤光素酶报告基因转染,抑制NF- κ B的痘病毒MC160蛋白用作阳性对照,NF- κ B通过具有NF- κ B亚基p65的细胞的转染被激活。图1B所示的结果表明,测试的所有MGF基因都抑制NF- κ B活性。

[0779] MGF360-12L抑制IRF3和NF- κ B的转录活性

[0780] 进行了进一步的实验以进一步研究MGF基因如何抑制IRF3和NF- κ B活性。

[0781] 转录因子 (TF) 通常具有两个主要结构域:转录激活结构域 (TAD) 和DNA结合结构域 (DBD)。这些结构域是可互换的,因此含有来自不同TF的TAD和DBD的嵌合蛋白可用于进一步探究细胞信号传导通路。

[0782] 含有NF- κ B p65或与GAL4 DBD融合的IRF3 TAD的嵌合体用于评估MGF直接抑制NF- κ B p65或IRF3转录活性的能力。在这种情况下,报告质粒含有在由GAL4 DBD识别的响应元件控制下的萤光素酶基因。因此,萤光素酶活性不依赖于IRF3或NF- κ B结合其启动子的能力,而仅依赖于它们的激活状态。

[0783] 图1C和图1D分别显示MGF360-12L抑制由IRF-3 (TAD) -GAL4 (DBD) 和p65 (TAD) -GAL4 (DBD) 的过表达诱导的萤光素酶活性。相比之下,MGF家族的其他成员在该测定中不抑制萤光素酶活性。

[0784] 总之,这些结果表明,所有测试的MGF基因都能够通过与DNA结合和/或募集共激活因子来抑制IRF-3和NF- κ B功能。MGF 360-12L还直接抑制这些转录因子的活性,因此为与其他MGF基因相比,使用MGF 360-12L观察到的IRF3和NF- κ B的更强抑制提供了可能的解释。NF- κ B启动子结合元件存在于除I型干扰素之外的其他基因的启动子中,该通路的抑制可能会影响更广泛的基因,包括那些参与激活促炎反应的基因。

[0785] 实施例2-MGFA与K145R或B125R的缺失使ASFV减毒并诱导针对攻击的保护

[0786] MGFA和MGFB缺失

[0787] 多基因家族360和505的两组基因在ASFV格鲁吉亚2007/1株中缺失。

[0788] 在MGFA中,基因MGF360-12L、MGF360-13L、MGF360-14L和MGF505-1R的完整编码区缺失。

[0789] 在MGFB中,基因MGF360-13L、MGF360-14L、MGF505-2R和MGF505-3R的完整编码区缺失。

[0790] MGFA和MGFB缺失在图2中示意性显示。在每个基因名称下方,总结了IRF3和NF- κ B依赖性萤光素酶报告基因的抑制信息,并列出了任何已确定的宿主靶标。

[0791] 将MGFA缺失与K145R基因(格鲁吉亚 Δ K145R Δ MGFA)或B125R基因(格鲁吉亚 Δ B125R Δ MGFA)的缺失组合。

[0792] MGFb缺失与K145R基因(格鲁吉亚 Δ K145R Δ MGFB)的缺失组合。

[0793] 疫苗接种实验方案

[0794] 用 10^4 TCID₅₀/ml格鲁吉亚 Δ K145R Δ MGFA(C组)、格鲁吉亚 Δ K145R Δ MGFB(D组)或格鲁吉亚 Δ B125R Δ MGFA(BA组)病毒对每组6头大白长白猪进行肌内免疫。

[0795] D组的猪在免疫后在人道终点淘汰。

[0796] 对C组和BA组中的猪进行加强免疫,然后用亲本强毒格鲁吉亚毒株攻击。

[0797] 实验方案如图3所示。

[0798] 存活率

[0799] 来自D组(格鲁吉亚 Δ K152R Δ MGFB)的猪均在免疫后第5天至第9天在中等严重程度终点淘汰(图4A)。

[0800] 来自C组(格鲁吉亚 Δ K145R Δ MGFA)和BA组(格鲁吉亚 Δ B125R Δ MGFA)的猪在免疫和加强免疫后存活。

[0801] 攻击后,来自C组的2头猪在攻击后第7天或第11天(图4A)淘汰,而BA组的3头猪在攻击后6至8天在中等严重程度终点淘汰(图4B)。其余的猪一直存活到实验结束。如所预期的,对照非免疫猪(F组)在攻击后第6天淘汰(图4A和图4B)。因此存活率为66%。

[0802] 体温和临床评分

[0803] C组和BA组中的猪在免疫和加强免疫后没有出现体温升高(图5A和图5B)或临床症状增加(图6A和图6B)。

[0804] 在攻击后第5天或第6天,所有猪(除了来自C组的一头猪)出现超过 40.5°C 的温度和持续1至3天的其他症状(除了在中等严重程度终点淘汰的猪)。其余的猪没有表现出进一步的症状,直至实验终止。

[0805] 病毒血症

[0806] 在整个实验过程中,通过定量PCR测量全血中病毒基因组的水平。C组中免疫的一头猪在免疫后第6天具有非常低的基因组水平,但C组或AB组中的其他猪在免疫或加强免疫后没有可检测的病毒基因组(图7A和图7B)。相比之下,D组中的所有猪在免疫后第6天都具有高水平的病毒基因组,如由临床症状所预期的(图7C)。

[0807] 攻击后,在所有猪的血液中检测到病毒基因组。在C组中,攻击后第7天在所有存活的猪中检测到在 10^4 至 10^6 基因组拷贝数/ml之间变化的峰值,并且在此之后缓慢下降。如所预期的,在两头未存活的猪中检测到更高水平的病毒基因组。在BA组中,在存活的猪中检测到相似水平的病毒基因组,而在未存活的猪中检测到更高水平的病毒基因组。

[0808] 血液中的感染性病毒

[0809] 攻击后测量全血中感染性病毒的水平(图8)。

[0810] T细胞应答

[0811] 在免疫前、加强前和攻击前收集外周血单核细胞(PBMC),并用活ASFV(同源强毒格鲁吉亚2007/1株或异源基因型I强毒株贝宁97/1)刺激。通过Elispot测定法测量产生干扰素 γ 的细胞的数量(图9)。

[0812] 如所预期的,在免疫前没有检测到应答。在C组中,在加强前检测到对格鲁吉亚病

毒刺激的低应答,但在攻击前这些应答增加了数倍(图9A)。除了一头猪外,对强毒贝宁的应答如所预期的那样低(图9B)。在AB组中,在加强之前观察到更高水平的产生IFN γ 的细胞,但在攻击之前该水平并未增加(图9C和图9D)。

[0813] 抗体应答

[0814] 免疫后使用商业竞争性ELISA (Ingenasa) 测量对主要ASFV衣壳蛋白p72/B646L的抗体应答。免疫后第30天(加强免疫后)在C组的猪中检测到高于截止值的抗体应答,此后增加,但直到攻击后才达到100% (图10A)。在BA组的猪中观察到了类似的结果,但在免疫后第20天首次检测到抗体应答(图10B)。

[0815] 实施例4-DIVA靶标的筛选

[0816] 为了在ASFV中筛选可作为区分感染和免疫动物(DIVA)标记物的基因,将编码与HA或V5表位标签融合的单独ASFV基因(不包括已知的必需基因)的71个质粒转染到Vero细胞中。将细胞固定、透化并用来自不同免疫猪的抗血清染色,然后用荧光标记的二抗染色。共聚焦显微镜用于评估是否可以检测到表达的基因。

[0817] 同时,细胞用抗与ASFV基因融合的HA或V5标签的抗体和不同的荧光标记二抗染色,以确认蛋白质的表达。

[0818] 用于对细胞进行染色的猪血清来自使用以下病毒的免疫研究:贝宁 Δ DP148R (5头猪)、贝宁 Δ MGF (6头猪)、OVRT88/3 (5头猪) 和格鲁吉亚 Δ MGF (4头猪)。对于每头猪,使用免疫前血清样品(作为对照)和免疫后攻击前血清样品。

[0819] 使用来自贝宁 Δ DP148R免疫猪的血清(第0天的免疫前血清,免疫后第38天的免疫后血清)进行基因的初步筛选。ASFV基因CP204L、B646L和E183L用作阳性对照,并使用免疫后血清进行检测。免疫前血清未检测到任何基因。

[0820] 使用贝宁 Δ DP148R免疫后血清检测到六个ASFV基因,如下表5所示(++表示强检测,+表示弱检测,-表示未检测)。

[0821] 表5

ASFV 基因	贝宁 Δ DP148R 免疫后血清(第 38 天)				
	猪 1	猪 2	猪 3	猪 4	猪 5
B125R	++	++	-	-	+
B175L	++	++	-	+	-
E184L	++	++	-	-	+
H339R	-	++	-	++	++
K145R	++	++	-	-	-
M448R	++	-	+	++	+

[0823] 然后用来自其他免疫研究的猪血清测试在初始筛选中检测到的六个ASFV基因。

[0824] 下表6显示了使用来自贝宁 Δ MGF病毒免疫的6头猪的免疫后血清的ASFV基因检测(在第15天加强,在免疫后第38天采集免疫后血清;免疫前血清为阴性)。

[0825] 表6

[0826]

	贝宁 Δ MGF 免疫后血清(第 38 天)					
ASFV 基因	猪 1	猪 2	猪 3	猪 4	猪 5	猪 6
B125R	++	++	+	++	++	++
B175L	++	++	++	++	++	++
E184L	++	++	++	++	++	+
H339R	-	-	+	+	++	++
K145R	+	-	-	++	++	++
M448R	++	-	++	-	+	++

[0827] 下表7显示了使用来自OURT88/3病毒免疫的5头猪的免疫后血清的ASFV基因检测(在免疫后第20天采集免疫后血清;免疫前血清除猪2外均为阴性)。

[0828] 表7

[0829]

	OURT88/3 免疫后血清(第 20 天)				
ASFV 基因	猪 1	猪 2	猪 3	猪 4	猪 5
B125R	++	++	+	+	-
B175L	++	++	+	++	+
E184L	++	++	+	++	++
H339R	++	++	+	++	+
K145R	++	++	+	+	+
M448R	++	++	+	++	+

[0830] 下表8显示了使用来自格鲁吉亚 Δ MGF病毒免疫的4头猪的免疫后血清的ASFV基因检测(在免疫后第34天采集免疫后血清;在第-3天采集的免疫前血清为阴性)。2头猪(A)用 10^3 格鲁吉亚 Δ MGF免疫;2头猪(B)用 10^4 格鲁吉亚 Δ MGF免疫。

[0831] 表8

[0832]

	格鲁吉亚 Δ MGF 免疫后血清(第 34 天)			
ASFV 基因	猪 1 (A)	猪 2 (A)	猪 3 (B)	猪 4 (B)
B125R	-	++	+	-
B175L	+	-	-	+
E184L	-	-	++	+
H339R	-	+	-	-
K145R	-	++	+	-
M448R	-	-	++	-

[0833] 实施例5-B125R在细胞表面的定位

[0834] 用表达与HA表位标签融合的B125R基因的质粒转染Vero细胞。将细胞固定并透化,然后用抗HA抗体和随后的适当的二抗染色。图11显示B125R蛋白(绿色)定位于细胞表面。

[0835] 以上说明书中提到的所有出版物通过引用并入本文。在不脱离本发明的范围和精神的情况下,本发明的所述方法和系统的各种修改和变化对于本领域技术人员将是显而易见的。尽管已经结合具体的优选实施方案描述了本发明,但应理解,要求保护的本发明不应过度限于这些具体的实施方案。实际上,对病毒学、分子生物学或相关领域的技术人员显而易见的用于实施本发明的所述模式的各种修改旨在落入所附权利要求的范围内。

序列表

<110> 皮尔布莱特研究所

<120> 抗非洲猪瘟病毒感染的疫苗

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Gly Ala Asp Ile Asn Tyr Gly Leu Ile Cys Ala Asn Thr Pro Pro Val
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Arg Glu Phe Cys Trp Glu Leu Gly Ala Lys Tyr Arg Val Asp Lys Lys
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Phe Tyr Asn Met Asp Asn Leu Phe Phe Cys Ile Asp Leu Gly Ala Asp		
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Ile Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Thr Ala		
50	55	60

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65	70	75	80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His			
	85	90	95
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile			
	100	105	110
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met			
	115	120	125
Arg Gln Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser			
	130	135	140
Lys Phe Arg Val Leu Leu Tyr Phe Lys His Arg Leu Glu Asp Asp Leu			
145	150	155	160
Pro Phe Thr His Leu Leu Ile Glu Lys Ala Cys Lys Asp His Asn Tyr			
	165	170	175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asn Met Ile			
	180	185	190
Asp Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu His Leu Tyr Cys			
	195	200	205
Leu Gly Tyr Arg Phe Ile Tyr Asn Arg Ile Val Pro Asp Lys Tyr His			
	210	215	220
His Leu Asp Ile Arg Met Leu Ser Ser Leu Gln Leu Leu His Lys Val			
225	230	235	240
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp			
	245	250	255
His Asn Lys Asp Asn Ile Asn Ile Ile Leu Thr Gln Ala Ala Thr Tyr			
	260	265	270
Asn His Arg Lys Ile Leu Ile Tyr Phe Ile Pro Gln Ser Thr His Ala			
	275	280	285
Gln Ile Glu Gln Cys Leu Leu Val Ala Ile Lys Ala Lys Ser Ser Arg			
	290	295	300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Asn Leu			
305	310	315	320
Ile Lys Lys Ile Ser His Tyr Val Ala Thr Tyr Asn Ser Thr Asn Ile			
	325	330	335
Ile Gly Ile Leu Ser Met Arg Arg Lys Lys Lys Ile Tyr Leu Asp Ile			
	340	345	350
Ile Leu Thr Lys Phe Val Lys Lys Ala Ile Phe Asn Lys Phe Val Val			
	355	360	365
Arg Cys Met Asp Thr Phe Ser Ile Asn Pro Glu Arg Ile Leu Lys Ile			

370	375	380
Ala Ala Arg Ile Asn Arg Met Met Leu Val Lys Lys Ile Ser Glu His		
385	390	395
Val Trp Lys Asn His Ala Val Arg Leu Lys Tyr Leu Lys His Ala Val		400
405	410	415
His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile		
420	425	430
Tyr Asp Arg Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu		
435	440	445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
450	455	460
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile		480
485	490	495
Asn Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Val Met Gly Val Leu		
500	505	510
Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys Gln		
515	520	525
Tyr Met Pro		
530		
<210> 7		
<211> 526		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 7		
Met Phe Ser Leu Gln Asp Leu Cys Arg Lys His Leu Phe Ile Leu Pro		
1	5	10
Asp Val Phe Gly Glu His Val Leu Gln Arg Leu Gly Leu Tyr Trp Arg		
20	25	30
Cys His Gly Ser Leu Gln Arg Ile Gly Asp Asp His Ile Leu Ile Arg		
35	40	45
Arg Asp Leu Ile Leu Ser Thr Asn Glu Ala Leu Arg Met Ala Gly Glu		
50	55	60
Glu Gly Asn Asn Glu Val Val Lys Leu Leu Leu Leu Trp Lys Gly Asn		
65	70	75
Leu His Tyr Ala Val Ile Gly Ala Leu Gln Gly Asp Gln Tyr Asp Leu		80
85	90	95
Ile His Lys Tyr Glu Asn Gln Ile Gly Asp Phe His Phe Ile Leu Pro		

100	105	110
Leu Ile Gln Asp Ala Asn Thr Phe	Glu Lys Cys His Ala Leu Glu Arg	
115	120	125
Phe Cys Gly Val Ser Cys Leu Leu	Lys His Ala Thr Lys Tyr Asn Met	
130	135	140
Leu Pro Ile Leu Gln Lys Tyr Gln	Glu Glu Leu Ser Met Arg Ala Tyr	
145	150	155
Leu His Glu Thr Leu Phe Glu Leu	Ala Cys Leu Trp Gln Arg Tyr Asp	
165	170	175
Val Leu Lys Trp Ile Glu Gln Thr	Ile His Val Tyr Asp Leu Lys Ile	
180	185	190
Met Phe Asn Ile Ala Ile Ser Lys	Arg Asp Leu Thr Met Tyr Ser Leu	
195	200	205
Gly Tyr Ile Phe Leu Phe Asp Arg	Gly Asn Thr Glu Ala Thr Leu Leu	
210	215	220
Thr Gln His Leu Lys Lys Thr Ala	Ala Lys Gly Leu Leu His Phe Val	
225	230	235
Leu Glu Thr Leu Lys Tyr Gly Gly	Asn Ile Asp Thr Val Leu Thr Gln	
245	250	255
Ala Val Lys Tyr Asn His Arg Lys	Leu Leu Asp Tyr Phe Leu Arg Gln	
260	265	270
Leu Pro Arg Lys His Ile Glu Lys	Leu Leu Leu Leu Ala Val Gln Glu	
275	280	285
Lys Ala Ser Lys Lys Thr Leu Asn	Leu Leu Leu Ser His Leu Asn Tyr	
290	295	300
Ser Val Lys Arg Ile Lys Lys Leu	Pro Arg Tyr Val Ile Glu Tyr Glu	
305	310	315
Ser Thr Leu Val Ile Lys Ile Leu	Leu Lys Lys Arg Val Asn Leu Ile	
325	330	335
Asp Ala Met Leu Glu Lys Met Val	Arg Tyr Phe Ser Ala Thr Lys Val	
340	345	350
Arg Thr Ile Met Asp Glu Leu Ser	Ile Ser Pro Glu Arg Val Ile Lys	
355	360	365
Met Ala Ile Gln Lys Met Arg Thr	Asp Ile Val Ile His Thr Ser Tyr	
370	375	380
Val Trp Glu Asp Asp Leu Glu Arg	Leu Thr Arg Leu Lys Asn Met Val	
385	390	395
Tyr Thr Ile Lys Tyr Glu His Gly	Lys Lys Met Leu Ile Lys Val Met	
405	410	415

His Gly Ile Tyr Lys Asn Leu Leu Tyr Gly Glu Arg Glu Lys Val Met
 420 425 430
 Phe Tyr Leu Ala Lys Leu Tyr Val Ala Gln Asn Ala Ala Thr Gln Phe
 435 440 445
 Arg Asp Ile Cys Lys Asp Cys Tyr Lys Leu Asp Val Ala Arg Phe Lys
 450 455 460
 Pro Arg Phe Lys Gln Leu Ile Leu Asp Cys Leu Glu Ile Ile Thr Lys
 465 470 475 480
 Lys Ser Cys Tyr Ser Ile Leu Glu Ile Leu Glu Lys His Ile Ile Ser
 485 490 495
 Leu Phe Thr Met Lys Val Met Thr Glu Glu Glu Lys Asn Leu Cys Leu
 500 505 510
 Glu Ile Leu Tyr Lys Val Ile His Tyr Lys Thr Ile Gln Cys
 515 520 525

<210> 8

<211> 280

<212> PRT

<213> 非洲猪瘟病毒

<400> 8

Met Ser Ser Ser Leu Gln Glu Leu Cys Arg Lys Lys Leu Pro Asp Cys
 1 5 10 15
 Ile Leu Pro Glu Phe Phe Asp Asp Tyr Val Leu Gln Leu Leu Gly Leu
 20 25 30
 His Trp Gln Asp His Gly Ser Leu Gln Arg Ile Glu Lys Asn Gln Ile
 35 40 45
 Leu Val Gln Gln Glu Pro Ile His Ile Asn Glu Ala Leu Lys Val Ala
 50 55 60
 Ala Ser Glu Gly Asn Tyr Glu Ile Val Glu Leu Leu Leu Ser Trp Glu
 65 70 75 80
 Ala Asp Pro Arg Tyr Ala Val Val Gly Ala Leu Glu Ser Lys Tyr Tyr
 85 90 95
 Asp Leu Val Tyr Lys Tyr Tyr Asp Gln Val Lys Asp Cys His Asp Ile
 100 105 110
 Leu Pro Leu Ile Gln Asn Pro Glu Thr Phe Glu Arg Cys His Glu Leu
 115 120 125
 Asn Ser Thr Cys Ser Leu Lys Cys Leu Phe Lys His Ala Val Ile Asn
 130 135 140
 Asp Met Leu Pro Ile Leu Gln Lys Tyr Thr Asp Tyr Leu Asp Arg Trp
 145 150 155 160

Glu Tyr Cys Ser Gln Met Leu Phe Glu Leu Ala Cys Ser Lys Lys Lys		
165	170	175
Tyr Glu Met Val Val Trp Ile Glu Gly Val Leu Gly Val Gly Lys Val		
180	185	190
Thr Ser Leu Phe Thr Ile Ala Ile Ser Asn Arg Asp Leu Gln Leu Tyr		
195	200	205
Ser Leu Gly Tyr Ser Ile Ile Leu Glu Asn Leu Tyr Ser Cys Gly Gln		
210	215	220
Asp Pro Lys Phe Leu Leu Asn His Phe Leu Arg Asp Val Ser Ile Lys		
225	230	235
Gly Leu Leu Pro Phe Val Ile Lys Thr Ile Glu Tyr Gly Gly Ser Lys		
245	250	255
Glu Ile Ala Ile Thr Leu Ala Lys Lys Tyr Gln His Lys His Ile Leu		
260	265	270
Lys Tyr Phe Glu Thr Trp Glu Ser		
275	280	

<210> 9

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 9

Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu		
1	5	10
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe		
20	25	30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser		
35	40	45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe		
50	55	60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile		
65	70	75
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile		
85	90	95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr		
100	105	110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu		
115	120	125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu		
130	135	140

Ser

145

<210> 10

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 10

Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln

1 5 10 15

Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala

20 25 30

Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe

35 40 45

Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile

50 55 60

Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys

65 70 75 80

Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile

85 90 95

Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp

100 105 110

Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg

115 120 125

<210> 11

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 11

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gtctggacta taaatgtcta atgataaacg atgagatata aaatagtaat tctgttgctc 180

tgccaaggct tttgcctctt caaaggcatc ggccccaga tctatacaaa agaacagggtt 240

atccatatta tagaatcgta tggaggcaat catggccaaa ttaatattag ctccctaagat 300

aaaacaataa tatatagtta aaaaattgtt atcttttgtg caggctatcc gcatcatttc 360

atccatgtcc atacggattt tttctttttc gtacaaatta thtaggtcaa acagcttatt 420

atagcaaaga gcacatgta accaccacgt attcagatac ttaaaatgtt ggtaaacata 480

agaaatggcc tccctaagat taccctgcaa tgccacgata aaacagtata tagttaacat 540

atcaccatcc gaaatattac ttaatacgtt ggtatcttct gctaaatfff ttagcttcca 600

atgtatacac gactttatff cccttataat gacataggct gaaaagggtat tgtcattaaa 660

aaatttaaga cataagataa tattattact agtagtgta ggatgtatta atttaaagaa 720
 tatgtgcata atcttctttt tatccacttg gtacttggct cctaattccc agcaaaattc 780
 tcgaataggt ggcgtattcg cgcaaatata cccatagttg atgtctgcgc cccaatccgt 840
 aaacatTTTT attaatgat agttgttttc cttttagacc aacattagtg ccgtattaag 900
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<210> 12

<211> 1038

<212> DNA

<213> 非洲猪瘟病毒

<400> 12

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 agatatcaaa tagtaattcc gttgctctgc tagggccttt gcctcttcaa aggcgtcggc 180
 tcccagatct atacaaaaga acaagttatc catattataa aatcgtacgc aggcaagcat 240
 agctgaatta atattagctc ctaagagaaa acaataatat atggttaaaa aattgttatt 300
 ttttgtgcag gccatccgca tcatttcac cagtcctatg cggatctttt ctttttcata 360
 caaattatgt aggtcaaaca gcttattaaa acaagagca cagattaacc accacgtatt 420
 tagatactta aaatgttgg aaacataaga aatggcctcc ctaagattat cctgcaatgc 480
 cactataaaa cagtatatcg ttaacatat accatccgac atattactta atatgtcgg 540
 gtcttctact aaccttttca acttccaata tatggatgac cttatttccc ttataatgac 600
 ataggctgga aagggtatt cattaaaaag ttaagacat aagataatat tactgctagt 660
 agtgccaggg tgtattaatt taaagaacat gtgcataatc ttctttttat ccacgcggta 720
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<210> 13

<211> 1038

<212> DNA

<213> 非洲猪瘟病毒

<400> 13

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 agatatcaaa tagtaattcc gttgctctgc tagggccttt gcctcttcaa aggcgtcggc 180
 tcccagatct atacaaaaga acaagttatc catattataa aatcgtacgc aggcaagcat 240

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 ttttgtgcag gccatccgca tcatttcac cagtgccatg cggatctttt ctttttcata 360
 caaattatgt aggtcaaaca gcttattaaa acaaagagca cagattaacc accacgtatt 420
 tagatactta aaatgttggg aaacataaga aatggcctcc ctaagattat cctgcaatgc 480
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 gtcttctact aaccttttca acttccaata tatggatgac cttattttccc ttataatgac 600
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 ttgtaaggaa ggaaacat 1038

<210> 14

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 14

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 atctggatga tagatatcta atgacaaacg atgtgatatt aaataatagt cccgtgctc 180
 tgctagggct tttgcctctt cgaaggcatt ggcccccaag tctatacaaa agaacagatt 240
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 attaattgtct atgcgaattt tttcctgctc atagagataa tggaggtcaa acagtttatt 420
 aaaacacaga gcacagatta accaccagc attcaggtgc ttaaaatgtt ggtaaaaata 480
 cgagacggcc tccctaagac cattctgcaa ggccaccata aaacaatata aagttagcat 540
 atcgccgtcc gaaacatcgc gtagtaggtc ttcgttctt actaacctcc tcagcctcca 600
 ataaagagac gactttattt cccttataat cacataggtg ggaaaaggat tctcattaaa 660
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<210> 15

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 15

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atcgccgtcc gaaacatcac gtagtaggtc ttcattctct actaacctcc tcagcctcca 600
ataaagagac gactttatct cccttataat cacataggtg ggaaaaggat tctcattaaa 660
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gtgtatcacc ttttttttat ccatgcgata gttcgctcct aattcccaac aaaactctcg 780
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caggccatcc gcaaagtatg gcaaccttat taacatgtgt ttgcaatcaa gtgaaattgg 960
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<210> 16

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 16

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atctggatga tagatatcta atgacaaacg atgtgatatt aaataatagt cccgctgctc 180
tgctagggct tttgcctctt cgaaggcatt ggcccccaag tctatacaaa agaacagatt 240
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attaatgtct atgcgaattt tttcctgctc atagagataa tggaggtcaa acagtttatt 420
aaaacacaga gcacagatta accaccacgt attcaggtgc ttaaaatgtt ggtaaaaata 480
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atgcatcacc ttttttttat ctaagcgata gtttgctcct aattcccaac aaaactctcg 780

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 caggccatcc gcaaagtatg gcaaccttat taacatgtgt ttacaatcaa gtgaaattgg 960
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<210> 17

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 17

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 gtctggacta taaatgtcta atgataaacg atgagatata aaatagtaat tctgttgctc 180
 tgccaaggct tttgcctctt caaaggcatc ggccccaga tctatacaaa agaacaggtt 240
 atccatatta tagaatcgta tggaggcaat catggccaaa ttaatattag ctcttaagat 300
 aaaacaataa tatatagtta aaaaattgtt atcttttgtg caggctatcc gcatcatttc 360
 atccatgtcc atacggattt tttctttttc gtacaaatta tgtaggtcaa acagcttatt 420
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 atcaccatcc gaaatattac ttaatacgtt ggtatcttct gctaaatttt ttagcttcca 600
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 aaatttaaga cataagataa tattattact agtagtgta ggatgtatta atttaaagaa 720
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 tcgaataggt ggcgtattcg cgcaaatata cccatagttg atgtctgcgc cccaatccgt 840
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 gtccaagcca tctgcaaagt ttggcagctt tatcagcata tgtttgcaat caagtgaat 960
 tggagcctta taccaccata gcccgcagcg ttctaagata acatggtaat caatagatac 1020
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<210> 18

<211> 1068

<212> DNA

<213> 非洲猪瘟病毒

<400> 18

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 cagggttttt gcctcttcaa aggcatcggc tcccaggtct atacaaaaga acaagttatc 240
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catgtccatg cggatctttt ccttttcata caaatcatgt aggtcaaaca gcttatttaa 420
 acaaagagca cagattaacc accacgtatt cagatgctta aaatgttggt aaaaataaga 480
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<210> 19

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 19

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<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 20

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<210> 21

<211> 1071

<212> DNA

<213> 非洲猪瘟病毒

<400> 21

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<210> 22

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 22

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<210> 23

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 23

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<210> 24

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 24

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<210> 25

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 25

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<210> 26

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 26

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<210> 27

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 27

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<210> 28

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 28

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<210> 29

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 29

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<210> 30

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 30

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<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 31

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<210> 32

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<213> 非洲猪瘟病毒

<400> 32

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<210> 33

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<213> 非洲猪瘟病毒

<400> 33

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<210> 34

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 34

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<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 35

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<210> 36

<211> 1062

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<213> 非洲猪瘟病毒

<400> 36

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<210> 37

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 37

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<210> 38

<211> 1053

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<213> 非洲猪瘟病毒

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<210> 39

<211> 1053

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<213> 非洲猪瘟病毒

<400> 39

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<211> 1056

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<213> 非洲猪瘟病毒

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<210> 41

<211> 1056

<212> DNA

<213> 非洲猪瘟病毒

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<210> 42

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 42

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<211> 1050

<212> DNA

<213> 非洲猪瘟病毒

<400> 43

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<210> 44

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 44

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<210> 45

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 45

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<210> 46

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 46

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<210> 47

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 47

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<210> 48

<211> 1053

<212> DNA

<213> 非洲猪瘟病毒

<400> 48

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 ttcgaaagca tcagcccccga gatccataca aaagaacatg ttttctatat tatagtactg 240
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<210> 49

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 49

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<210> 50

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 50

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<210> 51

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 51

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<210> 52

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 52

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<210> 53

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 53

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<210> 54

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 54

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<210> 55

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 55

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<210> 56

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 56

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<210> 57

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 57

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<210> 58

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 58

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<210> 59

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 59

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<210> 60

<211> 1062

<212> DNA

<213> 非洲猪瘟病毒

<400> 60

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<210> 61

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 61

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<210> 62

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 62

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<210> 63

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 63

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<210> 64

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 64

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<210> 65

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<213> 非洲猪瘟病毒

<400> 65

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<210> 66

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<213> 非洲猪瘟病毒

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<210> 67

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

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<210> 68

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 68

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 aactgtgtct aaagtgggtc tagttacggt ttccaagagt ggattatgac aaaacatgtc 660
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<210> 69

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 69

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<210> 70

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 70

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<210> 71

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 71

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ataagctttg tgcgcaatgc gttgtgccct atcaaaatca gtagccccc aatcgatgca 240
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<210> 72

<211> 1074

<212> DNA

<213> 非洲猪瘟病毒

<400> 72

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ataagttttg tgcgcaatgc gttgtgccct atcaaaatca gtagccccc aatcgatgca 240
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aactgtgtct aaagtgggtc tagttacggg ttccaagagt ggattatgac aaaacatgtc 660
ataaccagct agaactcctg cacaggattt tagcttggcc acttctttta aaatttccag 720

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<210> 73

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 73

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<210> 74

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 74

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<210> 75

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 75

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cgagcaggaa acaactgtgt gcttatacag caacataccc tcattcccgt aaatgaagcc 180

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ctgagaacag cagcatctga agaaaattat gagatcgtga gcctttttatt agcgtgggag 240
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 aaatatgatg accaaatcaa ggaccatcat gaaattctgc cattcattga cgatccagtc 360
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 gtaaaatata gtaagtttcg cgttcttctt tacttttaac atagattaga ggatgatttg 480
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<210> 76

<211> 1593

<212> DNA

<213> 非洲猪瘟病毒

<400> 76

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 cgagcaggaa acaactgtgt acttatccaa caacataacc tcattcccgt aaatgaagcc 180
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<210> 77

<211> 1593

<212> DNA

<213> 非洲猪瘟病毒

<400> 77

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<210> 78

<211> 1593

<212> DNA

<213> 非洲猪瘟病毒

<400> 78

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<210> 79

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 79

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<210> 80

<211> 1593

<212> DNA

<213> 非洲猪瘟病毒

<400> 80

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<210> 81

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 81

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<210> 82

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 82

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<210> 83

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 83

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<210> 84

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 84

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<210> 85

<211> 1596

<212> DNA

<213> 非洲猪瘟病毒

<400> 85

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<210> 86

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 86

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<210> 87

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 87

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<210> 88

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 88

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<210> 89

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 89

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<210> 90

<211> 1575

<212> DNA

<213> 非洲猪瘟病毒

<400> 90

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<210> 91

<211> 1575

<212> DNA

<213> 非洲猪瘟病毒

<400> 91

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<210> 92

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 92

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<210> 93

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 93

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<210> 94

<211> 1581

<212> DNA

<213> 非洲猪瘟病毒

<400> 94

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<210> 95

<211> 1554

<212> DNA

<213> 非洲猪瘟病毒

<400> 95

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<210> 96

<211> 1554

<212> DNA

<213> 非洲猪瘟病毒

<400> 96

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<210> 97

<211> 1569

<212> DNA

<213> 非洲猪瘟病毒

<400> 97

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ggagacgacc acatactcat acggcgggat ctcatccttt ccaccaacga ggccttaaga 180

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 gaaaacccaaa tcggcgactt tcatcttatt ttaccattga ttcaagatgc gaaaacgttt 360
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<210> 98

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 98

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 gggcttctcc cttttgtact gaaaaccata gaatatggtg gaagcaagga gatagccata 780
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<210> 99

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 99

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 aaatactatg accaagttaa agactgccat gatattctgc cgctgattca aaatccggaa 360
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<210> 100

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 100

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 gggcttctac cctttgtaat caaaaccata gaatatgggtg gaagcaagga gatagccata 780
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 tag 843

<210> 101

<211> 849

<212> DNA

<213> 非洲猪瘟病毒

<400> 101

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<210> 102

<211> 849

<212> DNA

<213> 非洲猪瘟病毒

<400> 102

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<210> 103

<211> 849

<212> DNA

<213> 非洲猪瘟病毒

<400> 103

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<210> 104

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 104

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 taa 843

<210> 105

<211> 837

<212> DNA

<213> 非洲猪瘟病毒

<400> 105

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<210> 106

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 106

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<210> 107

<211> 309

<212> DNA

<213> 非洲猪瘟病毒

<400> 107

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aaatgctaa 309

<210> 108

<211> 309

<212> DNA

<213> 非洲猪瘟病毒

<400> 108

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<210> 109

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 109

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ttttttgacg actatgtatt gcaactgtta ggactgcact ggcaagatca tggttctctt 120
cagcgtatcg agaagaacca gatacttggt caacaggaac ccatccatat caatgaagca 180
ctcaaagtag cagcatcgga agggaactat gaaatcgtag agctgttggt gtcatgggag 240

gcagatcccc gctacgccgt cgtaggagct ctcgaaagca aatactatga cctggttcac 300
 aaatactatg gccaagttaa agactgccat gatatcttgc cgctgattca aaatccggaa 360
 acattcgaaa aatgtcatga gttaaacagc acctgttcac tgaaatgctt attcaagcat 420
 gctgtgatga atgacatgct gccgattctt gaaaaatata cagactatct ggataggtgg 480
 gagtattgca gccagatgct gttcgaattg gcatgcagaa aaaaaaata tgagatgggt 540
 gtgtggatag agggagttct atgcgtcggc aaagttacgt ctcttttcac cattgcgatt 600
 agcaacagag acctacagct gtattctctg ggctactcaa ttattcttga gaaaatgtac 660
 tcctgtcgac aggacccccac gtttttacta aatcatttcc tgcgagacgt ttcgataaag 720
 gggcttctgc cctttgtact gaaaaccata gaatatgggtg gaagcaagga gatagccata 780
 actctggcta aaaaaatatca gcataaacat attttgaaat acttcgaaac ctgggaaagc 840
 tag 843

<210> 110

<211> 846

<212> DNA

<213> 非洲猪瘟病毒

<400> 110

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 gagtttttcg acgactatgt attgcaactg ttaggactgc actggcaaga tcatggttct 120
 cttcagcgta tcgagaagaa ccagatactt gttcaacagg aacccatcca tatcaatgaa 180
 gcactcaaag tagcagcatc ggaagggaac tatgaaatcg tagagctgtt gttgtcatgg 240
 gaggcagatc cccgctacgc cgtcgtagga gctctcgaaa gcaaatacta tgacctgggt 300
 cacaaatact atgaccaagt taaagactgc catgatatct tgccgctgat tcaaaatccg 360
 gaaacattcg aaaagtgtca tgagttaaag agcacctgtt cactgaaatg cttattcaag 420
 catgctgtga taaatgacat gctgccgatt cttcaaaaat atacagacta tctggatagg 480
 tgggagtatt gtagccagat gctgttcgaa ttggcatgta gaaaaaaaaa gtatgagatg 540
 gttgtgtgga tagagggagc tctgggcgtc ggcaaagtta catctctttt caccattgcg 600
 attagcaaca gagacctgca gctgtattct ctgggctact caatgattct tgagaaattg 660
 tactcctgtg gacaggaccc cacgttttta ctaaatacatt tcctgcgaga cgtttcgata 720
 aaggggcttc tgccctttgt actcaaaacc atagaatatg gtggaagcaa ggagatagcc 780
 ataactctgg ctaaaaaata tcagcataaa catattttga aatacttcga aacttgggaa 840
 agctag 846

<210> 111

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 111

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 tttttcgacg actatgtatt gcaactgtta ggactgcact ggcaagatca tggttctctt 120
 cagcgtatcg agaagaacca gatacttggt caacaggaac ccatccatat caatgaagca 180

ctcaaagtag cagcatcgga agggaaactat gaaatcgtag agctgttggt gtcatgggag 240
gcagatcccc gctacgccgt cgtaggagct ctcgaaagca aatactatga cctgggttcac 300
aaatactatg gccaagttaa agactgccat gatatcttgc cgctgattca aaatccggaa 360
acattcgaaa aatgtcatga gttaaacagc acctgttcac tgaaatgctt attcaagcat 420
gctgtgatga atgacatgct gccgattctt gaaaaatata cagactatct ggataggtgg 480
gagtattgca gccagatgct gttcgaattg gcatgtagaa aaaaaaata tgagatgggt 540
gtgtggatag agggagttct aggcacggc aaagttacgc ctcttttcac cattgcatg 600
agcaacagag acctacagct gtattctctg ggctactcaa ttattcttga gagaatgtat 660
tcctgtgaac aggatccac gtttttacta aatcatttcc tgcgagacgt ttcgataaag 720
gggcttctgc cttttgtact gaaaaccata gaatatgggt gaagcaaaga gatagccata 780
actctggcta aaaaaatatca gcataaacat attttgaaat acttcgaaac atgggaaagc 840
taa 843

<210> 112

<211> 843

<212> DNA

<213> 非洲猪瘟病毒

<400> 112

atgtcctctt cccttcagga actttgccga aaaaagctgc ctgactgcat acttccagag 60
tttttcgacg actatgtatt gcaactgtta ggattgcatt ggcaagatca tggttctctt 120
cagcgtatcg agaagaacca gatacttggt caacaggaac ccatccatat caatgaagca 180
ctcaaagtag cagcatcgga agggaaactat gaaatcgtag agctgttggt gtcatgggag 240
gcagatcccc gctacgccgt cgtaggagct ctcgaaagca aatactatga cctgggttcac 300
aaatactatg gccaagttaa agactgccat gatatcttgc cgctgattca aaatccggaa 360
acatttgaaa agtgtcatga gttaaacagc acctgttcac tgaaatgctt attcaagcat 420
gctgtgatga atgacatgct gccgattctt gaaaaatata cagactatct ggataggtgg 480
gagtattgca gccagatgct gttcgaattg gcatgtagaa aaaaaaata tgagatgggt 540
gtgtggatag agggagttct aggcgtcggc aaagttacgt ctcttttcac cattgcatg 600
agcaacagag acctacagct gtattctctg ggcttctcaa ttattcttga gaaattgtac 660
tcctgtggac aggacccac gtttttacta aatcatttcc tgcgagacgt ttcgataaag 720
gggcttctgc cttttgtact caaaaccata gaatatgggt gaagcaagga gatagccata 780
actctggcta aaaaaatatca gcataaacat attttgaaat acttcgaaac ctgggaaagc 840
tag 843

<210> 113

<211> 350

<212> PRT

<213> 非洲猪瘟病毒

<400> 113

Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln

1

5

10

15

Cys	Val	Pro	Thr	Asn	Gln	His	Tyr	Leu	Leu	Lys	Tyr	Tyr	Asp	Leu	Trp
20				25				30							
Trp	Tyr	Asn	Ala	Pro	Ile	Thr	Phe	Asp	His	Asn	Leu	Arg	Leu	Ile	Lys
35				40				45							
Ser	Ser	Gly	Ile	Lys	Glu	Gly	Leu	Asp	Leu	Asn	Thr	Ala	Leu	Val	Lys
50				55				60							
Ala	Val	Arg	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu	Phe	Thr	Glu	Trp
65				70				75				80			
Gly	Ala	Asp	Ile	Asn	Tyr	Gly	Leu	Val	Ser	Val	Asn	Thr	Glu	His	Thr
85				90				95							
Arg	Asp	Leu	Cys	Gln	Glu	Leu	Gly	Ala	Lys	Glu	Ile	Leu	Asn	Glu	Glu
100				105				110							
Glu	Ile	Leu	Gln	Ile	Phe	Ile	Asp	Leu	Lys	Phe	His	Lys	Thr	Ser	Ser
115				120				125							
Asn	Ile	Ile	Leu	Cys	His	Glu	Val	Phe	Ser	Asn	Asn	Pro	Ile	Leu	Gln
130				135				140							
Lys	Val	Asn	Asn	Leu	Lys	Leu	Arg	Ile	Glu	Ile	Phe	Trp	Glu	Leu	Arg
145				150				155				160			
Glu	Leu	Ile	Glu	Lys	Thr	Asp	Leu	Leu	Asn	Asn	Glu	Phe	Leu	Leu	Ser
165				170				175							
Thr	Leu	Leu	Leu	Lys	Tyr	Trp	Tyr	Ala	Ile	Ala	Val	Arg	Tyr	Ser	Leu
180				185				190							
Lys	Glu	Ala	Ile	Gln	Tyr	Phe	Tyr	Gln	Lys	Tyr	Thr	His	Met	Asn	Thr
195				200				205							
Trp	Arg	Leu	Thr	Cys	Ala	Leu	Cys	Phe	Asn	Asn	Val	Phe	Asp	Leu	His
210				215				220							
Glu	Ala	Tyr	Glu	Lys	Asp	Lys	Ile	His	Met	Asp	Ile	Glu	Glu	Met	Met
225				230				235				240			
Arg	Ile	Ala	Cys	Ile	Lys	Asp	His	Asn	Leu	Ser	Thr	Met	Tyr	Tyr	Cys
245				250				255							
Tyr	Met	Leu	Gly	Ala	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Ile	Gln
260				265				270							
Tyr	Tyr	Asn	Ile	Glu	Asn	Met	Phe	Phe	Cys	Met	Asp	Leu	Gly	Ala	Asp
275				280				285							
Val	Phe	Glu	Glu	Gly	Thr	Thr	Ala	Leu	Gly	Glu	Gly	Tyr	Glu	Leu	Ile
290				295				300							
Lys	Asn	Ile	Leu	Ser	Leu	Lys	Ile	Tyr	Ser	Pro	Thr	Thr	Ile	Pro	Leu
305				310				315				320			
Pro	Lys	Ser	Thr	Asp	Pro	Glu	Ile	Ile	Asp	His	Ala	Leu	Lys	Asn	Tyr

				325				330				335			
Phe	Ser	Lys	Asn	Met	Met	Ile	Phe	Leu	Ser	Tyr	Asp	Leu	Arg		
				340				345				350			
<210> 114															
<211> 350															
<212> PRT															
<213> 非洲猪瘟病毒															
<400> 114															
Met	Leu	Pro	Ser	Leu	Gln	Ser	Leu	Thr	Lys	Lys	Val	Leu	Ala	Gly	Gln
				5				10				15			
Cys	Val	Pro	Thr	Asn	Gln	His	Tyr	Leu	Leu	Lys	Cys	Tyr	Asp	Leu	Trp
				20				25				30			
Trp	His	Asp	Ala	Pro	Ile	Thr	Phe	Asp	His	Asn	Leu	Arg	Leu	Ile	Lys
				35				40				45			
Ser	Ala	Gly	Ile	Lys	Glu	Gly	Leu	Asn	Leu	Asn	Thr	Ala	Leu	Val	Lys
				50				55				60			
Ala	Val	Arg	Glu	Asn	Asn	Tyr	Asn	Leu	Ile	Lys	Leu	Phe	Ala	Glu	Trp
65				70				75				80			
Gly	Ala	Asp	Ile	Asn	Tyr	Gly	Leu	Val	Ser	Val	Asn	Thr	Glu	His	Thr
				85				90				95			
Trp	Asp	Leu	Cys	Arg	Glu	Leu	Gly	Ala	Lys	Glu	Thr	Leu	Asn	Glu	Glu
				100				105				110			
Glu	Ile	Leu	Gln	Ile	Phe	Ile	Asp	Leu	Lys	Phe	His	Lys	Thr	Ser	Ser
				115				120				125			
Asn	Ile	Ile	Leu	Cys	His	Glu	Val	Phe	Ser	Asn	Asn	Pro	Ile	Leu	Gln
				130				135				140			
Lys	Val	Asn	Asn	Ile	Lys	Met	Arg	Ile	Glu	Ile	Phe	Trp	Glu	Leu	Arg
145				150				155				160			
Glu	Leu	Ile	Val	Lys	Thr	Asp	Leu	Leu	Asn	Asn	Glu	Phe	Ser	Leu	Ser
				165				170				175			
Thr	Leu	Leu	Leu	Lys	Tyr	Trp	Tyr	Ala	Ile	Ala	Ile	Arg	Tyr	Asn	Leu
				180				185				190			
Lys	Glu	Ala	Ile	Gln	Tyr	Phe	Tyr	Gln	Lys	Tyr	Thr	His	Leu	Asn	Thr
				195				200				205			
Trp	Arg	Leu	Thr	Cys	Ala	Leu	Cys	Phe	Asn	Asn	Val	Phe	Asp	Leu	His
210				215				220							
Glu	Ala	Tyr	Glu	Lys	Asp	Lys	Ile	His	Met	Asp	Ile	Glu	Glu	Met	Met
225				230				235				240			
Arg	Ile	Ala	Cys	Ile	Lys	Asp	His	Asn	Leu	Ser	Thr	Met	Tyr	Tyr	Cys

	245		250		255
Tyr Val Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Ser Ser Ile Gln					
	260		265		270
Tyr Tyr Asn Ile Glu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Asp					
	275		280		285
Val Phe Glu Glu Gly Thr Thr Ala Leu Gly Glu Gly Tyr Glu Leu Ile					
	290		295		300
Lys Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Ala Thr Thr Pro Leu					
305		310		315	320
Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Ala Leu Lys Asn Tyr					
	325		330		335
Val Ser Lys Asn Met Met Ile Phe Leu Thr Tyr Asp Leu Arg					
	340		345		350
<210> 115					
<211> 351					
<212> PRT					
<213> 非洲猪瘟病毒					
<400> 115					
Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Arg Gln					
1	5		10		15
Cys Leu Pro Glu Asp Gln His Tyr Leu Leu Lys Cys Tyr Asp Leu Trp					
	20		25		30
Trp Asn Asn Ala Pro Ile Thr Phe Asp His Asn Leu Arg Leu Ile Lys					
	35		40		45
Leu Ala Gly Ile Gln Glu Gly Leu Asp Leu Asn Met Ala Leu Val Lys					
	50		55		60
Ala Val Lys Glu Asn Asn Tyr Ser Leu Ile Lys Leu Phe Thr Glu Trp					
65		70		75	80
Gly Ala Asn Ile Asn Tyr Gly Leu Ile Ser Val Asn Thr Glu His Thr					
	85		90		95
Trp Asp Leu Cys Arg Glu Leu Gly Ala Lys Lys Thr Leu Asn Glu Gly					
	100		105		110
Asp Ile Leu Gln Ile Phe Ile Asp Leu Lys Phe Tyr Lys Thr Ser Ser					
	115		120		125
Asn Ile Ile Leu Cys His Glu Val Phe Ser Asp Asn Leu Leu Leu Lys					
	130		135		140
Arg Val Asn Asn Leu Lys Met Arg Ile Glu Ile Phe Trp Glu Leu Arg					
145		150		155	160
Glu Ile Ile Glu Lys Thr Asp Leu Leu Asn Asn Glu Phe Ser Leu Asn					

	165							170					175			
Thr	Leu	Leu	Leu	Lys	Tyr	Trp	Tyr	Ala	Ile	Ala	Val	Arg	Tyr	Asn	Leu	
	180							185					190			
Lys	Glu	Ala	Ile	Gln	Tyr	Phe	Tyr	Gln	Lys	Tyr	Thr	His	Leu	Asn	Thr	
	195							200					205			
Trp	Arg	Leu	Thr	Cys	Ala	Leu	Cys	Phe	Asn	Asn	Val	Phe	Asp	Leu	His	
	210							215					220			
Glu	Ala	Tyr	Glu	Lys	Asp	Lys	Ile	Cys	Met	Asp	Leu	Glu	Glu	Met	Met	
225	230							235					240			
Arg	Ile	Ala	Cys	Ile	Lys	Asp	His	Asn	Leu	Ser	Thr	Ile	Tyr	Tyr	Cys	
	245							250					255			
Tyr	Met	Leu	Gly	Ala	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Ile	Gln	
	260							265					270			
Tyr	Tyr	Asn	Ile	Glu	Asn	Ile	Phe	Phe	Cys	Met	Asp	Leu	Gly	Ala	Asp	
	275							280					285			
Ala	Phe	Glu	Glu	Gly	Met	Ala	Leu	Val	Gly	Gln	Glu	Gly	Tyr	Glu	Pro	
	290							295					300			
Ile	Arg	Asn	Ile	Leu	Ser	Leu	Lys	Ile	Tyr	Ser	Pro	Ala	Thr	Thr	Pro	
305	310							315					320			
Leu	Pro	Lys	Ser	Thr	Asp	Pro	Glu	Ile	Ile	Asp	His	Ala	Leu	Lys	Asn	
	325							330					335			
Tyr	Phe	Ser	Lys	Asn	Met	Met	Val	Phe	Leu	Thr	Tyr	Asp	Leu	Arg		
	340							345					350			

<210> 116

<211> 351

<212> PRT

<213> 非洲猪瘟病毒

<400> 116

Met	Leu	Pro	Ser	Leu	Gln	Ser	Leu	Thr	Lys	Lys	Val	Leu	Ala	Gly	Gln
1			5						10					15	
Cys	Leu	Pro	Glu	Asp	Gln	His	Tyr	Leu	Leu	Lys	Cys	Tyr	Asp	Leu	Trp
	20								25					30	
Trp	Asn	Asn	Ala	Pro	Ile	Thr	Phe	Asp	His	Asn	Leu	Arg	Leu	Ile	Lys
	35								40					45	
Ser	Ala	Gly	Leu	Gln	Glu	Gly	Leu	Asp	Leu	Asn	Met	Ala	Leu	Val	Lys
	50								55					60	
Ala	Val	Lys	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu	Phe	Thr	Glu	Trp
65									70					75	80
Gly	Ala	Asn	Ile	Asn	Tyr	Gly	Leu	Ile	Ser	Val	Asn	Thr	Glu	His	Thr

	85		90		95
Trp Asp Leu Cys Arg Glu Leu Gly Ala Lys Lys Thr Leu Asn Glu Gly					
100		105		110	
Asp Ile Leu Gln Ile Phe Ile Asp Leu Lys Phe His Lys Thr Ser Ser					
115		120		125	
Asn Ile Ile Leu Cys His Glu Val Phe Ser Asp Asn Leu Leu Leu Lys					
130		135		140	
Lys Val Asn Asn Leu Lys Met Arg Ile Glu Ile Phe Trp Glu Leu Arg					
145		150		155	160
Glu Ile Ile Glu Lys Thr Asp Leu Leu Asn Asn Glu Phe Ser Leu Asn					
165		170		175	
Thr Leu Leu Leu Lys Tyr Trp Tyr Ala Ile Ala Val Arg Tyr Asn Leu					
180		185		190	
Lys Glu Ala Ile Gln Tyr Phe Tyr Gln Lys Tyr Thr His Leu Asn Thr					
195		200		205	
Trp Arg Leu Thr Cys Ala Leu Cys Phe Asn Asn Val Phe Asp Leu His					
210		215		220	
Glu Ala Tyr Glu Lys Asp Lys Ile Cys Met Asp Leu Glu Glu Met Met					
225		230		235	240
Arg Ile Ala Cys Ile Lys Asp His Ser Leu Ser Thr Ile Tyr Tyr Cys					
245		250		255	
Tyr Met Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Thr Ser Ile Gln					
260		265		270	
Tyr Tyr Asn Ile Glu Asn Ile Phe Phe Cys Met Asp Leu Gly Ala Asp					
275		280		285	
Ala Phe Glu Glu Gly Met Ala Leu Val Gly Gln Glu Gly Tyr Glu Pro					
290		295		300	
Ile Arg Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Ala Thr Thr Pro					
305		310		315	320
Leu Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Glu Leu Lys Asn					
325		330		335	
Tyr Phe Ser Lys Asn Met Met Val Phe Leu Thr Tyr Asp Leu Arg					
340		345		350	
<210> 117					
<211> 350					
<212> PRT					
<213> 非洲猪瘟病毒					
<400> 117					
Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln					

1	5	10	15
Cys Val Pro Thr Asn Gln His Tyr Leu Leu Lys Tyr Tyr Asp Leu Trp			
20	25	30	
Trp Tyr Asn Ala Pro Ile Thr Phe Asp His Asn Leu Arg Leu Ile Lys			
35	40	45	
Ser Ser Gly Ile Lys Glu Gly Leu Asp Leu Asn Thr Ala Leu Val Lys			
50	55	60	
Ala Val Arg Glu Asn Asn Tyr Ser Leu Ile Lys Leu Phe Thr Glu Trp			
65	70	75	80
Gly Ala Asp Ile Asn Tyr Gly Leu Val Ser Val Asn Thr Glu His Thr			
85	90	95	
Arg Asp Leu Cys Gln Glu Leu Gly Ala Lys Glu Ile Leu Asn Glu Glu			
100	105	110	
Glu Ile Leu Gln Ile Phe Ile Asp Leu Lys Phe His Lys Thr Ser Ser			
115	120	125	
Asn Ile Ile Leu Cys His Glu Val Phe Ser Asn Asn Pro Ile Leu Gln			
130	135	140	
Lys Val Asn Asn Leu Lys Leu Arg Ile Glu Ile Phe Trp Glu Leu Arg			
145	150	155	160
Glu Leu Ile Glu Lys Thr Asp Leu Leu Asn Asn Glu Phe Leu Leu Ser			
165	170	175	
Thr Leu Leu Leu Lys Tyr Trp Tyr Ala Ile Ala Val Arg Tyr Ser Leu			
180	185	190	
Lys Glu Ala Ile Gln Tyr Phe Tyr Gln Lys Tyr Thr His Leu Asn Thr			
195	200	205	
Trp Arg Leu Thr Cys Ala Leu Cys Phe Asn Asn Val Phe Asp Leu His			
210	215	220	
Glu Ala Tyr Glu Lys Asp Lys Ile His Met Asp Ile Glu Glu Met Met			
225	230	235	240
Arg Ile Ala Cys Ile Lys Asp His Asn Leu Ser Thr Met Tyr Tyr Cys			
245	250	255	
Tyr Met Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Thr Ser Ile Gln			
260	265	270	
Tyr Tyr Asn Ile Glu Asn Met Phe Phe Cys Met Asp Leu Gly Ala Asp			
275	280	285	
Val Phe Glu Glu Gly Thr Thr Ala Leu Gly Glu Gly Tyr Glu Leu Ile			
290	295	300	
Lys Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Thr Thr Ile Pro Leu			
305	310	315	320

Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Ala Leu Lys Asn Tyr
 325 330 335
 Phe Ser Lys Asn Met Met Ile Phe Leu Ser Tyr Asp Leu Arg
 340 345 350
 <210> 118
 <211> 349
 <212> PRT
 <213> 非洲猪瘟病毒
 <400> 118
 Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln
 1 5 10 15
 Cys Leu Pro Thr Asp Gln Tyr Tyr Leu Leu Lys Cys Tyr Asp Leu Trp
 20 25 30
 Trp Tyr Asp Ser Pro Ile Thr Phe Asp His Asn Leu Gly Leu Ile Lys
 35 40 45
 Ser Ala Gly Ile Lys Asp Gly Leu Asp Leu Asn Thr Ala Leu Val Lys
 50 55 60
 Ala Val Arg Glu Asn Asn Tyr Asn Leu Ile Lys Leu Phe Thr Glu Trp
 65 70 75 80
 Gly Ala Asp Ile Asn Tyr Gly Leu Val Ser Val Asn Thr Glu His Thr
 85 90 95
 Arg Asp Leu Cys Arg Glu Leu Gly Ala Lys Glu Thr Leu Asn Glu Glu
 100 105 110
 Glu Ile Leu Arg Ile Phe Ile Asp Leu Lys Phe Tyr Lys Thr Ser Ser
 115 120 125
 Asn Ile Ile Leu Cys His Glu Val Phe Ser Asn Asn Pro Leu Leu Gln
 130 135 140
 Lys Val Asn Asn Leu Lys Met Arg Ile Glu Ile Phe Trp Glu Leu Arg
 145 150 155 160
 Glu Leu Ile Lys Lys Thr Asp Leu Leu Asn Asn Glu Phe Ser Leu Asn
 165 170 175
 Thr Leu Leu Leu Lys Tyr Trp Tyr Ala Ile Ala Val Arg Tyr Asn Leu
 180 185 190
 Lys Glu Ala Ile Gln Tyr Phe Tyr Gln Lys Tyr Thr His Leu Asn Thr
 195 200 205
 Trp Arg Leu Thr Cys Ala Leu Cys Phe Asn Asn Val Phe Asp Leu His
 210 215 220
 Glu Ala Tyr Glu Lys Asp Lys Ile Tyr Met Asp Leu Glu Glu Met Met
 225 230 235 240

Arg Val Ala Cys Ile Lys Asp His Asn Leu Ser Thr Ile Tyr Tyr Cys			
245	250	255	
Tyr Val Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Ala Ser Ile Gln			
260	265	270	
Tyr Tyr Asn Ile Glu Asn Met Phe Phe Cys Met Asp Leu Gly Ala Asp			
275	280	285	
Val Phe Glu Glu Asn Met Pro Val Gly Glu Gly Tyr Glu Leu Ile Arg			
290	295	300	
Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Ser Thr Ala Pro Leu Pro			
305	310	315	320
Lys Asn Thr Asp Pro Glu Ile Ile Asp His Val Leu Lys Asn Tyr Lys			
325	330	335	
Ser Lys Asn Met Met Thr Phe Leu Ser Tyr Asp Leu Arg			
340	345		
<210> 119			
<211> 350			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 119			
Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln			
1	5	10	15
Cys Val Pro Thr Asn Gln His Tyr Leu Leu Lys Tyr Tyr Asp Leu Trp			
20	25	30	
Trp His Asp Ala Pro Ile Thr Phe Asp His Asn Leu Arg Leu Ile Lys			
35	40	45	
Ser Ala Gly Ile Lys Glu Gly Leu Asp Leu Asn Thr Ala Leu Val Lys			
50	55	60	
Ala Val Lys Glu Asn Asn Tyr Asn Leu Ile Lys Leu Phe Ala Glu Trp			
65	70	75	80
Gly Ala Asp Ile Asn Tyr Gly Leu Val Ser Val Ser Ser Glu His Thr			
85	90	95	
Trp Asp Leu Cys Arg Glu Leu Gly Ala Lys Glu Thr Leu Asn Glu Lys			
100	105	110	
Glu Ile Leu Gln Ile Phe Ile Asp Leu Lys Phe His Lys Thr Ser Ser			
115	120	125	
Asn Ile Ile Leu Cys His Glu Val Phe Ser Asn Asn Pro Ile Leu Gln			
130	135	140	
Lys Val Asn Asn Ile Lys Met Arg Ile Glu Ile Phe Trp Glu Leu Arg			
145	150	155	160

Glu Leu Ile Glu Lys Thr Asp Leu Leu Asn Asn Glu Phe Ser Leu Ser		
165	170	175
Thr Leu Leu Leu Lys Tyr Trp Tyr Ala Ile Ala Ile Arg Tyr Asn Leu		
180	185	190
Lys Glu Ala Ile Gln Tyr Phe Tyr Gln Lys Tyr Thr His Leu Asn Thr		
195	200	205
Trp Arg Leu Thr Cys Ala Leu Cys Phe Asn Asn Val Phe Asp Leu His		
210	215	220
Glu Ala Tyr Glu Lys Asp Lys Ile Tyr Met Asp Ile Glu Glu Met Met		
225	230	235
Arg Ile Ala Cys Ile Lys Asp His Asn Leu Ser Thr Met Tyr Tyr Cys		
245	250	255
Tyr Met Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Thr Ser Ile Gln		
260	265	270
Tyr Tyr Asn Ile Glu Asn Met Phe Phe Cys Met Asp Leu Gly Ala Asp		
275	280	285
Val Phe Glu Glu Gly Thr Thr Ala Leu Gly Glu Gly Tyr Glu Leu Ile		
290	295	300
Lys Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Thr Thr Ile Pro Leu		
305	310	315
Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Ala Leu Lys Asn Tyr		
325	330	335
Phe Ser Lys Asn Met Met Ile Phe Leu Ser Tyr Asp Leu Arg		
340	345	350

<210> 120

<211> 350

<212> PRT

<213> 非洲猪瘟病毒

<400> 120

Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln		
1	5	10
Cys Val Pro Thr Asn Gln His Tyr Leu Leu Lys Cys Tyr Asp Leu Trp		
20	25	30
Trp His Asp Gly Pro Ile Thr Phe Asp His Asn Leu Lys Leu Ile Lys		
35	40	45
Ser Ala Gly Ile Lys Glu Gly Leu Asp Leu Asn Thr Ala Leu Val Lys		
50	55	60
Ala Val Arg Glu Asn Asn Tyr Asn Leu Ile Lys Leu Phe Ala Glu Trp		
65	70	75
		80

Gly	Ala	Asn	Ile	Asn	Tyr	Gly	Leu	Val	Ser	Val	Asn	Thr	Glu	His	Thr
				85					90					95	
Trp	Asp	Leu	Cys	Arg	Glu	Leu	Gly	Ala	Lys	Glu	Thr	Leu	Asn	Glu	Glu
			100					105					110		
Glu	Ile	Leu	Gln	Ile	Phe	Ile	Asp	Leu	Lys	Phe	His	Lys	Thr	Ser	Ser
		115					120					125			
Asn	Ile	Ile	Leu	Cys	His	Glu	Val	Phe	Ser	Asn	Asn	Pro	Ile	Leu	Gln
		130					135					140			
Lys	Val	Asn	Asn	Ile	Lys	Met	Arg	Ile	Glu	Ile	Phe	Trp	Glu	Leu	Arg
145					150						155				160
Glu	Leu	Ile	Glu	Lys	Thr	Asp	Leu	Leu	Asn	Asn	Glu	Phe	Ser	Leu	Ser
				165					170					175	
Thr	Leu	Leu	Leu	Lys	Tyr	Trp	Tyr	Ala	Ile	Ala	Ile	Arg	Tyr	Asn	Leu
			180					185						190	
Lys	Glu	Ala	Ile	Gln	Tyr	Phe	Tyr	Gln	Lys	Tyr	Thr	His	Leu	Asn	Thr
		195						200					205		
Trp	Arg	Leu	Thr	Cys	Ala	Leu	Cys	Phe	Asn	Asn	Val	Phe	Asp	Leu	His
		210					215					220			
Glu	Ala	Tyr	Glu	Lys	Asp	Lys	Ile	His	Met	Asp	Ile	Glu	Glu	Met	Met
225					230					235					240
Arg	Ile	Ala	Cys	Ile	Lys	Asp	His	Asn	Leu	Ser	Thr	Met	Tyr	Tyr	Cys
			245						250					255	
Tyr	Val	Leu	Gly	Gly	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Ile	Gln
		260						265						270	
Tyr	Tyr	Asn	Ile	Glu	Asn	Met	Phe	Phe	Cys	Met	Asp	Leu	Gly	Ala	Asp
		275					280						285		
Ala	Phe	Glu	Glu	Gly	Thr	Ile	Ala	Leu	Gly	Glu	Gly	Tyr	Lys	Leu	Ile
		290					295					300			
Lys	Asn	Ile	Leu	Ser	Leu	Lys	Ile	Tyr	Ser	Pro	Ala	Thr	Thr	Pro	Leu
305					310					315					320
Pro	Lys	Ser	Thr	Asp	Pro	Glu	Ile	Ile	Asp	His	Ala	Leu	Lys	Asn	Tyr
			325						330					335	
Val	Ser	Lys	Asn	Met	Met	Ile	Phe	Leu	Thr	Tyr	Asp	Leu	Arg		
			340					345					350		

<210> 121
 <211> 350
 <212> PRT
 <213> 非洲猪瘟病毒
 <400> 121

Met	Leu	Pro	Ser	Leu	Gln	Ser	Leu	Thr	Lys	Lys	Val	Leu	Ala	Gly	Gln
1				5					10					15	
Cys	Val	Pro	Thr	Asn	Gln	His	Tyr	Leu	Leu	Lys	Cys	Tyr	Asp	Leu	Trp
			20					25					30		
Trp	His	Asp	Ala	Pro	Ile	Thr	Phe	Asp	His	Asn	Leu	Arg	Leu	Ile	Lys
		35					40					45			
Ser	Ala	Gly	Ile	Lys	Glu	Gly	Leu	Asn	Leu	Asn	Thr	Ala	Leu	Val	Lys
		50				55					60				
Ala	Val	Arg	Glu	Asn	Asn	Tyr	Asn	Leu	Ile	Lys	Leu	Phe	Ala	Glu	Trp
65				70						75				80	
Gly	Ala	Asp	Ile	Asn	Tyr	Gly	Leu	Val	Ser	Val	Asn	Thr	Glu	His	Thr
			85					90					95		
Trp	Asp	Leu	Cys	Arg	Glu	Leu	Gly	Ala	Lys	Glu	Thr	Leu	Asn	Glu	Glu
			100					105					110		
Glu	Ile	Leu	Gln	Ile	Phe	Ile	Asp	Leu	Lys	Phe	His	Lys	Thr	Ser	Ser
		115					120					125			
Asn	Ile	Ile	Leu	Cys	His	Glu	Val	Phe	Ser	Asn	Asn	Pro	Ile	Leu	Gln
		130				135						140			
Lys	Val	Asn	Asn	Ile	Lys	Met	Arg	Ile	Glu	Ile	Phe	Trp	Glu	Leu	Arg
145				150						155				160	
Glu	Leu	Ile	Glu	Lys	Thr	Asp	Leu	Leu	Asn	Asn	Glu	Phe	Ser	Leu	Ser
			165					170					175		
Thr	Leu	Leu	Leu	Lys	Tyr	Trp	Tyr	Ala	Ile	Ala	Ile	Arg	Tyr	Asn	Leu
			180					185					190		
Lys	Glu	Ala	Ile	Gln	Tyr	Phe	Tyr	Gln	Lys	Tyr	Thr	His	Leu	Asn	Thr
		195					200					205			
Trp	Arg	Leu	Thr	Cys	Ala	Leu	Cys	Phe	Asn	Asn	Val	Phe	Asp	Leu	His
		210				215					220				
Glu	Ala	Tyr	Glu	Lys	Asp	Lys	Ile	His	Met	Asp	Ile	Glu	Glu	Met	Met
225				230						235				240	
Arg	Ile	Ala	Cys	Ile	Lys	Asp	His	Asn	Leu	Ser	Thr	Met	Tyr	Tyr	Cys
			245					250					255		
Tyr	Val	Leu	Gly	Ala	Asn	Ile	Asn	Gln	Ala	Met	Leu	Ser	Ser	Ile	Gln
		260					265						270		
Tyr	Tyr	Asn	Ile	Glu	Asn	Met	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Ala	Asp
		275					280					285			
Val	Phe	Glu	Glu	Gly	Thr	Thr	Ala	Leu	Gly	Glu	Gly	Tyr	Glu	Leu	Ile
		290				295					300				
Lys	Asn	Ile	Leu	Ser	Leu	Lys	Ile	Tyr	Ser	Pro	Ala	Thr	Thr	Pro	Leu

305	310	315	320
Pro Lys Ser Met Asp	Pro Glu Ile Ile	Asp His Ala Leu Lys	Asn Tyr
	325	330	335
Val Ser Lys Asn Met	Met Ile Phe Leu Thr	Tyr Asp Leu Arg	
	340	345	350
<210> 122			
<211> 350			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 122			
Met Leu Pro Ser Leu Gln	Ser Leu Thr Lys Lys	Val Leu Ala Gly Gln	
1	5	10	15
Cys Val Pro Thr Asn Gln	His Tyr Leu Leu Lys	Cys Tyr Asp Leu Trp	
	20	25	30
Trp His Asp Gly Pro Ile	Thr Phe Asp His Asn	Leu Lys Leu Ile Lys	
	35	40	45
Ser Ala Gly Ile Lys Glu	Gly Leu Asp Leu Asn	Thr Ala Leu Val Lys	
	50	55	60
Ala Val Arg Glu Asn Asn	Tyr Asn Leu Ile Lys	Leu Phe Ala Glu Trp	
65	70	75	80
Gly Ala Asp Ile Asn Tyr	Gly Leu Val Ser Val	Asn Thr Glu His Thr	
	85	90	95
Arg Asp Leu Cys Arg Glu	Leu Gly Ala Lys Glu	Thr Leu Asn Glu Glu	
	100	105	110
Glu Ile Leu Gln Ile Phe	Ile Asp Leu Lys Phe	His Lys Thr Ser Ser	
	115	120	125
Asn Ile Ile Leu Cys His	Glu Val Phe Ser Asn	Asn Pro Ile Leu Gln	
	130	135	140
Lys Val Asn Asn Ile Lys	Met Arg Ile Glu Ile	Phe Trp Glu Leu Arg	
145	150	155	160
Glu Leu Ile Glu Lys Thr	Asp Leu Leu Asn Asn	Glu Phe Ser Leu Ser	
	165	170	175
Thr Leu Leu Leu Lys Tyr	Trp Tyr Ala Ile Ala	Ile Arg Tyr Asn Leu	
	180	185	190
Lys Glu Ala Ile Gln Tyr	Phe Tyr Gln Lys Tyr	Thr His Leu Asn Thr	
	195	200	205
Trp Arg Leu Thr Cys Ala	Leu Cys Phe Asn Asn	Val Phe Asp Leu His	
	210	215	220
Glu Ala Tyr Glu Lys Asp	Lys Ile Tyr Met Asp	Ile Glu Glu Met Met	

225	230	235	240
Arg Ile Ala Cys Ile Lys Asp His Asn Leu Ser Thr Met Tyr Tyr Cys			
	245	250	255
Tyr Val Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Thr Ser Ile Gln			
	260	265	270
Tyr Tyr Asn Val Glu Asn Met Phe Phe Cys Met Asp Leu Gly Ala Asp			
	275	280	285
Ala Phe Glu Glu Gly Thr Ile Ala Leu Gly Glu Gly Tyr Lys Leu Ile			
	290	295	300
Lys Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Ala Thr Thr Pro Leu			
305	310	315	320
Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Ala Val Lys Asn Tyr			
	325	330	335
Val Ser Lys Asn Met Met Ile Phe Leu Thr Tyr Asp Leu Arg			
	340	345	350
<210> 123			
<211> 350			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 123			
Met Leu Pro Ser Leu Gln Ser Leu Thr Lys Lys Val Leu Ala Gly Gln			
1	5	10	15
Cys Val Pro Thr Asn Gln His Tyr Leu Leu Lys Cys Tyr Asp Leu Trp			
	20	25	30
Trp His Asp Gly Pro Ile Thr Phe Asp His Asn Leu Lys Leu Ile Lys			
	35	40	45
Ser Ala Gly Ile Lys Glu Gly Leu Asp Leu Asn Thr Ala Leu Val Lys			
	50	55	60
Ala Val Arg Glu Asn Asn Tyr Asn Leu Ile Lys Leu Phe Ala Glu Trp			
65	70	75	80
Gly Ala Asn Ile Asn Tyr Gly Leu Val Ser Val Asn Thr Glu His Thr			
	85	90	95
Arg Asp Leu Cys Arg Glu Leu Gly Ala Lys Glu Thr Leu Asn Glu Glu			
	100	105	110
Glu Ile Leu Gln Ile Phe Ile Asp Leu Lys Phe His Lys Thr Ser Ser			
	115	120	125
Asn Ile Ile Leu Cys His Glu Val Phe Ser Asn Asn Pro Ile Leu Gln			
	130	135	140
Lys Val Asn Asn Ile Lys Met Arg Ile Glu Ile Phe Trp Glu Leu Arg			

145	150	155	160
Glu Leu Ile Glu Lys Thr Asp Leu Leu Asn Asn Glu Phe Ser Leu Ser			
	165	170	175
Ala Leu Leu Leu Lys Tyr Trp Tyr Ala Ile Ala Ile Arg Tyr Asn Leu			
	180	185	190
Lys Glu Ala Ile Gln Tyr Phe Tyr Gln Lys Tyr Thr His Leu Asn Thr			
	195	200	205
Trp Arg Leu Thr Cys Ala Leu Cys Phe Asn Asn Val Phe Asp Leu His			
	210	215	220
Glu Ala Tyr Glu Lys Asp Lys Ile His Met Asp Ile Glu Glu Met Met			
225	230	235	240
Arg Ile Ala Cys Ile Lys Asp His Asn Leu Ser Thr Met Tyr Tyr Cys			
	245	250	255
Tyr Val Leu Gly Ala Asn Ile Asn Gln Ala Met Leu Thr Ser Ile Gln			
	260	265	270
Tyr Tyr Asn Ile Glu Asn Met Phe Phe Cys Met Asp Leu Gly Ala Asp			
	275	280	285
Ala Phe Glu Glu Gly Thr Ile Ala Leu Gly Glu Gly Tyr Lys Leu Ile			
	290	295	300
Lys Asn Ile Leu Ser Leu Lys Ile Tyr Ser Pro Ala Thr Thr Pro Leu			
305	310	315	320
Pro Lys Ser Thr Asp Pro Glu Ile Ile Asp His Ala Leu Lys Asn Tyr			
	325	330	335
Val Ser Lys Asn Met Met Ile Phe Leu Thr Tyr Asp Leu Arg			
	340	345	350
<210> 124			
<211> 353			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 124			
Met Ser Leu Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala			
1	5	10	15
Ser Gln Cys Leu Ser Ile Asp Glu His Cys Ile Leu Lys Tyr Cys Gly			
	20	25	30
Leu Trp Trp His Asp Ala Pro Leu Lys Leu Cys Met Asp Arg Gly Arg			
	35	40	45
Ile Gln Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu Arg Val			
	50	55	60
Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Ser Leu Ile Lys Leu			

65	70	75	80
Phe Thr Glu Trp Gly Ala Asn Ile Asn Tyr Ser Leu Leu Ser Ile Asn			
	85	90	95
Thr Lys His Ile Arg Glu Leu Cys Arg Gln Leu Gly Ala Lys Glu Thr			
	100	105	110
Leu Glu Asp Asn Asp Ile Phe Arg Ile Phe Thr Arg Ile Met His Asn			
	115	120	125
Lys Thr Ser Gly Ser Ile Ile Leu Cys His Glu Ile Phe Met Asn Asn			
	130	135	140
Pro Met Leu Glu Asn Lys Phe Val Ile Gln Leu Arg Gly Leu Ile Tyr			
145	150	155	160
Lys Arg Leu Trp Gly Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Asn			
	165	170	175
Asp Leu Leu Val Lys Tyr Trp Tyr Ala Lys Ala Val Gln Tyr Val Cys			
	180	185	190
Lys Asn Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Asp Leu Asn Glu			
	195	200	205
Trp Arg Leu Lys Cys Leu Leu Tyr Tyr Asn Lys Ile Tyr Glu Leu His			
	210	215	220
Glu Met Tyr His Lys Lys Lys Val Gln Ile Asp Val His Asp Met Ile			
225	230	235	240
Cys Leu Ala Cys Ala Lys Asp Asn Asn Leu Leu Thr Ile Tyr Tyr Cys			
	245	250	255
Tyr Ala Leu Gly Gly Asn Ile Asn Gln Ala Met Leu Thr Ser Val Gln			
	260	265	270
Tyr Tyr Asn Val Gly Asn Ile Phe Phe Cys Ile Asp Leu Gly Gly Asn			
	275	280	285
Ala Phe Glu Glu Gly Arg Ala Ile Ala Glu Gln Lys Gly Tyr Asn Phe			
	290	295	300
Leu Ser His Ser Leu Thr Leu Asp Ile Tyr Ser Ser Asp Ala Ser Leu			
305	310	315	320
Pro Leu Asn Leu Lys Asp Pro Glu Lys Ile Ser Ser Leu Leu Lys Asp			
	325	330	335
Tyr Lys Ser Lys Asn Leu Ser Ile Ile Trp Glu Tyr Ser His Asn Ile			
	340	345	350
Leu			
<210> 125			
<211> 353			
<212> PRT			

<213> 非洲猪瘟病毒

<400> 125

Met	Ser	Leu	Pro	Leu	Ser	Leu	Gln	Thr	Leu	Val	Lys	Lys	Thr	Ile	Ala
1				5					10					15	
Ser	Gln	Cys	Leu	Ser	Ile	Asp	Glu	His	Cys	Ile	Leu	Lys	Tyr	Cys	Gly
			20					25						30	
Leu	Trp	Trp	His	Asp	Ala	Pro	Leu	Lys	Leu	Cys	Met	Asp	Arg	Gly	Arg
			35					40						45	
Ile	Gln	Ile	Lys	Ser	Gly	Phe	Leu	Gly	Glu	Asp	Ile	Asp	Leu	Arg	Val
			50				55							60	
Ala	Leu	Ile	Ile	Ala	Val	Lys	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu
65					70					75					80
Phe	Thr	Glu	Trp	Gly	Ala	Asn	Ile	Asn	Tyr	Gly	Leu	Leu	Ser	Ile	Asn
					85					90					95
Thr	Lys	His	Ile	Arg	Glu	Leu	Cys	Arg	Gln	Leu	Gly	Ala	Lys	Glu	Thr
					100					105					110
Leu	Glu	Asp	Asn	Asp	Ile	Phe	Arg	Ile	Phe	Thr	Arg	Ile	Met	His	Asn
					115										125
Lys	Thr	Ser	Gly	Ser	Ile	Ile	Leu	Cys	His	Glu	Ile	Phe	Met	Asn	Asn
Pro	Ile	Leu	Glu	Asn	Lys	Phe	Val	Ile	Gln	Leu	Arg	Gly	Leu	Ile	Tyr
145						150									160
Lys	Arg	Leu	Trp	Gly	Leu	Ile	Glu	Ile	Lys	Glu	Thr	Asp	Glu	Leu	Asn
Gly	Leu	Leu	Val	Lys	Tyr	Trp	Tyr	Ala	Lys	Ala	Val	Gln	Tyr	Asp	Cys
Lys	Asp	Ala	Ile	Cys	Phe	Leu	Asp	Glu	Lys	Tyr	Thr	Asp	Leu	Asn	Glu
Trp	Arg	Leu	Lys	Cys	Leu	Leu	Tyr	Tyr	Asn	Lys	Ile	Tyr	Glu	Leu	His
Glu	Met	Tyr	His	Lys	Glu	Asn	Ile	Gln	Ile	Asp	Val	His	Asp	Met	Ile
225															240
Cys	Leu	Ala	Ser	Thr	Lys	Asp	Asn	Asn	Pro	Leu	Thr	Ile	Tyr	Tyr	Cys
Tyr	Ala	Leu	Gly	Gly	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Val	Gln
Tyr	Tyr	Asn	Ile	Gly	Asn	Ile	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Gly	Asn
Ala	Phe	Glu	Glu	Gly	Arg	Ala	Ile	Ala	Glu	Gln	Lys	Gly	Tyr	Asn	Phe

290	295	300
Leu Ser His Ser Leu Ala Leu Asp Ile Tyr Ser Ser Asp Ala Ser Leu		
305	310	315
Pro Leu Asn Leu Lys Asp Pro Glu Glu Ile Ser Ser Leu Leu Lys Asp		
325	330	335
Tyr Lys Ser Lys Asn Leu Ser Ile Ile Trp Glu Tyr Ser His Asn Ile		
340	345	350
Leu		
<210> 126		
<211> 352		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 126		
Met Ser Ser Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala		
1	5	10
Gly Thr Ser Cys Leu Ser Ile Asp Glu His Ile Leu Lys Tyr Cys Gly		
20	25	30
Leu Trp Trp His Asp Ala Pro Leu Lys Leu Tyr Ile Asp Arg Gly Arg		
35	40	45
Ile Tyr Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu Cys Val		
50	55	60
Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Ser Met Ile Lys Leu		
65	70	75
Phe Thr Glu Trp Gly Ala Tyr Ile Asn Tyr Ser Leu Leu Ser Ile Asn		
85	90	95
Thr Lys His Ala Arg Asp Leu Cys Arg Gln Leu Gly Ala Lys Glu Thr		
100	105	110
Leu Asp Asp Tyr Asp Ile Phe Cys Ile Phe Asn Lys Ile Met His Asn		
115	120	125
Lys Thr Ser Gly Ser Ile Ile Leu Cys His Glu Ile Phe Ile Asn Asn		
130	135	140
Pro Asn Leu Glu Asn Asn Phe Ala Ala Gln Leu Arg Arg Leu Ile Tyr		
145	150	155
Lys Arg Leu Cys Gly Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Ser		
165	170	175
Glu Leu Leu Val Lys Tyr Trp Tyr Ala Asn Ala Val Gln Tyr Asp His		
180	185	190
Lys Asp Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Asp Leu Asp Glu		
195	200	205

Trp	Leu	Lys	Cys	Tyr	Leu	Cys	Tyr	Asn	Lys	Ile	Tyr	Glu	Leu	His	Asp
210								215					220		
Ile	Tyr	His	Lys	Glu	Lys	Ile	Gln	Ile	Asp	Val	Asn	Glu	Met	Leu	Ser
225						230				235					240
Leu	Ala	Cys	Ile	Arg	Asp	Asn	Asn	Leu	Leu	Thr	Ile	Tyr	Tyr	Cys	Tyr
				245						250				255	
Ala	Leu	Gly	Gly	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Val	Gln	Tyr
				260						265				270	
Tyr	Asn	Ile	Gly	Asn	Ile	Tyr	Phe	Cys	Ile	Asp	Leu	Gly	Gly	Asn	Ala
				275						280				285	
Phe	Glu	Glu	Gly	Ser	Ala	Ile	Ala	Arg	Gln	Asn	Gly	Tyr	Asn	Phe	Leu
				290						295				300	
Ser	His	Ser	Leu	Val	Leu	Asn	Ile	Tyr	Ser	Ser	Asp	Ala	Ser	Leu	Pro
305						310					315				320
Leu	Asn	Leu	Lys	Asp	Pro	Glu	Glu	Ile	Ser	Ser	Leu	Leu	Lys	Asn	Tyr
				325							330			335	
Lys	Ser	Lys	Asn	Leu	Ser	Ile	Ile	Leu	Asp	Tyr	Ser	His	Lys	Ile	Leu
				340						345				350	

<210> 127
 <211> 353
 <212> PRT
 <213> 非洲猪瘟病毒
 <400> 127

Met	Ser	Ser	Pro	Leu	Ser	Leu	Gln	Thr	Leu	Val	Lys	Lys	Thr	Val	Ala
1				5					10					15	
Ser	Thr	Ser	Cys	Leu	Ser	Ile	Asp	Glu	His	Ile	Leu	Lys	Tyr	Cys	Gly
				20					25					30	
Leu	Trp	Trp	His	Asp	Ala	Pro	Leu	Lys	Leu	Tyr	Ile	Asp	Arg	Gly	Arg
				35					40					45	
Ile	Tyr	Ile	Lys	Ser	Gly	Phe	Leu	Gly	Glu	Asp	Ile	Asp	Leu	Cys	Val
				50					55					60	
Ala	Leu	Ile	Ile	Ala	Val	Lys	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu
65						70					75				80
Phe	Thr	Glu	Trp	Gly	Ala	Tyr	Ile	Asn	Tyr	Ser	Leu	Leu	Ser	Ile	Asn
				85							90			95	
Thr	Lys	His	Ala	Arg	Asp	Leu	Cys	Arg	Gln	Leu	Gly	Ala	Lys	Glu	Thr
				100						105				110	
Leu	Asp	Asp	Tyr	Asp	Ile	Phe	Cys	Ile	Phe	Asn	Lys	Ile	Met	His	Asn
				115						120				125	

Lys Thr Ser Gly Ser Ile Ile Leu Cys His Glu Ile Phe Ile Asn Asn
 130 135 140
 Pro Lys Leu Glu Asn Asn Phe Ala Ala Gln Leu Arg Arg Leu Ile Tyr
 145 150 155 160
 Lys Arg Leu Cys Gly Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Ser
 165 170 175
 Glu Leu Leu Val Lys Tyr Trp Tyr Ala Asn Ala Val Gln Tyr Asp His
 180 185 190
 Lys Asp Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Asp Leu Asp Glu
 195 200 205
 Trp Arg Leu Lys Cys Tyr Leu Cys Tyr Asn Lys Ile Tyr Glu Leu His
 210 215 220
 Asp Ile Tyr His Lys Lys Lys Ile Gln Ile Asp Val Asn Glu Met Leu
 225 230 235 240
 Ser Leu Ala Cys Ile Arg Asp Asn Asn Leu Leu Thr Ile Tyr Tyr Cys
 245 250 255
 Tyr Ala Leu Gly Gly Asn Ile Asn Gln Ala Met Leu Thr Ser Val Gln
 260 265 270
 Tyr Tyr Asn Ile Gly Asn Ile Tyr Phe Cys Ile Asp Leu Gly Gly Asn
 275 280 285
 Ala Phe Glu Glu Gly Ser Ala Ile Ala Arg Gln Asn Gly Tyr Asn Phe
 290 295 300
 Leu Cys His Ser Leu Ile Leu Asn Ile Tyr Ser Ser Asp Ala Ser Leu
 305 310 315 320
 Pro Leu Asn Leu Lys Val Pro Glu Glu Ile Ser Ser Leu Leu Lys Asn
 325 330 335
 Tyr Lys Ser Lys Asn Leu Ser Ile Ile Leu Asp Tyr Ser His Lys Ile
 340 345 350

Leu

<210> 128

<211> 353

<212> PRT

<213> 非洲猪瘟病毒

<400> 128

Met Ser Leu Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala
 1 5 10 15
 Ser Gln Cys Leu Ser Ile Asp Glu His Cys Ile Leu Lys Tyr Cys Gly
 20 25 30
 Leu Trp Trp His Asp Ala Pro Leu Lys Leu Cys Met Asp Arg Gly Arg

35	40	45
Ile Gln Ile Lys Ser Gly Phe	Leu Gly Glu Asp Ile	Asp Leu Arg Val
50	55	60
Ala Leu Ile Ile Ala Val Lys	Glu Asn Asn Tyr Ser	Leu Ile Lys Leu
65	70	75
Phe Thr Glu Trp Gly Ala Asn	Ile Asn Tyr Ser Leu	Leu Ser Ile Asn
85	90	95
Thr Lys His Ile Arg Glu Leu	Cys Arg Gln Leu Gly	Ala Lys Glu Thr
100	105	110
Leu Glu Asp Asn Asp Ile Phe	Arg Ile Phe Thr Arg	Ile Met His Asn
115	120	125
Lys Thr Ser Gly Ser Ile Ile	Leu Cys His Glu Ile	Phe Met Asn Asn
130	135	140
Pro Met Leu Glu Asn Lys Phe	Val Ile Gln Leu Arg	Gly Leu Ile Tyr
145	150	155
Lys Arg Leu Trp Gly Leu Ile	Glu Ile Lys Glu Thr	Asp Glu Leu Asn
165	170	175
Asp Leu Leu Val Lys Tyr Trp	Tyr Ala Lys Ala Val	Gln Tyr Val Cys
180	185	190
Lys Asn Ala Ile Cys Phe Leu	Asp Glu Lys Tyr Thr	Asp Leu Asn Glu
195	200	205
Trp Arg Leu Lys Cys Leu Leu	Tyr Tyr Asn Lys Ile	Tyr Glu Leu His
210	215	220
Glu Met Tyr His Lys Lys Lys	Val Gln Ile Asp Val	His Asp Met Ile
225	230	235
Cys Leu Ala Cys Ala Lys Asp	Asn Asn Leu Leu Thr	Ile Tyr Tyr Cys
245	250	255
Tyr Ala Leu Gly Gly Asn Ile	Asn Gln Ala Met Leu	Thr Ser Val Gln
260	265	270
Tyr Tyr Asn Val Gly Asn Ile	Phe Phe Cys Ile Asp	Leu Gly Gly Asn
275	280	285
Ala Phe Glu Glu Gly Arg Ala	Ile Ala Glu Gln Lys	Gly Tyr Asn Phe
290	295	300
Leu Ser His Ser Leu Thr Leu	Asp Ile Tyr Ser Ser	Asp Ala Ser Leu
305	310	315
Pro Leu Asn Leu Lys Asp Pro	Glu Lys Ile Ser Ser	Leu Leu Lys Asp
325	330	335
Tyr Lys Ser Lys Asn Leu Ser	Ile Ile Trp Glu Tyr	Ser His Asn Ile
340	345	350

Leu
 <210> 129
 <211> 353
 <212> PRT
 <213> 非洲猪瘟病毒
 <400> 129
 Met Ser Ala Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala
 1 5 10 15
 Ser Thr Ser Cys Leu Ser Ile Asp Glu His Ile Leu Lys Tyr Cys Asp
 20 25 30
 Leu Trp Trp His Asp Ala Pro Leu Lys Leu Tyr Met Asp Arg Gly Arg
 35 40 45
 Ile Gln Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu Cys Val
 50 55 60
 Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Asn Leu Ile Lys Leu
 65 70 75 80
 Phe Thr Glu Leu Gly Ala Asn Ile Asn Tyr Ser Leu Leu Ser Ile Asn
 85 90 95
 Thr Lys His Val Arg Asp Leu Cys Arg Gln Leu Gly Ala Lys Glu Thr
 100 105 110
 Leu Glu Asp Tyr Asp Ile Phe Cys Ile Phe Asn Lys Ile Met His Asn
 115 120 125
 Lys Thr Ser Gly Ser Val Ile Leu Cys His Glu Ile Phe Ile Asn Asn
 130 135 140
 Pro Asn Leu Glu Asn Lys Phe Ala Ala Gln Leu Arg Arg Leu Ile Tyr
 145 150 155 160
 Lys Arg Leu Cys Gly Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Ser
 165 170 175
 Glu Leu Leu Val Lys Tyr Trp Tyr Ala Lys Ala Val Gln Tyr Asp Tyr
 180 185 190
 Lys Asp Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Asp Leu Asn Glu
 195 200 205
 Trp Arg Leu Lys Cys Tyr Leu Tyr Tyr Asn Lys Ile Tyr Glu Leu His
 210 215 220
 Asp Ile Tyr His Lys Glu Lys Ile Gln Ile Asp Val Asn Glu Met Leu
 225 230 235 240
 Ser Leu Ala Cys Ile Arg Asp Asn Asn Pro Leu Thr Ile Tyr Tyr Cys
 245 250 255
 Tyr Ala Leu Gly Gly Asn Ile Asn Gln Ala Met Leu Thr Ser Val Gln

260	265	270
Tyr Tyr Asn Ile Gly Asn Ile Tyr Phe Cys Ile Asp Leu Gly Gly Asn		
275	280	285
Ala Phe Glu Glu Gly Ser Ala Ile Ala Arg Gln Lys Gly Tyr Asn Phe		
290	295	300
Leu Ser His Ser Leu Val Leu Asn Ile Tyr Ser Ser Asp Ala Ser Leu		
305	310	315
Pro Leu Asn Leu Lys Asp Pro Glu Glu Ile Ser Ser Leu Leu Lys Asn		
325	330	335
Tyr Lys Ser Lys Asn Leu Ser Ile Ile Leu Asp Tyr Ser His Asn Ile		
340	345	350
Leu		
<210> 130		
<211> 353		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 130		
Met Ser Leu Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala		
1	5	10
Ser Gln Cys Leu Ser Ile Asp Glu His Cys Ile Leu Lys Tyr Cys Gly		
20	25	30
Leu Trp Trp His Asp Ala Pro Leu Lys Leu Cys Met Asp Arg Gly Arg		
35	40	45
Ile Gln Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu Arg Val		
50	55	60
Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Ser Leu Ile Lys Leu		
65	70	75
Phe Thr Glu Trp Gly Ala Asn Ile Asn Tyr Ser Leu Leu Ser Ile Asn		
85	90	95
Thr Lys His Ile Arg Glu Leu Cys Arg Gln Leu Gly Ala Lys Glu Thr		
100	105	110
Leu Glu Asp Asn Asp Ile Phe Arg Ile Phe Thr Arg Ile Met His Asn		
115	120	125
Lys Thr Ser Gly Ser Ile Ile Leu Cys His Glu Ile Phe Met Asn Asn		
130	135	140
Pro Ile Leu Glu Asn Lys Phe Val Ile Gln Leu Arg Gly Leu Ile Tyr		
145	150	155
Lys Arg Leu Trp Gly Leu Ile Glu Ile Lys Glu Thr Asp Lys Leu Asn		
165	170	175

Met	Ser	Leu	Pro	Leu	Ser	Leu	Gln	Thr	Leu	Val	Lys	Lys	Thr	Val	Ala
1				5					10					15	
Ser	Gln	Cys	Leu	Ser	Ile	Asp	Glu	His	Cys	Ile	Leu	Lys	His	Cys	Gly
			20					25					30		
Leu	Trp	Trp	His	Asp	Val	Pro	Leu	Lys	Leu	Cys	Met	Asp	Arg	Gly	Gln
		35					40					45			
Ile	Gln	Ile	Lys	Ser	Gly	Phe	Leu	Gly	Glu	Asp	Ile	Asp	Leu	His	Ile
	50					55					60				
Ala	Leu	Ile	Ile	Ala	Val	Lys	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu
65					70					75					80
Phe	Thr	Glu	Trp	Gly	Ala	His	Ile	Asn	Tyr	Ser	Leu	Leu	Ser	Ile	Asn

				85				90				95			
Thr	Glu	His	Ile	Arg	Glu	Leu	Cys	Arg	Gln	Leu	Gly	Ala	Lys	Glu	Thr
				100				105				110			
Leu	Glu	Asp	Asp	Asp	Val	Phe	Arg	Ile	Phe	Thr	Lys	Ile	Met	His	Asn
				115				120				125			
Lys	Thr	Ser	Gly	Arg	Ile	Ile	Leu	Cys	His	Asp	Ile	Phe	Met	Asn	Asn
				130				135				140			
Pro	Asn	Ile	Glu	Asn	Lys	Phe	Thr	Ile	Gln	Leu	Arg	Gly	Leu	Ile	Cys
145				150				155				160			
Lys	Arg	Leu	Trp	Gly	Leu	Ile	Glu	Ile	Lys	Glu	Thr	Asp	Glu	Leu	Asn
				165				170				175			
Asp	Leu	Leu	Val	Lys	Tyr	Trp	Tyr	Ala	Lys	Ala	Val	Gln	Tyr	Glu	Cys
				180				185				190			
Lys	Asp	Ala	Ile	Cys	Phe	Leu	Glu	Glu	Lys	Tyr	Thr	Asp	Leu	Asn	Glu
				195				200				205			
Trp	Arg	Leu	Lys	Cys	Leu	Leu	Tyr	Phe	Asn	Lys	Ile	Tyr	Glu	Leu	His
				210				215				220			
Glu	Met	Tyr	His	Lys	Glu	Lys	Val	Gln	Ile	Asp	Val	His	Asp	Met	Ile
225				230				235				240			
Cys	Leu	Ala	Ser	Thr	Lys	Asp	Asn	Asn	Pro	Leu	Thr	Ile	Tyr	Tyr	Cys
				245				250				255			
Tyr	Ala	Leu	Gly	Gly	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Ile	Gln
				260				265				270			
Tyr	Tyr	Asn	Ile	Gly	Asn	Ile	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Gly	Asn
				275				280				285			
Ala	Phe	Glu	Glu	Gly	Arg	Ala	Ile	Ala	Glu	Gln	Lys	Gly	Tyr	Asn	Phe
290				295				300							
Leu	Ser	His	Ser	Leu	Ala	Leu	Asp	Ile	Phe	Ser	Ser	Asp	Ala	Ser	Leu
305				310				315				320			
Pro	Leu	Asn	Leu	Lys	Asp	Pro	Glu	Glu	Ile	Ser	Ser	Phe	Leu	Lys	Asp
				325				330				335			
Tyr	Lys	Ser	Lys	Asn	Leu	Ser	Ile	Ile	Trp	Glu	Tyr	Ser	His	Asn	Ile
				340				345				350			

Leu

<210> 132

<211> 353

<212> PRT

<213> 非洲猪瘟病毒

<400> 132

Met	Ser	Leu	Pro	Leu	Ser	Leu	Gln	Thr	Leu	Val	Lys	Lys	Thr	Val	Ala
1				5					10					15	
Asn	Gln	Ser	Leu	Ser	Ile	Asp	Glu	His	Cys	Ile	Leu	Lys	His	Cys	Gly
			20					25					30		
Leu	Trp	Trp	His	Asp	Val	Pro	Leu	Lys	Leu	Cys	Met	Asp	Arg	Gly	Gln
		35					40					45			
Ile	Gln	Ile	Lys	Ser	Gly	Phe	Leu	Gly	Glu	Asp	Ile	Asp	Leu	His	Ile
	50					55					60				
Ala	Leu	Ile	Ile	Ala	Val	Lys	Glu	Asn	Asn	Tyr	Ser	Leu	Ile	Lys	Leu
65					70					75					80
Phe	Thr	Glu	Trp	Gly	Ala	Asn	Ile	Asn	Tyr	Ser	Leu	Leu	Ser	Ile	Asn
				85					90					95	
Thr	Lys	His	Ile	Arg	Glu	Leu	Cys	Arg	Gln	Leu	Gly	Ala	Lys	Glu	Thr
			100						105					110	
Leu	Glu	Asp	Asp	Asp	Ile	Phe	Arg	Ile	Phe	Thr	Lys	Ile	Met	His	Asn
		115						120					125		
Lys	Thr	Ser	Gly	Ser	Ile	Ile	Leu	Cys	His	Asp	Ile	Phe	Met	Asn	Asn
	130					135						140			
Pro	Asn	Ile	Glu	Asp	Lys	Phe	Thr	Ile	Gln	Leu	Arg	Gly	Leu	Ile	Tyr
145					150					155					160
Lys	Arg	Leu	Trp	Gly	Leu	Ile	Glu	Ile	Lys	Glu	Thr	Asp	Glu	Leu	Asn
				165					170					175	
Gly	Leu	Leu	Val	Lys	Tyr	Trp	Tyr	Ala	Lys	Ala	Val	Gln	Tyr	Glu	Cys
			180					185					190		
Lys	Asp	Ala	Ile	Cys	Phe	Leu	Asp	Glu	Lys	Tyr	Thr	Asp	Leu	Asn	Glu
		195						200					205		
Trp	Arg	Leu	Lys	Cys	Leu	Leu	Tyr	Tyr	Asn	Lys	Ile	Tyr	Glu	Leu	His
		210				215						220			
Glu	Met	Tyr	His	Lys	Glu	Asn	Ile	Gln	Ile	Asp	Val	His	Asp	Met	Ile
225					230					235					240
Cys	Leu	Ala	Ser	Thr	Lys	Asp	Asn	Asn	Pro	Leu	Thr	Ile	Tyr	Tyr	Cys
				245					250					255	
Tyr	Ala	Leu	Gly	Gly	Asn	Ile	Asn	Gln	Ala	Met	Leu	Thr	Ser	Val	Gln
			260					265						270	
Tyr	Tyr	Asn	Ile	Gly	Asn	Ile	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Gly	Asn
		275					280						285		
Ala	Phe	Glu	Glu	Gly	Arg	Ala	Ile	Ala	Glu	Gln	Lys	Gly	Tyr	Asn	Phe
	290					295						300			
Leu	Ser	His	Ser	Leu	Ala	Leu	Asp	Ile	Tyr	Ser	Ser	Asp	Ala	Ser	Leu

305	310	315	320
Pro Leu Asn Leu Lys Asp Pro Glu Glu Ile Ser Ser Leu Leu Lys Asp			
	325	330	335
Tyr Lys Ser Lys Asn Leu Ser Ile Ile Trp Glu Tyr Ser His Asn Ile			
	340	345	350
Leu			
<210> 133			
<211> 353			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 133			
Met Ser Leu Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala			
1	5	10	15
Ser Gln Cys Leu Ser Thr Asp Glu His Cys Ile Leu Lys His Cys Gly			
	20	25	30
Leu Trp Trp His Asp Val Pro Leu Lys Leu Cys Met Asp Arg Gly Gln			
	35	40	45
Ile Gln Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu His Val			
	50	55	60
Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Ser Leu Ile Lys Leu			
65	70	75	80
Phe Thr Glu Trp Gly Ala His Ile Asn Tyr Ser Leu Leu Ser Ile Asn			
	85	90	95
Thr Glu His Ile Arg Glu Leu Cys Arg Gln Leu Gly Ala Lys Lys Thr			
	100	105	110
Leu Glu Asp Asn Asp Ile Phe Arg Ile Phe Thr Lys Ile Met His Asn			
	115	120	125
Lys Thr Ser Gly Arg Ile Ile Leu Cys His Glu Ile Phe Met Asn Asn			
	130	135	140
Pro Asn Ile Glu Asn Lys Phe Thr Ile Gln Leu Arg Gly Leu Ile Cys			
145	150	155	160
Lys Arg Leu Trp Arg Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Asn			
	165	170	175
Asp Leu Leu Val Lys Tyr Trp Tyr Ala Lys Ala Val Gln Tyr Glu Cys			
	180	185	190
Lys Asp Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Gly Leu Asn Glu			
	195	200	205
Trp Arg Leu Lys Cys Leu Leu Tyr Tyr Asn Lys Ile Tyr Glu Leu His			
	210	215	220

Glu Met Tyr His Lys Asp Lys Val Gln Ile Asp Val His Asp Met Ile
 225 230 235 240
 Cys Leu Ala Ser Thr Lys Asp Asn Asn Pro Leu Thr Ile Tyr Tyr Cys
 245 250 255
 Tyr Ala Leu Gly Gly Asn Ile Asn Gln Ala Met Leu Thr Ser Val Gln
 260 265 270
 Tyr Tyr Asn Ile Gly Asn Ile Phe Phe Cys Ile Asp Leu Gly Gly Asn
 275 280 285
 Ala Phe Glu Glu Gly Arg Ala Ile Ala Glu Gln Lys Gly Tyr His Phe
 290 295 300
 Leu Ser His Ser Leu Ala Leu Asp Ile Tyr Ser Ser Asp Ala Ser Leu
 305 310 315 320
 Pro Leu Asn Leu Lys Asp Pro Glu Glu Ile Ser Ser Leu Leu Lys Gly
 325 330 335
 Tyr Lys Ser Lys Asn Leu Ser Ile Ile Trp Glu Tyr Ser His Asn Ile
 340 345 350

Leu

<210> 134

<211> 353

<212> PRT

<213> 非洲猪瘟病毒

<400> 134

Met Ser Leu Pro Leu Ser Leu Gln Thr Leu Val Lys Lys Thr Val Ala
 1 5 10 15
 Ser Gln Cys Leu Ser Thr Asp Glu His Cys Ile Leu Lys His Cys Gly
 20 25 30
 Leu Trp Trp His Asp Val Pro Leu Lys Leu Cys Met Asp Arg Gly Gln
 35 40 45
 Ile Gln Ile Lys Ser Gly Phe Leu Gly Glu Asp Ile Asp Leu His Ile
 50 55 60
 Ala Leu Ile Ile Ala Val Lys Glu Asn Asn Tyr Ser Leu Ile Lys Leu
 65 70 75 80
 Phe Thr Glu Trp Gly Ala His Ile Asn Tyr Ser Leu Leu Ser Ile Asn
 85 90 95
 Thr Glu His Ile Arg Glu Leu Cys Arg Gln Leu Gly Ala Lys Glu Thr
 100 105 110
 Leu Glu Asp Asn Asp Ile Phe Arg Ile Phe Thr Lys Ile Met His Asn
 115 120 125
 Lys Thr Ser Gly Arg Ile Ile Leu Cys His Glu Ile Phe Met Asn Asn

130	135	140
Pro Asn Ile Glu Asn Lys Phe Thr Ile Gln Leu Arg Gly Leu Ile Cys		
145	150	155
Lys Arg Leu Trp Gly Leu Ile Glu Ile Lys Glu Thr Asp Glu Leu Asn		
165	170	175
Asp Leu Leu Val Lys Tyr Trp Tyr Ala Lys Ala Val Gln Tyr Glu Cys		
180	185	190
Lys Asp Ala Ile Cys Phe Leu Asp Glu Lys Tyr Thr Asp Leu Asn Glu		
195	200	205
Trp Arg Leu Lys Cys Leu Leu Tyr Tyr Asn Lys Ile Tyr Glu Leu His		
210	215	220
Glu Met Tyr His Lys Glu Lys Val Gln Ile Asp Val His Asp Met Ile		
225	230	235
Cys Leu Ala Ser Thr Lys Asp Asn Asn Pro Leu Thr Ile Tyr Tyr Cys		
245	250	255
Tyr Ala Leu Gly Gly Asn Ile Asn Gln Ala Met Leu Thr Ser Val Gln		
260	265	270
Tyr Tyr Asn Ile Gly Asn Ile Phe Phe Cys Ile Asp Leu Gly Gly Asn		
275	280	285
Ala Phe Glu Glu Gly Arg Ala Ile Ala Glu Gln Lys Gly Tyr His Phe		
290	295	300
Leu Ser His Ser Leu Thr Leu Asp Ile Tyr Ser Ser Asp Ala Ser Leu		
305	310	315
Pro Leu Asn Leu Lys Asp Pro Glu Glu Ile Ser Ser Leu Leu Lys Asp		
325	330	335
Tyr Lys Ser Lys Asn Leu Ser Ile Ile Trp Glu Tyr Ser His Asn Ile		
340	345	350

Leu

<210> 135

<211> 357

<212> PRT

<213> 非洲猪瘟病毒

<400> 135

Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr		
1	5	10
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp		
20	25	30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Val Phe Ser		
35	40	45

Tyr	Lys	His	Leu	Gln	Cys	Phe	Ser	Glu	Asp	Asp	Leu	Cys	Leu	Glu	Ala
50						55					60				
Ala	Leu	Val	Lys	Ala	Val	Lys	Ser	Asp	Asn	Leu	Glu	Leu	Ile	Arg	Leu
65				70					75					80	
Phe	Val	Asp	Trp	Gly	Ala	Asn	Pro	Glu	Tyr	Gly	Leu	Ile	Arg	Val	Pro
			85					90					95		
Ala	Val	Tyr	Leu	Lys	Arg	Leu	Cys	Ala	Glu	Leu	Gly	Gly	Leu	Thr	Pro
			100					105					110		
Val	Ser	Glu	Pro	Arg	Leu	Leu	Glu	Ile	Leu	Lys	Glu	Val	Ala	Asn	Leu
			115					120					125		
Lys	Ser	Cys	Ala	Gly	Val	Leu	Leu	Gly	Tyr	Asp	Met	Phe	Cys	His	Asn
			130					135				140			
Pro	Leu	Leu	Glu	Thr	Val	Thr	Arg	Thr	Thr	Leu	Asp	Thr	Val	Thr	Tyr
145					150					155					160
Thr	Cys	Ser	Asn	Ile	Pro	Leu	Thr	Gly	Asp	Thr	Ala	His	Leu	Leu	Leu
				165					170					175	
Thr	Lys	Phe	Trp	Phe	Ala	Leu	Ala	Leu	Arg	His	Asn	Phe	Thr	Lys	Ala
			180						185					190	
Ile	His	Tyr	Phe	Tyr	Lys	Arg	His	Lys	Asn	Gln	Leu	Tyr	Trp	Arg	Val
			195					200						205	
Ala	Cys	Ser	Leu	Tyr	Phe	Asn	Asn	Ile	Phe	Asp	Ile	His	Glu	Leu	Cys
			210					215					220		
Arg	Glu	Lys	Glu	Ile	Cys	Ile	Ser	Pro	Asn	Leu	Met	Met	Lys	Phe	Ala
225					230					235					240
Cys	Leu	Arg	Glu	Lys	Asn	Tyr	Ala	Ala	Ile	Tyr	Tyr	Cys	His	Arg	Leu
				245					250					255	
Gly	Ala	Ser	Leu	Asp	Tyr	Gly	Met	Asn	Leu	Ser	Ile	Tyr	Asn	Asn	Asn
			260					265						270	
Thr	Leu	Asn	Met	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Ala	Ala	Asp	Phe	Asp
			275					280					285		
Arg	Ala	Gln	Leu	Ile	Ala	His	Lys	Ala	Tyr	Met	Tyr	Asn	Leu	Ser	Asn
			290					295					300		
Ile	Phe	Leu	Val	Lys	Gln	Leu	Phe	Ser	Arg	Asp	Val	Thr	Leu	Val	Leu
305					310					315					320
Asp	Val	Thr	Glu	Pro	Gln	Glu	Ile	Tyr	Asp	Met	Leu	Lys	Thr	Tyr	Thr
				325					330					335	
Ser	Lys	Asn	Met	Lys	Arg	Ala	Glu	Glu	Tyr	Leu	Thr	Ala	His	Pro	Glu
			340						345					350	
Ile	Ile	Val	Ile	Asp											

355

<210> 136

<211> 357

<212> PRT

<213> 非洲猪瘟病毒

<400> 136

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Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr
1           5           10           15
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp
           20           25           30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Val Phe Ser
           35           40           45
Tyr Lys His Leu Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala
           50           55           60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu
65           70           75           80
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro
           85           90           95
Ala Val Tyr Leu Lys Arg Leu Cys Ala Glu Leu Gly Gly Leu Thr Pro
           100          105          110
Val Ser Glu Pro Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Arg Leu
           115          120          125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn
           130          135          140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asp Thr Val Thr Tyr
145          150          155          160
Thr Cys Ser Asn Ile Pro Leu Thr Gly Asp Thr Ala His His Leu Leu
           165          170          175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala
           180          185          190
Ile His Tyr Phe Tyr Lys Arg His Lys Asn His Leu Tyr Trp Arg Val
           195          200          205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Ile His Glu Leu Cys
           210          215          220
Arg Glu Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala
225          230          235          240
Cys Leu Arg Glu Lys Asn Tyr Ala Ala Ile Tyr Tyr Cys His Arg Leu
           245          250          255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn

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260	265	270
Thr Leu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Ala Asp Phe Asp		
275	280	285
Arg Ala Gln Leu Ile Ala His Lys Ala Tyr Met Tyr Asn Leu Ser Asn		
290	295	300
Ile Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Val Thr Leu Val Leu		
305	310	315
Asp Val Thr Glu Pro Gln Glu Ile Tyr Asp Met Leu Lys Thr Tyr Thr		
325	330	335
Ser Lys Asn Leu Lys Arg Ala Glu Glu Tyr Leu Thr Ala His Pro Glu		
340	345	350
Ile Ile Val Ile Asp		
355		
<210> 137		
<211> 357		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 137		
Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr		
1	5	10
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp		
20	25	30
Asp Leu Gly Pro Ile His Leu Cys Asn Thr Cys Lys Gln Ile Phe Ser		
35	40	45
Tyr Gln His Leu Gln Cys Phe Ser Val Asp Asp Leu Cys Leu Asp Ala		
50	55	60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu		
65	70	75
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro		
85	90	95
Ala Val His Leu Lys Arg Leu Cys Thr Glu Leu Gly Gly Leu Thr Pro		
100	105	110
Val Ser Glu Ser Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Asp Leu		
115	120	125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn		
130	135	140
Pro Leu Met Glu Thr Val Thr Arg Thr Thr Leu Asn Thr Val Met Tyr		
145	150	155
Thr Arg Ser Lys Ile Pro Leu Thr Gly Asp Thr Ala His Leu Leu Leu		

				165				170				175			
Thr	Lys	Phe	Trp	Phe	Ala	Leu	Ala	Leu	Arg	His	Asn	Phe	Thr	Lys	Ala
				180				185				190			
Ile	His	Tyr	Phe	Tyr	Glu	Lys	His	Lys	Asn	Gln	Leu	Tyr	Trp	Arg	Leu
				195				200				205			
Thr	Cys	Ser	Leu	Tyr	Phe	Asn	Asn	Ile	Phe	Asp	Leu	His	Glu	Leu	Cys
				210				215				220			
Ser	Lys	Lys	Glu	Ile	Cys	Ile	Ser	Pro	Asn	Leu	Met	Met	Lys	Phe	Ala
225				230				235				240			
Cys	Leu	Arg	Glu	Glu	Asn	Tyr	Ala	Ala	Ile	Tyr	Tyr	Cys	His	Met	Leu
				245				250				255			
Gly	Ala	Ser	Pro	Asp	Tyr	Gly	Met	Asn	Leu	Ser	Ile	Tyr	Asn	Asn	Asn
				260				265				270			
Thr	Leu	Asn	Leu	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Ala	Thr	Asn	Phe	Asp
				275				280				285			
Arg	Ala	Arg	Leu	Ile	Ala	His	Arg	Val	Tyr	Met	Tyr	Asn	Leu	Ser	Asn
				290				295				300			
Ile	Phe	Leu	Val	Lys	Gln	Leu	Phe	Ser	Arg	Asp	Ala	Ser	Leu	Val	Leu
305				310				315				320			
Asn	Ile	Thr	Glu	Pro	Gln	Ala	Ile	Tyr	Asp	Met	Leu	Lys	Thr	Tyr	Thr
				325				330				335			
Ser	Lys	Asn	Leu	Lys	Arg	Ala	Glu	Glu	Tyr	Phe	Thr	Ala	His	Pro	Glu
				340				345				350			
Ile	Val	Val	Ile	Asp											
355															

$\langle 400 \rangle$ 138

Met	Leu	Ser	Leu	Gln	Thr	Leu	Ala	Lys	Lys	Val	Val	Ala	Cys	Asn	Tyr
1				5					10					15	
Leu	Ser	Ser	Asp	Tyr	Asp	Tyr	Thr	Leu	Gln	Arg	Phe	Gly	Leu	Trp	Trp
			20					25					30		
Asp	Leu	Gly	Pro	Ile	His	Leu	Cys	Asn	Thr	Cys	Lys	Gln	Ile	Phe	Ser
		35					40					45			
Tyr	Gln	His	Leu	Gln	Cys	Phe	Ser	Glu	Asp	Asp	Leu	Cys	Leu	Asp	Ala
	50					55					60				
Ala	Leu	Val	Lys	Ala	Val	Lys	Ser	Asp	Asn	Leu	Glu	Leu	Ile	Arg	Leu

65	70	75	80
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro			
	85	90	95
Ala Val Asp Leu Lys Arg Leu Cys Thr Glu Leu Gly Gly Leu Thr Pro			
	100	105	110
Val Ser Glu Ser Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Asp Leu			
	115	120	125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn			
	130	135	140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asn Thr Val Met Tyr			
145	150	155	160
Thr Arg Ser Lys Ile Pro Leu Thr Gly Asp Thr Ala His Leu Leu Leu			
	165	170	175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala			
	180	185	190
Ile His Tyr Phe Tyr Glu Lys His Lys Asn Gln Leu Tyr Trp Arg Leu			
	195	200	205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Leu His Glu Leu Cys			
	210	215	220
Ser Lys Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala			
225	230	235	240
Cys Leu Arg Glu Glu Asn Tyr Ala Ala Ile Tyr Tyr Cys His Met Leu			
	245	250	255
Gly Ala Ser Pro Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn			
	260	265	270
Thr Leu Asn Leu Phe Phe Cys Ile Asp Leu Gly Ala Thr Asn Phe Asp			
	275	280	285
Arg Ala Arg Leu Ile Ala His Arg Val Tyr Met Tyr Asn Leu Ser Asn			
	290	295	300
Ile Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Ala Ser Leu Val Leu			
305	310	315	320
Asn Ile Thr Glu Pro Gln Ala Ile Tyr Asp Met Leu Lys Thr Tyr Thr			
	325	330	335
Ser Lys Asn Leu Lys Arg Ala Glu Glu Tyr Phe Thr Ala His Pro Glu			
	340	345	350
Ile Val Val Ile Asp			
	355		
<210> 139			
<211> 357			

<212> PRT

<213> 非洲猪瘟病毒

<400> 139

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Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr
1           5           10           15
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp
           20           25           30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Val Phe Ser
           35           40           45
Tyr Lys His Leu Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala
           50           55           60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu
65           70           75           80
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro
           85           90           95
Ala Val Tyr Leu Lys Arg Leu Cys Ala Glu Leu Gly Gly Leu Thr Pro
           100          105          110
Val Ser Glu Pro Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Asn Leu
           115          120          125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn
           130          135          140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asp Thr Val Thr Tyr
145          150          155          160
Thr Cys Ser Asn Ile Pro Leu Thr Gly Asp Thr Ala His Leu Leu Leu
           165          170          175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala
           180          185          190
Ile His Tyr Phe Tyr Lys Arg His Lys Asn Gln Leu Tyr Trp Arg Val
           195          200          205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Ile His Glu Leu Cys
           210          215          220
Arg Glu Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala
225          230          235          240
Cys Leu Arg Glu Lys Asn Tyr Ala Ala Ile Tyr Tyr Cys His Arg Leu
           245          250          255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn
           260          265          270
Thr Leu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Ala Asp Phe Asp
           275          280          285

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Arg	Ala	Gln	Leu	Ile	Ala	His	Lys	Ala	Tyr	Met	Tyr	Asn	Leu	Ser	Asn
290							295					300			
Ile	Phe	Leu	Val	Lys	Gln	Leu	Phe	Ser	Arg	Asp	Val	Thr	Leu	Val	Leu
305					310					315					320
Asp	Val	Thr	Glu	Pro	Gln	Glu	Ile	Tyr	Asp	Met	Leu	Lys	Thr	Tyr	Thr
				325					330					335	
Ser	Lys	Asn	Met	Lys	Arg	Ala	Glu	Glu	Tyr	Leu	Thr	Ala	His	Pro	Glu
			340					345					350		
Ile	Ile	Val	Ile	Asp											
355															
<210>	140														
<211>	357														
<212>	PRT														
<213>	非洲猪瘟病毒														
<400>	140														
Met	Leu	Ser	Leu	Gln	Thr	Leu	Ala	Lys	Lys	Val	Val	Ala	Cys	Asn	Tyr
1			5					10					15		
Leu	Ser	Ser	Asp	Tyr	Asp	Tyr	Thr	Leu	Gln	Arg	Phe	Gly	Leu	Trp	Trp
			20					25					30		
Asp	Leu	Gly	Pro	Ile	His	Leu	Cys	Asn	Thr	Cys	Lys	Gln	Ile	Phe	Ser
			35				40					45			
Tyr	Lys	His	Leu	Gln	Cys	Phe	Ser	Glu	Asp	Asp	Leu	Cys	Leu	Glu	Ala
			50				55				60				
Ala	Leu	Val	Lys	Ala	Val	Lys	Ser	Asp	Asn	Leu	Glu	Leu	Ile	Arg	Leu
65				70						75				80	
Phe	Val	Asp	Trp	Gly	Ala	Asn	Pro	Glu	Tyr	Gly	Leu	Ile	Arg	Val	Pro
				85					90					95	
Ala	Val	His	Leu	Lys	Arg	Leu	Cys	Met	Glu	Leu	Gly	Gly	Leu	Thr	Pro
			100					105					110		
Val	Ser	Glu	Ser	Arg	Leu	Leu	Glu	Ile	Leu	Lys	Glu	Val	Ala	Asp	Leu
			115					120					125		
Lys	Ser	Cys	Ala	Gly	Val	Leu	Leu	Gly	Tyr	Asp	Met	Phe	Cys	His	Asn
			130					135				140			
Pro	Leu	Leu	Glu	Thr	Val	Thr	Arg	Thr	Thr	Leu	Asp	Thr	Val	Met	Tyr
145				150						155				160	
Thr	Arg	Ser	Lys	Ile	Pro	Leu	Thr	Gly	Asp	Thr	Ala	His	Leu	Leu	Leu
				165					170				175		
Ser	Lys	Phe	Trp	Phe	Ala	Leu	Ala	Leu	Arg	His	Asn	Phe	Thr	Lys	Ala
			180						185				190		

Ile His Tyr Phe Tyr Glu Lys His Lys Asn Gln Leu Tyr Trp Arg Leu		
195	200	205
Thr Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Leu His Glu Leu Cys		
210	215	220
Cys Lys Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala		
225	230	235 240
Cys Leu Arg Glu Glu Asn Tyr Ala Ala Ile Tyr Tyr Cys His Met Leu		
	245	250 255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn		
	260	265 270
Thr Leu Asn Leu Phe Phe Cys Ile Asp Leu Gly Ala Thr Asn Phe Asp		
	275	280 285
Arg Ala Arg Leu Ile Ala Arg Arg Val Tyr Met Tyr Asn Leu Ser Asn		
	290	295 300
Leu Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Val Ser Leu Ile Leu		
305	310	315 320
Asp Leu Thr Glu Pro Gln Ala Ile Tyr Asp Met Leu Asn Thr Tyr Thr		
	325	330 335
Ser Lys Asn Leu Lys Gln Ala Glu Glu Tyr Phe Thr Ala His Pro Glu		
	340	345 350
Ile Val Val Ile Asp		
355		

<210> 141

<211> 357

<212> PRT

<213> 非洲猪瘟病毒

<400> 141

Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr		
1	5	10 15
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp		
	20	25 30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Val Phe Ser		
	35	40 45
Tyr Lys His Leu Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala		
	50	55 60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu		
65	70	75 80
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro		
	85	90 95

Ala Val Tyr Leu Lys Arg Leu Cys Ala Glu Leu Gly Gly Leu Thr Pro		
100	105	110
Val Ser Glu Pro Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Asn Leu		
115	120	125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn		
130	135	140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asp Thr Val Thr Tyr		
145	150	155
Thr Cys Ser Asn Ile Pro Leu Thr Gly Asp Thr Ala His Leu Leu Leu		
165	170	175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala		
180	185	190
Ile His Tyr Phe Tyr Lys Arg His Lys Asn Gln Leu Tyr Trp Arg Val		
195	200	205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Ile His Glu Leu Cys		
210	215	220
Arg Glu Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala		
225	230	235
Cys Leu Arg Glu Lys Asn Tyr Ala Ala Ile Tyr Tyr Cys His Arg Leu		
245	250	255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn		
260	265	270
Thr Leu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Ala Asp Phe Asp		
275	280	285
Arg Ala Gln Leu Ile Ala His Lys Ala Tyr Met Tyr Asn Leu Ser Asn		
290	295	300
Ile Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Val Thr Leu Val Leu		
305	310	315
Asp Val Thr Glu Pro Gln Glu Ile Tyr Asp Met Leu Lys Thr Tyr Thr		
325	330	335
Ser Lys Asn Met Lys Arg Ala Glu Glu Tyr Leu Thr Ala His Pro Glu		
340	345	350
Ile Ile Val Ile Asp		
355		
<210> 142		
<211> 357		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 142		

Met	Leu	Ser	Leu	Gln	Thr	Leu	Ala	Lys	Lys	Val	Val	Ala	Cys	Asn	Tyr
1				5					10					15	
Leu	Ser	Ser	Asp	Tyr	Asp	Tyr	Thr	Leu	Gln	Arg	Phe	Gly	Leu	Trp	Trp
			20					25					30		
Asp	Leu	Gly	Pro	Ile	His	Leu	Cys	Asn	Asn	Cys	Lys	Gln	Ile	Phe	Ser
		35					40					45			
Tyr	Lys	His	Leu	Gln	Cys	Phe	Ser	Glu	Asp	Asp	Leu	Cys	Leu	Glu	Ala
	50					55					60				
Ala	Leu	Val	Lys	Ala	Val	Lys	Ser	Asp	Asn	Leu	Glu	Leu	Ile	Arg	Leu
65				70					75					80	
Phe	Val	Asp	Trp	Gly	Ala	Asn	Pro	Glu	Tyr	Gly	Leu	Ile	Arg	Val	Pro
			85					90					95		
Ala	Val	His	Leu	Lys	Arg	Leu	Cys	Thr	Glu	Leu	Gly	Gly	Leu	Thr	Pro
			100					105					110		
Val	Thr	Glu	Pro	Arg	Leu	Leu	Glu	Ile	Leu	Lys	Glu	Val	Ala	Lys	Leu
		115					120					125			
Lys	Ser	Cys	Ala	Gly	Val	Leu	Leu	Gly	Tyr	Asp	Met	Phe	Cys	His	Asn
	130					135					140				
Pro	Leu	Leu	Glu	Thr	Val	Thr	Arg	Thr	Thr	Leu	Asp	Thr	Val	Thr	Tyr
145				150						155				160	
Thr	Cys	Ser	Asn	Ile	Pro	Leu	Thr	Gly	Asp	Thr	Ala	His	Leu	Leu	Leu
			165					170					175		
Thr	Lys	Phe	Trp	Phe	Ala	Leu	Ala	Leu	Arg	His	Asn	Phe	Thr	Lys	Ala
		180						185					190		
Ile	His	Tyr	Phe	Tyr	Lys	Arg	His	Lys	Asn	His	Leu	Tyr	Trp	Arg	Val
	195					200					205				
Ala	Cys	Ser	Leu	Tyr	Phe	Asn	Asn	Ile	Phe	Asp	Ile	His	Glu	Leu	Cys
	210					215				220					
Arg	Glu	Lys	Glu	Ile	Cys	Ile	Ser	Pro	Asn	Leu	Met	Met	Lys	Phe	Ala
225				230						235				240	
Cys	Leu	Gln	Lys	Lys	Asn	Tyr	Ala	Ala	Ile	Tyr	Tyr	Cys	Tyr	Arg	Leu
			245					250					255		
Gly	Ala	Ser	Leu	Asp	Tyr	Gly	Met	Asn	Leu	Ser	Ile	Tyr	Asn	Asn	Asn
		260						265				270			
Thr	Leu	Asn	Met	Phe	Phe	Cys	Ile	Asp	Leu	Gly	Ala	Thr	Asp	Phe	Asp
	275						280					285			
Arg	Ala	Gln	His	Ile	Ala	His	Lys	Ala	Tyr	Met	Tyr	Asn	Leu	Ser	Asn
	290					295				300					
Ile	Phe	Leu	Val	Lys	Gln	Leu	Phe	Ser	Arg	Asp	Val	Thr	Leu	Ala	Leu

305	310	315	320
Asp Val Thr Glu Pro Gln Glu Ile Tyr Asp Arg Leu Lys Ser Tyr Thr			
	325	330	335
Ser Lys Asn Leu Lys Arg Ala Glu Glu Tyr Leu Thr Ala His Pro Glu			
	340	345	350
Ile Ile Val Ile Asp			
355			
<210> 143			
<211> 357			
<212> PRT			
<213> 非洲猪瘟病毒			
<400> 143			
Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr			
1	5	10	15
Leu Ser Ser Asp Tyr Asp Tyr Thr Leu Gln Arg Phe Gly Leu Trp Trp			
	20	25	30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Ile Phe Ser			
	35	40	45
Tyr Lys His Val Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala			
	50	55	60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu			
65	70	75	80
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro			
	85	90	95
Ala Val His Leu Lys Arg Leu Cys Thr Glu Leu Gly Gly Leu Thr Pro			
	100	105	110
Val Ser Glu Ser Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Arg Leu			
	115	120	125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn			
	130	135	140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asp Thr Val Thr Tyr			
145	150	155	160
Thr Cys Ser Asn Ile Pro Leu Thr Gly Asp Thr Ala His His Leu Leu			
	165	170	175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala			
	180	185	190
Ile His Tyr Phe Tyr Lys Arg His Lys Asn His Leu Tyr Trp Arg Val			
	195	200	205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Ile His Glu Leu Cys			

210	215	220
Arg Glu Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala		
225	230	235
Cys Leu Gln Lys Lys Asn Tyr Ala Ala Ile Tyr Tyr Cys Tyr Arg Leu		240
245	250	255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn		
260	265	270
Thr Leu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Thr Asp Phe Asp		
275	280	285
Arg Ala Gln Arg Ile Ala His Lys Ala Tyr Met Tyr Asn Leu Ser Asn		
290	295	300
Ile Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Val Thr Leu Ala Leu		
305	310	315
Asp Val Thr Glu Pro Gln Glu Ile Tyr Asp Met Leu Lys Ser Tyr Thr		
325	330	335
Ser Lys Asn Leu Lys Arg Ala Glu Glu Tyr Leu Thr Ala His Pro Glu		
340	345	350
Ile Ile Val Ile Asp		
355		
<210> 144		
<211> 357		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 144		
Met Leu Ser Leu Gln Thr Leu Ala Lys Lys Val Val Ala Cys Asn Tyr		
1	5	10
Leu Ser Ser Asp Tyr Asp Tyr Met Leu Gln Arg Phe Gly Leu Trp Trp		15
20	25	30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Ile Phe Ser		
35	40	45
Tyr Lys His Leu Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala		
50	55	60
Ala Leu Val Lys Ala Val Lys Arg Asp Asn Leu Glu Leu Ile Arg Leu		
65	70	75
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Cys Val Pro		
85	90	95
Thr Val His Leu Lys Arg Leu Cys Thr Glu Leu Gly Gly Leu Thr Pro		
100	105	110
Val Ser Glu Pro Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Asn Leu		

115	120	125
Lys Ser Cys Ala Gly Val Leu	Leu Gly Tyr Asp Met	Phe Cys Tyr Asn
130	135	140
Pro Leu Leu Glu Thr Ile Thr	Arg Thr Thr Leu Asp Thr	Val Met Tyr
145	150	155
Ser Cys Ser Lys Ile Pro Leu	Met Gly Asp Thr Ala His	His Leu Leu
165	170	175
Thr Lys Phe Trp Phe Ala Leu	Ala Leu Arg His Asn Phe	Thr Lys Ala
180	185	190
Ile His Tyr Phe Tyr Lys Arg	His Lys Asn His Leu Tyr	Trp Arg Val
195	200	205
Ala Cys Ser Leu Tyr Phe Asn	Asn Ile Phe Asp Ile His	Glu Leu Cys
210	215	220
Arg Glu Lys Glu Ile Cys Ile	Ser Pro Asn Leu Met Met	Lys Phe Ala
225	230	235
Cys Leu Arg Glu Lys Asn Tyr	Ala Ala Ile Tyr Tyr Cys	Tyr Arg Leu
245	250	255
Gly Ala Ser Leu Asp Tyr Gly	Met Asn Leu Ser Ile Tyr	Asn Asn Asn
260	265	270
Ser Leu Asn Leu Phe Phe Cys	Ile Asp Leu Gly Ala Thr	Asp Phe Asp
275	280	285
Arg Ala Gln Arg Ile Ala His	Lys Ala Tyr Met Tyr Asn	Leu Ser Asn
290	295	300
Ile Leu Leu Val Lys Gln Leu	Phe Ser Arg Asp Val Thr	Leu Ala Leu
305	310	315
Asp Val Thr Glu Pro Gln Glu	Ile Tyr Asp Arg Leu Lys	Ala Tyr Thr
325	330	335
Ser Lys Asn Met Lys Arg Ala	Glu Glu Tyr Leu Thr Ala	His Pro Glu
340	345	350
Ile Ile Val Ile Asp		
355		
<210> 145		
<211> 357		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 145		
Met Leu Ser Leu Gln Thr Leu	Ala Lys Lys Val Val Ala	Cys Asn Tyr
1	5	10
15		
Leu Ser Ser Asp Tyr Asp Tyr	Met Leu Gln Arg Phe Gly	Leu Trp Trp

20	25	30
Asp Leu Gly Pro Ile His Leu Cys Asn Asn Cys Lys Gln Ile Phe Ser		
35	40	45
Tyr Lys His Leu Gln Cys Phe Ser Glu Asp Asp Leu Cys Leu Glu Ala		
50	55	60
Ala Leu Val Lys Ala Val Lys Ser Asp Asn Leu Glu Leu Ile Arg Leu		
65	70	75
Phe Val Asp Trp Gly Ala Asn Pro Glu Tyr Gly Leu Ile Arg Val Pro		
85	90	95
Ala Val His Leu Lys Arg Leu Cys Thr Glu Leu Gly Gly Leu Thr Pro		
100	105	110
Val Ser Glu Pro Arg Leu Leu Glu Ile Leu Lys Glu Val Ala Lys Leu		
115	120	125
Lys Ser Cys Ala Gly Val Leu Leu Gly Tyr Asp Met Phe Cys His Asn		
130	135	140
Pro Leu Leu Glu Thr Val Thr Arg Thr Thr Leu Asp Thr Val Thr Tyr		
145	150	155
Thr Cys Ser Asn Ile Pro Leu Thr Gly Asp Thr Ala His His Leu Leu		
165	170	175
Thr Lys Phe Trp Phe Ala Leu Ala Leu Arg His Asn Phe Thr Lys Ala		
180	185	190
Ile His Tyr Phe Tyr Lys Arg His Lys Asn His Leu Tyr Trp Arg Val		
195	200	205
Ala Cys Ser Leu Tyr Phe Asn Asn Ile Phe Asp Ile His Glu Leu Cys		
210	215	220
Arg Glu Lys Glu Ile Cys Ile Ser Pro Asn Leu Met Met Lys Phe Ala		
225	230	235
Cys Leu Arg Lys Lys Asn Tyr Ala Ala Ile Tyr Tyr Cys Tyr Arg Leu		
245	250	255
Gly Ala Ser Leu Asp Tyr Gly Met Asn Leu Ser Ile Tyr Asn Asn Asn		
260	265	270
Thr Leu Asn Met Phe Phe Cys Ile Asp Leu Gly Ala Thr Asp Phe Asp		
275	280	285
Arg Ala Gln Arg Ile Ala His Lys Thr Tyr Met Tyr Asn Leu Ser Asn		
290	295	300
Ile Phe Leu Val Lys Gln Leu Phe Ser Arg Asp Val Thr Leu Ala Leu		
305	310	315
Asp Val Thr Glu Pro Gln Glu Ile Tyr Asp Met Leu Lys Ser Tyr Thr		
325	330	335

Ser Lys Asn Leu Lys Arg Ala Glu Glu Tyr Leu Thr Ala His Pro Glu
 340 345 350
 Ile Ile Val Ile Asp
 355
 <210> 146
 <211> 531
 <212> PRT
 <213> 非洲猪瘟病毒
 <400> 146
 Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys
 1 5 10 15
 Leu Pro Glu Phe Phe Asp Asp Tyr Ile Leu Gln Leu Leu Gly Leu Tyr
 20 25 30
 Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu
 35 40 45
 Ile Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala
 50 55 60
 Ala Ser Glu Glu Asn Tyr Glu Ile Val Gly Leu Leu Leu Ala Trp Glu
 65 70 75 80
 Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg Tyr
 85 90 95
 Asn Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Asp Ile
 100 105 110
 Leu Pro Phe Ile Asp Asp Pro Ile Ile Phe His Lys Cys His Ile Met
 115 120 125
 Arg Arg Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser
 130 135 140
 Lys Phe Arg Val Leu Leu Tyr Phe Lys Tyr Thr Leu Glu Asp Asp Leu
 145 150 155 160
 Pro Leu Val His Leu Leu Ile Glu Lys Ala Cys Glu Asp His Asn Tyr
 165 170 175
 Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Val Cys His Ile Ile
 180 185 190
 Asp Thr Phe Asp Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys
 195 200 205
 Leu Gly Tyr Thr Phe Ile Tyr Asn Arg Ile Val Pro Tyr Lys Tyr His
 210 215 220
 His Leu Asp Ile Leu Ile Leu Ser Ser Leu Gln Leu Leu His Lys Val
 225 230 235 240

Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp		
	245	250 255
His Asn Ile Asp Asn Leu Asp Val Ile Leu Thr Gln Ala Ala Thr Tyr		
	260	265 270
Asn His Arg Lys Ile Leu Thr Tyr Phe Ile Pro Gln Ser Thr Tyr Ala		
	275	280 285
Gln Ile Glu Gln Cys Leu Phe Val Ala Ile Lys Thr Lys Ser Ser Lys		
	290	295 300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Lys Leu		
305	310	315 320
Ile Gln Lys Ile Ser Gln Tyr Val Ala Thr Phe Asn Ser Thr Asn Ile		
	325	330 335
Ile Gly Ile Leu Ser Met Lys Arg Lys Lys Lys Ile Tyr Leu Asp Ile		
	340	345 350
Ile Leu Thr Lys Phe Val Lys Asn Ala Ile Phe Asn Lys Phe Val Val		
	355	360 365
Arg Cys Met Glu Arg Phe Ser Ile Asn Pro Glu Arg Ile Val Lys Met		
	370	375 380
Ala Ala Arg Ile Asn Lys Met Met Leu Val Lys Lys Ile Ser Glu His		
385	390	395 400
Val Trp Lys Asn His Ala Ala Arg Leu Lys His Leu Lys His Ala Val		
	405	410 415
His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile		
	420	425 430
Tyr Glu His Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu		
	435	440 445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
	450	455 460
Tyr Asn Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475 480
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile		
	485	490 495
Asn Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu		
	500	505 510
Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His		
	515	520 525
Tyr Met Pro		
	530	

<210> 147

<211> 531

<212> PRT

<213> 非洲猪瘟病毒

<400> 147

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Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asn Arg Lys
1           5           10           15
Leu Pro Glu Phe Phe Asp Glu Tyr Ile Leu Gln Leu Leu Gly Leu Tyr
           20           25           30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu
           35           40           45
Ile Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Thr Ala
           50           55           60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu
65           70           75           80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His
           85           90           95
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile
           100          105          110
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met
           115          120          125
Arg Gln Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser
           130          135          140
Lys Phe Arg Val Leu Leu Tyr Phe Lys His Arg Leu Glu Asp Asp Leu
145          150          155          160
Pro Phe Thr His Leu Leu Ile Glu Lys Ala Cys Lys Asp His Asn Tyr
           165          170          175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asn Met Ile
           180          185          190
Asp Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu His Leu Tyr Cys
           195          200          205
Leu Gly Tyr Arg Phe Ile Tyr Asn Arg Ile Val Pro Asp Lys Tyr His
           210          215          220
His Leu Asp Ile Arg Met Leu Ser Ser Leu Gln Leu Leu His Lys Val
225          230          235          240
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp
           245          250          255
His Asn Lys Asp Asn Ile Asn Ile Ile Leu Thr Gln Ala Ala Thr Tyr
           260          265          270
Asn His Arg Lys Ile Leu Ile Tyr Phe Ile Pro Gln Ser Thr His Ala

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275	280	285
Gln Ile Glu Gln Cys Leu Leu Val Ala Ile Lys Ala Lys Ser Ser Arg		
290	295	300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Asn Leu		
305	310	315
Ile Lys Lys Ile Ser His Tyr Val Ala Thr Tyr Asn Ser Thr Asn Ile		
325	330	335
Ile Gly Ile Leu Ser Met Arg Arg Lys Lys Lys Ile Tyr Leu Asp Ile		
340	345	350
Ile Leu Thr Lys Phe Val Lys Lys Ala Ile Phe Asn Lys Phe Val Val		
355	360	365
Arg Cys Met Asp Thr Phe Ser Ile Asn Pro Glu Arg Ile Leu Lys Ile		
370	375	380
Ala Ala Arg Ile Asn Arg Met Met Leu Val Lys Lys Ile Ser Glu His		
385	390	395
Val Trp Lys Asn His Ala Val Arg Leu Lys Tyr Leu Lys His Ala Val		
405	410	415
His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile		
420	425	430
Tyr Asp Arg Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu		
435	440	445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
450	455	460
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile		
485	490	495
Asn Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Val Met Gly Val Leu		
500	505	510
Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys Gln		
515	520	525
Tyr Met Pro		
530		
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<212> PRT		
<213> 非洲猪瘟病毒		
<400> 148		
Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys		

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Leu Pro Glu Phe Phe Asp Asp Tyr Val Leu Gln Leu Leu Gly Leu Tyr			
20	25	30	
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu			
35	40	45	
Ile Gln Gln His Asn Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala			
50	55	60	
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu			
65	70	75	80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His			
85	90	95	
Asn Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile			
100	105	110	
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met			
115	120	125	
Arg Arg Cys Phe Phe Asn Cys Met Leu Tyr Gln Ala Val Lys Tyr Ser			
130	135	140	
Lys Phe Ser Val Leu Leu Tyr Phe Lys Tyr Ile Leu Lys Glu Asn Leu			
145	150	155	160
Pro Leu Val His Ser Leu Ile Glu Lys Ala Tyr Lys Tyr His Asn Tyr			
165	170	175	
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asp Ile Ile			
180	185	190	
Asn Thr Phe Lys Tyr Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys			
195	200	205	
Leu Gly Tyr Thr Phe Val Tyr Asn Arg Ile Val Pro Tyr Lys Tyr Tyr			
210	215	220	
His Leu Asp Ile Arg Ile Leu Leu Arg Leu Gln Leu Leu His Lys Val			
225	230	235	240
Thr Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp			
245	250	255	
His Asn Thr Asn Asn Ile Asp Ile Ile Leu Thr Gln Ala Ala Thr Tyr			
260	265	270	
Asn His Arg Asn Ile Leu Thr Tyr Phe Ile Pro Gln Ser Thr Tyr Ala			
275	280	285	
Gln Ile Glu Gln Cys Leu Phe Val Ala Ile Lys Thr Asn Ala Ser Lys			
290	295	300	
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Lys Leu			
305	310	315	320

Val Lys Lys Leu Ser Gln Tyr Val Val Ala Tyr Lys Ser Thr Asn Ile		
325	330	335
Ile Ser Ile Leu Ser Met Gln Gln Lys Lys Lys Ile Tyr Leu Asp Ile		
340	345	350
Ile Leu Thr Lys Val Val Lys Asn Ala Val Phe Ile Lys Phe Val Ile		
355	360	365
Gly Cys Met Val Thr Phe Ser Ile Asn Pro Glu Arg Ile Val Lys Met		
370	375	380
Ala Ala Arg Ile Lys Lys Met Lys Leu Val Lys Asn Ile Ser Glu His		
385	390	395
Val Trp Lys Asn His Ala Ala Lys Leu Lys His Leu Lys His Ala Val		
405	410	415
His Thr Met Lys His Gln Glu Gly Lys Asn Arg Leu Met Asn Phe Ile		
420	425	430
Tyr Asp His Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu		
435	440	445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
450	455	460
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475
Asp Cys Ser His Ile Ile Ala Lys Asn Ala His Asp Ala Ser Ile Asn		
485	490	495
Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu Ser		
500	505	510
Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys Tyr Asp		
515	520	525
Ile Leu		
530		
<210> 149		
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<212> PRT		
<213> 非洲猪瘟病毒		
<400> 149		
Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys		
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Leu Pro Glu Phe Phe Asp Asp Tyr Val Leu Gln Leu Leu Gly Leu Tyr		
20	25	30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu		
35	40	45

Ile Gln Gln His Asn Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala		
50	55	60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu		
65	70	75 80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn His His		
	85	90 95
Asn Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile		
	100	105 110
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Thr Met		
	115	120 125
Arg Arg Cys Phe Phe Asn Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser		
	130	135 140
Lys Phe Ser Val Leu Leu Tyr Phe Lys Tyr Ile Leu Lys Glu Asn Leu		
145	150	155 160
Pro Leu Val His Ser Leu Ile Glu Lys Ala Tyr Lys Tyr His Asn Tyr		
	165	170 175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asp Ile Ile		
	180	185 190
Asn Thr Phe Lys Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys		
	195	200 205
Leu Gly Tyr Thr Phe Val Tyr Asn Arg Ile Val Pro Tyr Lys Tyr Tyr		
210	215	220
His Leu Asp Ile Arg Ile Leu Leu Arg Leu Gln Leu Leu His Lys Val		
225	230	235 240
Thr Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp		
	245	250 255
His Asn Thr Asn Asn Ile Asp Ile Ile Leu Thr Gln Ala Ala Thr Tyr		
	260	265 270
Asn His Arg Asn Ile Leu Thr Tyr Phe Ile Pro Gln Ser Thr Tyr Ala		
	275	280 285
Gln Ile Glu Gln Cys Leu Phe Val Ala Ile Lys Thr Asn Ala Ser Lys		
290	295	300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Lys Leu		
305	310	315 320
Val Lys Lys Leu Ser Gln Tyr Val Val Ala Tyr Lys Ser Thr Asn Ile		
	325	330 335
Ile Ser Ile Leu Ser Arg Gln Gln Lys Lys Lys Ile Tyr Leu Asp Ile		
	340	345 350
Ile Leu Thr Lys Val Val Lys Asn Ala Val Phe Asn Lys Phe Val Ile		

355	360	365
Gly Cys Met Val Thr Phe Ser Ile Asn Pro Glu Arg Ile Val Lys Met		
370	375	380
Ala Ala Arg Ile Lys Lys Met Lys Leu Val Lys Asn Ile Ser Glu His		
385	390	395
Val Trp Lys Asn His Ala Val Lys Leu Lys Tyr Leu Lys His Ala Val		
405	410	415
His Thr Met Lys His Gln Glu Gly Lys Asn Arg Leu Met Asn Phe Ile		
420	425	430
Tyr Asp His Cys Tyr Tyr His Met Gln Glu Glu Glu Ile Phe Ser Leu		
435	440	445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
450	455	460
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475
Asp Cys Ser His Ile Ile Val Lys Asn Ala His Asp Ala Ser Ile Asn		
485	490	495
Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu Ser		
500	505	510
Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys Asp Tyr		
515	520	525
Met Leu		
530		
<210> 150		
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<213> 非洲猪瘟病毒		
<400> 150		
Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Arg Lys		
1	5	10
Leu Pro Glu Phe Phe Asp Asp Tyr Val Leu Gln Leu Leu Gly Leu Tyr		
20	25	30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu		
35	40	45
Ile Gln Gln His Asn Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala		
50	55	60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu		
65	70	75
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His		
80		

				85				90				95			
Asn	Leu	Ile	Arg	Lys	Tyr	Asp	Asp	Gln	Ile	Lys	Asp	His	His	Glu	Ile
				100				105				110			
Leu	Pro	Phe	Ile	Asp	Asp	Pro	Val	Ile	Phe	His	Lys	Cys	His	Met	Met
				115				120				125			
Arg	Arg	Cys	Phe	Phe	Asn	Cys	Ile	Leu	Tyr	Gln	Ala	Val	Lys	Tyr	Ser
				130				135				140			
Lys	Phe	Ser	Val	Leu	Leu	Tyr	Phe	Lys	Tyr	Ile	Leu	Lys	Glu	Asn	Leu
145				150				155				160			
Pro	Leu	Val	His	Ser	Leu	Ile	Glu	Lys	Ala	Cys	Glu	Asp	His	Asn	Tyr
				165				170				175			
Glu	Val	Ile	Lys	Trp	Ile	Tyr	Glu	Asn	Leu	His	Ile	Tyr	Glu	Ile	Met
				180				185				190			
Asp	Thr	Phe	Lys	Cys	Ala	Ile	Ala	His	Lys	Asp	Leu	His	Leu	Tyr	Ser
				195				200				205			
Leu	Gly	Tyr	Thr	Phe	Ile	Tyr	Asn	Arg	Ile	Val	Pro	Tyr	Lys	Tyr	His
210				215				220							
His	Leu	Asp	Ile	Arg	Ile	Leu	Ser	Arg	Leu	Gln	Leu	Leu	His	Lys	Val
225				230				235				240			
Thr	Ala	Lys	Gly	Tyr	Leu	Asp	Phe	Ile	Leu	Glu	Thr	Leu	Lys	Tyr	Asp
				245				250				255			
His	Asn	Lys	Asp	Asn	Ile	Asn	Ile	Ile	Leu	Thr	Gln	Ala	Ala	Thr	Tyr
				260				265				270			
Asn	His	Arg	Asn	Ile	Leu	Thr	Tyr	Phe	Ile	Pro	Gln	Ser	Thr	Tyr	Ala
				275				280				285			
Gln	Ile	Glu	Gln	Cys	Leu	Phe	Val	Ala	Ile	Lys	Thr	Asn	Ala	Ser	Lys
290				295				300							
Lys	Thr	Leu	Asn	Leu	Leu	Leu	Ser	His	Leu	Asn	Leu	Ser	Ile	Lys	Leu
305				310				315				320			
Val	Lys	Lys	Leu	Ser	Gln	Tyr	Val	Val	Ala	Tyr	Lys	Ser	Thr	Asn	Ile
				325				330				335			
Ile	Ser	Ile	Leu	Ser	Met	Gln	Gln	Lys	Lys	Lys	Ile	Tyr	Leu	Asp	Ile
				340				345				350			
Ile	Leu	Thr	Lys	Val	Val	Lys	Asn	Ala	Ile	Phe	Ile	Lys	Phe	Val	Ile
				355				360				365			
Gly	Cys	Met	Val	Thr	Phe	Ser	Ile	Asn	Pro	Glu	Arg	Ile	Val	Lys	Met
370				375				380							
Ala	Ala	Arg	Ile	Lys	Lys	Met	Lys	Leu	Val	Lys	Asn	Ile	Ser	Glu	His
385				390				395				400			

Val Trp Lys Asn His Ala Ala Lys Leu Lys His Leu Lys His Ala Val			
405	410	415	
His Thr Met Lys His Gln Glu Gly Lys Asn Arg Leu Met Asn Phe Ile			
420	425	430	
Tyr Asp His Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu			
435	440	445	
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe			
450	455	460	
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu			
465	470	475	480
Asp Cys Ser Tyr Ile Ile Ala Lys Asn Ala His Asp Ala Ser Ile Asn			
485	490	495	
Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu Ser			
500	505	510	
Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys Asp Tyr			
515	520	525	
Met Leu			
530			
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<213> 非洲猪瘟病毒			
<400> 151			
Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys			
1	5	10	15
Leu Pro Glu Phe Phe Asp Asp Tyr Ile Leu Gln Leu Leu Gly Leu Tyr			
20	25	30	
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu			
35	40	45	
Ile Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala			
50	55	60	
Ala Ser Glu Glu Asn Tyr Glu Ile Val Gly Leu Leu Leu Ala Trp Glu			
65	70	75	80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg Tyr			
85	90	95	
Asn Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Asp Ile			
100	105	110	
Leu Pro Phe Ile Asp Asp Pro Ile Ile Phe His Lys Cys His Ile Met			
115	120	125	

Arg	Arg	Cys	Phe	Phe	Asp	Cys	Ile	Leu	Tyr	Gln	Ala	Val	Lys	Tyr	Ser
130						135					140				
Lys	Phe	Arg	Val	Leu	Leu	Tyr	Phe	Lys	Tyr	Thr	Leu	Glu	Asp	Asp	Leu
145				150						155					160
Pro	Leu	Val	His	Leu	Leu	Ile	Glu	Lys	Ala	Cys	Glu	Asp	His	Asn	Tyr
			165						170					175	
Glu	Val	Ile	Lys	Trp	Ile	Tyr	Glu	Asn	Leu	His	Val	Cys	His	Ile	Ile
			180					185					190		
Asp	Thr	Phe	Asp	Cys	Ala	Ile	Ala	His	Lys	Asp	Leu	Arg	Leu	Tyr	Cys
		195					200					205			
Leu	Gly	Tyr	Thr	Phe	Ile	Tyr	Asn	Arg	Ile	Val	Pro	Tyr	Lys	Tyr	His
	210					215					220				
His	Leu	Asp	Ile	Leu	Ile	Leu	Ser	Ser	Leu	Gln	Leu	Leu	His	Lys	Val
225				230						235					240
Ala	Ala	Lys	Gly	Tyr	Leu	Asp	Phe	Ile	Leu	Glu	Thr	Leu	Lys	Tyr	Asp
			245						250					255	
His	Asn	Ile	Asp	Asn	Leu	Asp	Val	Ile	Leu	Thr	Gln	Ala	Ala	Thr	Tyr
		260						265						270	
Asn	His	Arg	Lys	Ile	Leu	Thr	Tyr	Phe	Ile	Pro	Gln	Ser	Thr	Tyr	Ala
		275					280					285			
Gln	Ile	Glu	Gln	Cys	Leu	Phe	Val	Ala	Ile	Lys	Thr	Lys	Ser	Ser	Lys
	290					295					300				
Lys	Thr	Leu	Asn	Leu	Leu	Leu	Ser	His	Leu	Asn	Leu	Ser	Ile	Lys	Leu
305				310						315					320
Ile	Gln	Lys	Ile	Ser	Gln	Tyr	Val	Ala	Thr	Phe	Asn	Ser	Thr	Asn	Ile
			325						330					335	
Ile	Gly	Ile	Leu	Ser	Met	Lys	Arg	Lys	Lys	Lys	Ile	Tyr	Leu	Asp	Ile
		340						345					350		
Ile	Leu	Thr	Lys	Phe	Val	Lys	Asn	Ala	Ile	Phe	Asn	Lys	Phe	Val	Val
		355					360					365			
Arg	Cys	Met	Glu	Arg	Phe	Ser	Ile	Asn	Pro	Glu	Arg	Ile	Val	Lys	Met
	370					375					380				
Ala	Ala	Arg	Ile	Asn	Lys	Met	Met	Leu	Val	Lys	Lys	Ile	Ser	Glu	His
385				390						395					400
Val	Trp	Lys	Asn	His	Ala	Ala	Arg	Leu	Lys	His	Leu	Lys	His	Ala	Val
			405						410				415		
His	Thr	Met	Lys	His	Lys	Asp	Gly	Lys	Asn	Arg	Leu	Met	Asn	Phe	Ile
		420						425				430			
Tyr	Glu	His	Cys	Tyr	Tyr	His	Met	Gln	Gly	Glu	Glu	Ile	Phe	Ser	Leu

435	440	445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
450	455	460
Tyr Asn Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile		480
485	490	495
Asn Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu		
500	505	510
Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His		
515	520	525
Tyr Met Pro		
530		
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<212> PRT		
<213> 非洲猪瘟病毒		
<400> 152		
Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys		
1	5	10
Leu Pro Glu Phe Phe Asp Glu Tyr Ile Leu Gln Leu Leu Gly Leu Tyr		
20	25	30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu		
35	40	45
Ile Gln Gln His Asn Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala		
50	55	60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu		
65	70	75
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg Pro		
85	90	95
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile		
100	105	110
Leu Pro Phe Ile Asp Asp Pro Ile Ile Phe His Lys Cys His Ile Met		
115	120	125
Arg Arg Cys Phe Phe Asn Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser		
130	135	140
Lys Phe Arg Val Leu Leu Tyr Phe Lys His Arg Leu Gly Asp Asp Leu		
145	150	155
Pro Leu Thr His Leu Leu Ile Glu Lys Ala Cys Glu Asp His Asn Tyr		160

	165		170		175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ser Tyr Asn Ile Met					
	180		185		190
Asp Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys					
	195		200		205
Leu Gly Tyr Thr Phe Ile Tyr Asn Arg Ile Val Pro Tyr Lys Tyr His					
	210		215		220
His Leu Asp Ile Cys Ile Leu Ser Ser Leu Gln Leu Leu His Lys Val					
225		230		235	240
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp					
	245		250		255
His Asn Ile Asn Asn Ile Asp Ile Ile Leu Thr Gln Ala Ala Thr Tyr					
	260		265		270
Asn His Arg Lys Ile Leu Thr Tyr Phe Ile Pro Gln Leu Thr Tyr Ala					
	275		280		285
Gln Ile Glu Gln Cys Leu Leu Val Ala Ile Lys Thr Lys Ala Ser Lys					
	290		295		300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Lys Leu					
305		310		315	320
Ile Lys Lys Ile Ser Gln Tyr Val Val Thr Tyr Asn Ser Thr Asn Ile					
	325		330		335
Ile Ser Ile Leu Ser Met Arg Arg Lys Lys Lys Ile Tyr Leu Asp Ile					
	340		345		350
Ile Leu Thr Glu Phe Val Lys Asn Ala Ile Phe Asn Lys Phe Val Val					
	355		360		365
Arg Cys Met Asp Thr Phe Ser Ile Asn Pro Glu Arg Ile Val Lys Met					
	370		375		380
Ala Ala Arg Ile Asn Arg Met Met Leu Val Lys Asn Ile Ser Glu Arg					
385		390		395	400
Val Trp Lys Asn His Ala Val Lys Leu Lys His Leu Lys His Ala Val					
	405		410		415
His Thr Met Lys His Gln Glu Gly Lys Asn Arg Leu Met Asn Phe Ile					
	420		425		430
Tyr Asp His Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Gly Leu					
	435		440		445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe					
	450		455		460
Tyr Asp Cys Cys Met Leu Asp Ala Thr Arg Phe Lys Ser Leu Leu Leu					
465		470		475	480

Asp Cys Pro His Ile Ile Gly Lys Asn Ala Tyr Asp Ala Gly Ile Asn
 485 490 495
 Leu Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu Ser
 500 505 510
 Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His Asp
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 Met Phe
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 <213> 非洲猪瘟病毒
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 Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu
 35 40 45
 Ile Gln Gln His Thr Leu Ile Pro Ile Asn Glu Ala Leu Arg Thr Ala
 50 55 60
 Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu
 65 70 75 80
 Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His
 85 90 95
 Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile
 100 105 110
 Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met
 115 120 125
 Arg Arg Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser
 130 135 140
 Lys Phe Arg Val Leu Leu Tyr Phe Lys Tyr Arg Leu Glu Asp Asp Leu
 145 150 155 160
 Pro Leu Thr His Leu Leu Ile Glu Lys Ala Cys Glu Asn His Asn Tyr
 165 170 175
 Glu Val Ile Arg Trp Ile Tyr Glu Asn Leu His Ile Tyr Asn Met Ile
 180 185 190
 Asp Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys
 195 200 205

Leu Gly Tyr Thr Phe Ile Tyr Asn Arg Ile Val Pro Asn Lys Tyr His		
210	215	220
His Ile Asp Ile Leu Ile Leu Ser Ser Leu Gln Leu Leu His Lys Val		
225	230	235 240
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp		
	245	250 255
His Asn Asn Asp Asn Leu Asp Ile Ile Leu Thr Gln Ala Ala Thr Tyr		
	260	265 270
Asn His Arg Lys Ile Leu Thr Tyr Phe Ile Pro Gln Ser Thr Tyr Ala		
	275	280 285
Gln Ile Glu Gln Cys Leu Met Val Ala Ile Lys Thr Lys Ser Ser Lys		
	290	295 300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Lys Leu		
305	310	315 320
Ile Lys Lys Ile Ser Gln Tyr Val Val Thr Tyr Asn Ser Thr Asn Ile		
	325	330 335
Ile Gly Ile Leu Ser Met Lys Arg Lys Lys Lys Ile Tyr Leu Asp Ile		
	340	345 350
Leu Leu Thr Lys Phe Val Lys Asn Ala Ile Phe Asn Lys Phe Val Val		
	355	360 365
Arg Tyr Met Asp Thr Phe Ser Ile Asn Pro Glu Lys Ile Val Lys Met		
370	375	380
Ala Ala Arg Ile Asn Lys Met Met Leu Val Lys Lys Ile Ser Glu His		
385	390	395 400
Ile Trp Lys Asn His Ala Ala Arg Leu Glu His Leu Lys His Ala Val		
	405	410 415
His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile		
	420	425 430
Tyr Glu Tyr Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu		
	435	440 445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe		
	450	455 460
Tyr Asn Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu		
465	470	475 480
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile		
	485	490 495
Asn Ile Val Asn Lys Tyr Ile Asp Asn Leu Phe Ala Met Gly Val Leu		
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Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His		

515	520	525
Tyr Met Pro		
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20 25 30		
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu		
35 40 45		
Val Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala		
50 55 60		
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu		
65 70 75 80		
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His		
85 90 95		
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile		
100 105 110		
Leu Pro Phe Ile Asp Asn Pro Val Ile Phe His Lys Cys His Ile Met		
115 120 125		
Arg Arg Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser		
130 135 140		
Lys Phe Arg Val Leu Leu Tyr Phe Lys Tyr Arg Leu Glu Asn Asp Leu		
145 150 155 160		
Pro Leu Ala His Leu Leu Val Glu Lys Ala Cys Glu Asp His Asn Tyr		
165 170 175		
Glu Val Ile Lys Trp Leu Tyr Glu Asn Leu His Ile Tyr Asn Ile Met		
180 185 190		
Glu Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Arg		
195 200 205		
Leu Gly Tyr Thr Phe Ile Tyr Asn Arg Ile Val Pro Tyr Lys Tyr His		
210 215 220		
Tyr Leu Asp Val Leu Ile Leu Ser Gly Leu His Leu Leu Tyr Lys Val		
225 230 235 240		
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp		

				245				250				255			
His	Asn	Asn	Asp	Asn	Leu	Asp	Ile	Ile	Leu	Thr	Gln	Ala	Val	Thr	Tyr
				260				265				270			
Asn	His	Arg	Lys	Ile	Leu	Thr	Tyr	Tyr	Ile	Pro	Gln	Leu	Thr	Tyr	Ala
				275				280				285			
Gln	Ile	Glu	Gln	Cys	Leu	Phe	Met	Ala	Ile	Lys	Lys	Lys	Ser	Ser	Lys
				290				295				300			
Lys	Thr	Leu	Asn	Leu	Leu	Leu	Ser	His	Leu	Lys	Leu	Ser	Ile	Lys	Leu
305				310				315				320			
Ile	Lys	Lys	Ile	Ser	Gln	Tyr	Val	Ala	Thr	Tyr	Asn	Ser	Thr	Asn	Ile
				325				330				335			
Ile	Gly	Ile	Leu	Asn	Met	Lys	Arg	Lys	Lys	Lys	Ile	Tyr	Leu	Asp	Ile
				340				345				350			
Ile	Leu	Thr	Lys	Phe	Val	Lys	Tyr	Ala	Ile	Phe	Asn	Lys	Tyr	Val	Val
				355				360				365			
Arg	Cys	Met	Asp	Thr	Phe	Ser	Ile	Asn	Pro	Glu	Arg	Ile	Ile	Lys	Met
370				375				380							
Ala	Ala	Arg	Ile	Asn	Lys	Met	Leu	Leu	Val	Lys	Lys	Ile	Ser	Gln	His
385				390				395				400			
Ala	Trp	Lys	Asn	His	Ala	Ala	Arg	Leu	Lys	His	Leu	Lys	His	Ala	Val
				405				410				415			
Tyr	Thr	Met	Lys	His	Lys	Asp	Gly	Lys	Asn	Arg	Leu	Met	Asn	Leu	Ile
				420				425				430			
Tyr	Asp	His	Tyr	Tyr	Tyr	His	Met	Gln	Gly	Glu	Glu	Ile	Phe	Ser	Leu
				435				440				445			
Ala	Arg	Phe	Tyr	Ala	Ile	His	His	Ala	Pro	Lys	Leu	Phe	Asp	Val	Phe
				450				455				460			
Tyr	Asp	Cys	Cys	Leu	Leu	Asp	Thr	Ile	Arg	Phe	Lys	Ser	Leu	Leu	Leu
465				470				475				480			
Asp	Cys	Ser	His	Ile	Ile	Gly	Lys	Asn	Ala	His	Asp	Ala	Thr	Asn	Ile
				485				490				495			
Thr	Ile	Val	Asn	Lys	Tyr	Ile	Gly	Asn	Leu	Phe	Ala	Met	Gly	Val	Leu
				500				505				510			
Ser	Lys	Lys	Glu	Ile	Leu	Gln	Asp	Tyr	Pro	Ser	Ile	Tyr	Ser	Lys	His
				515				520				525			
Tyr Met Pro															
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<212> PRT

<213> 非洲猪瘟病毒

<400> 155

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Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys
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Leu Pro Glu Phe Phe Asp Glu Tyr Ile Leu Gln Leu Leu Gly Leu Tyr
           20           25           30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu
           35           40           45
Ile Gln Gln His Asn Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala
           50           55           60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu
65           70           75           80
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His
           85           90           95
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile
           100          105          110
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met
           115          120          125
Arg Gln Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser
           130          135          140
Lys Phe Arg Val Leu Leu Ser Phe Lys His Arg Leu Arg Asp Asp Leu
145          150          155          160
Pro Phe Thr His Leu Leu Ile Glu Lys Ala Cys Lys Asp His Asn Tyr
           165          170          175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asn Met Ile
           180          185          190
Asp Thr Phe Glu Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Cys
           195          200          205
Leu Gly Tyr Arg Phe Ile Tyr Asn Arg Ile Val Pro Asp Lys Tyr His
           210          215          220
His Leu Asp Ile Arg Met Leu Ser Ser Leu Gln Leu Leu His Lys Val
225          230          235          240
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp
           245          250          255
His Asn Lys Asp Asn Ile Asn Ile Ile Leu Thr Gln Ala Ala Thr Tyr
           260          265          270
Asn His Arg Lys Ile Leu Ile Tyr Phe Ile Pro Gln Ser Thr His Ala
           275          280          285

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Gln Ile Glu Gln Cys Leu Leu Val Ala Ile Lys Thr Lys Ser Ser Lys
 290 295 300
 Lys Thr Leu Asn Leu Leu Leu Ser His Leu Asn Leu Ser Ile Asn Leu
 305 310 315 320
 Ile Lys Lys Ile Ser His Tyr Val Ala Thr Tyr Asn Ser Thr Asn Ile
 325 330 335
 Ile Gly Ile Leu Ser Met Arg Arg Lys Lys Lys Ile Tyr Leu Asp Ile
 340 345 350
 Ile Leu Thr Lys Phe Val Lys Lys Ala Ile Phe Asn Lys Phe Val Val
 355 360 365
 Arg Cys Met Asp Thr Phe Ser Ile Asn Pro Glu Arg Ile Leu Lys Ile
 370 375 380
 Ala Ala Arg Ile Asn Arg Thr Met Leu Val Lys Lys Ile Ser Glu His
 385 390 395 400
 Val Trp Lys Asn His Ala Val Arg Leu Lys Tyr Leu Lys His Ala Val
 405 410 415
 His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile
 420 425 430
 Tyr Asp Arg Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu
 435 440 445
 Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe
 450 455 460
 Tyr Asp Cys Cys Ile Leu Asp Thr Ile Arg Phe Lys Ser Leu Leu Leu
 465 470 475 480
 Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile
 485 490 495
 Asn Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Val Met Gly Val Leu
 500 505 510
 Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His
 515 520 525
 Tyr Met Pro
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 <213> 非洲猪瘟病毒
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 Met Phe Ser Leu Gln Asn Leu Cys Arg Lys Thr Leu Pro Asp Cys Lys
 1 5 10 15

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Trp	Glu	Asn	His	Gly	Thr	Ile	Gln	Arg	Ala	Gly	Asn	Asn	Cys	Val	Leu	
35					40					45						
Ile	Gln	Gln	Arg	Thr	Leu	Ile	Pro	Val	Asn	Glu	Ala	Leu	Arg	Ile	Ala	
50					55					60						
Ala	Ser	Glu	Glu	Asn	Tyr	Glu	Ile	Val	Gly	Leu	Leu	Leu	Ala	Trp	Glu	
65					70					75					80	
Gly	Asn	Leu	Tyr	Tyr	Ala	Ile	Ile	Gly	Ala	Leu	Glu	Gly	Asn	Arg	His	
85					90					95						
Asp	Leu	Ile	Arg	Lys	Tyr	Asp	Asp	Gln	Ile	Lys	Asp	His	His	Glu	Ile	
100					105					110						
Leu	Pro	Phe	Ile	Asp	Asp	Pro	Val	Ile	Phe	His	Lys	Cys	His	Ile	Ile	
115					120					125						
Arg	Arg	Cys	Phe	Phe	Asn	Cys	Ile	Leu	Tyr	Gln	Ala	Val	Lys	Tyr	Ser	
130					135					140						
Lys	Phe	Arg	Val	Leu	Leu	Tyr	Phe	Lys	His	Arg	Leu	Glu	Asp	Asp	Leu	
145					150					155					160	
Pro	Leu	Thr	His	Leu	Leu	Ile	Glu	Lys	Ala	Cys	Glu	Asp	His	Asn	Tyr	
165					170					175						
Glu	Val	Ile	Lys	Trp	Ile	Tyr	Glu	Asn	Leu	His	Thr	Tyr	Asp	Ile	Met	
180					185					190						
Asp	Thr	Phe	Glu	Cys	Ala	Ile	Ala	His	Lys	Asp	Leu	Arg	Leu	Tyr	Cys	
195					200					205						
Leu	Gly	Tyr	Thr	Phe	Ile	Tyr	Asn	Arg	Ile	Val	Pro	Tyr	Glu	Tyr	His	
210					215					220						
His	Leu	Asp	Ile	Leu	Ile	Leu	Ser	Ser	Leu	Gln	Leu	Leu	His	Lys	Val	
225					230					235					240	
Ala	Ala	Lys	Gly	Tyr	Leu	Asp	Phe	Ile	Leu	Glu	Thr	Leu	Lys	Tyr	Asp	
245					250					255						
His	Asn	Asn	Asp	Asn	Leu	Asp	Ile	Ile	Leu	Thr	Gln	Ala	Ala	Thr	Tyr	
260					265					270						
Asn	His	Arg	Lys	Ile	Leu	Thr	Tyr	Phe	Ile	Pro	Gln	Leu	Thr	Tyr	Ala	
275					280					285						
Gln	Ile	Glu	Gln	Cys	Leu	Phe	Met	Ala	Ile	Lys	Arg	Lys	Ser	Ser	Lys	
290					295					300						
Lys	Thr	Leu	Asn	Leu	Leu	Leu	Ser	His	Leu	Thr	Leu	Ser	Ile	Glu	Leu	
305					310					315					320	
Ile	Lys	Lys	Ile	Ser	Gln	Tyr	Val	Val	Thr	Tyr	Asn	Ser	Thr	Asn	Ile	

	325		330		335
Ile Gly Ile Leu Ser Met Lys Arg Lys Lys Lys Ile Tyr Leu Asp Ile					
	340		345		350
Met Leu Thr Lys Tyr Val Lys Tyr Ala Ile Phe Asn Lys Tyr Val Val					
	355		360		365
Arg Cys Met Asp Arg Phe Ser Ile Asn Pro Glu Arg Ile Ile Lys Met					
	370		375		380
Ala Ala Arg Ile Asn Arg Met Met Leu Val Lys Lys Ile Ser Glu His					
385		390		395	400
Val Trp Lys Asn His Ala Ala Arg Leu Lys His Leu Lys His Ala Val					
	405		410		415
His Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Phe Ile					
	420		425		430
Tyr Asp Arg Cys Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu					
	435		440		445
Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe					
	450		455		460
Tyr Asp Cys Cys Ile Leu Asp Thr Ile Gln Phe Lys Ser Leu Leu Leu					
465		470		475	480
Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile					
	485		490		495
Asn Ile Val Asn Lys Tyr Ile Gly Asp Leu Phe Ala Met Gly Val Leu					
	500		505		510
Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His					
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Tyr Met Leu					
	530				
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<213> 非洲猪瘟病毒					
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	20		25		30
Trp Glu Asn His Gly Thr Ile Gln Arg Ala Gly Asn Asn Cys Val Leu					
	35		40		45
Ile Gln Gln His Thr Leu Ile Pro Val Asn Glu Ala Leu Arg Ile Ala					

50	55	60
Ala Ser Glu Glu Asn Tyr Glu Ile Val Ser Leu Leu Leu Ala Trp Glu		
65	70	75
Gly Asn Leu Tyr Tyr Ala Ile Ile Gly Ala Leu Glu Gly Asn Arg His		
85	90	95
Asp Leu Ile Arg Lys Tyr Asp Asp Gln Ile Lys Asp His His Glu Ile		
100	105	110
Leu Pro Phe Ile Asp Asp Pro Val Ile Phe His Lys Cys His Ile Met		
115	120	125
Arg Arg Cys Phe Phe Asp Cys Ile Leu Tyr Gln Ala Val Lys Tyr Ser		
130	135	140
Lys Phe Arg Val Leu Leu Tyr Phe Lys Tyr Arg Leu Glu Asn Asp Leu		
145	150	155
Pro Leu Ala His Leu Leu Ile Lys Lys Ala Cys Glu Asp His Asn Tyr		
165	170	175
Glu Val Ile Lys Trp Ile Tyr Glu Asn Leu His Ile Tyr Asn Ile Met		
180	185	190
Asp Thr Phe Gly Cys Ala Ile Ala His Lys Asp Leu Arg Leu Tyr Arg		
195	200	205
Leu Gly Tyr Thr Phe Ile Tyr Asn Arg Ile Val Pro Tyr Lys Tyr His		
210	215	220
Tyr Leu Asp Val Leu Ile Leu Ser Gly Leu His Leu Leu Tyr Lys Val		
225	230	235
Ala Ala Lys Gly Tyr Leu Asp Phe Ile Leu Glu Thr Leu Lys Tyr Asp		
245	250	255
His Asn Asn Asp Asn Leu Asp Ile Ile Leu Thr Gln Ala Ala Thr Tyr		
260	265	270
Asn His Arg Lys Ile Leu Thr Tyr Tyr Ile Pro Gln Leu Thr Tyr Ala		
275	280	285
Gln Ile Glu Gln Cys Leu Phe Met Ala Ile Lys Lys Lys Ser Ser Lys		
290	295	300
Lys Thr Leu Asn Leu Leu Leu Ser His Leu Lys Leu Ser Ile Lys Leu		
305	310	315
Ile Lys Lys Ile Ser Gln Tyr Val Ala Thr Tyr Asn Ser Thr Asn Ile		
325	330	335
Ile Gly Ile Leu Asn Met Arg Arg Lys Lys Lys Ile Tyr Leu Asp Ile		
340	345	350
Ile Leu Thr Lys Phe Val Lys Lys Ala Ile Phe Asn Lys Phe Val Val		
355	360	365

Arg Cys Met Asp Thr Phe Ser Ile Asn Pro Glu Arg Ile Ile Lys Met
 370 375 380
 Ala Ala Arg Ile Asn Lys Met Leu Leu Val Lys Lys Ile Ser Glu His
 385 390 395 400
 Ala Trp Lys Asn His Ala Ala Arg Leu Lys His Leu Lys His Ala Val
 405 410 415
 Tyr Thr Met Lys His Lys Asp Gly Lys Asn Arg Leu Met Asn Leu Ile
 420 425 430
 Tyr Asp His Tyr Tyr Tyr His Met Gln Gly Glu Glu Ile Phe Ser Leu
 435 440 445
 Ala Arg Phe Tyr Ala Ile His His Ala Pro Lys Leu Phe Asp Val Phe
 450 455 460
 Tyr Asp Cys Cys Leu Leu Asp Thr Ile Arg Phe Lys Asn Leu Leu Leu
 465 470 475 480
 Asp Cys Ser His Ile Ile Gly Lys Asn Ala His Asp Ala Thr Asn Ile
 485 490 495
 Thr Ile Val Asn Lys Tyr Ile Gly Asn Leu Phe Ala Met Gly Val Leu
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 Ser Lys Lys Glu Ile Leu Gln Asp Tyr Pro Ser Ile Tyr Ser Lys His
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 Tyr Met Pro
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<211> 438

<212> DNA

<213> 非洲猪瘟病毒

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 gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
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 aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
 agactgaaaa ctttttatat aagtcctaata aagtataata atttttacac tgctccctct 360
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 ggaggagaag aatcctaa 438

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<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 159

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttaatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
aggctgaaaa ctttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttaatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
aggctgaaaa ctttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
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<212> DNA

<213> 非洲猪瘟病毒

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gcctcgacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttgttaacta tattaaagcg agtaaacaag agtatttatg tctgttgatt 240
aatcctaaac tagtcactaa gtttttaaaa ataacgagct ttaaaattta cattaatttt 300
aggctgaaaa ctttttatat aagtcctaata aagtataata atttttacat cgctccctct 360
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<212> DNA

<213> 非洲猪瘟病毒

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gcctcgacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttgttaacta tattaaagcg agtaaacaag agtatttatg tctgttgatt 240
aatcctaaac tagtcactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
aggctaaaaa ctttctatat aagtcctaata aagtataata atttttacat cgctccctct 360
gaagaaaagg ccaatcatct cctaaaagaa gaaaaaacct gggcaaagat tgttgaagaa 420
ggaggagaag aatcctaa 438

<210> 163

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 163

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gcctcgacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttgttaacta tattaaagcg agtaaacaag agtatttatg tctgttgatt 240
aatcctaaac tagtcactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
aggctgaaaa ctttttatat aagtcctaata aagtataata atttttacat cgctccctct 360
gaagaaaagg ccaatcatct cctaaaagaa gaaaaaacct gggcaaagat tgttgaagaa 420
ggaggagaag aatcctaa 438

<210> 164

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 164

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa ctttttatat aagtcctaata aagtataata atttttacac tgctccctct 360
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ggaggagaag aatcctaa 438

<210> 165

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 165

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gcctcaacgc agctttatcg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatc 240
aatcctaaac tagttacgaa gtttttaaaa ataacgagtt ttaaaattta cattaatttc 300
aggctgaaaa cttttttatat aagtcctaata aatataata atttttacac cgctccctct 360
gaagaaaagg ccaatcatct cctaaaagaa gaaaaaacct gggcaaagat tggtgaagaa 420
ggaggagaag aatcctaa 438

<210> 166

<211> 441

<212> DNA

<213> 非洲猪瘟病毒

<400> 166

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cctatagggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa cttttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
gaagaaaaga ccaaccatct cctaaaagaa gaaaaaactt gggcaaagat tggtgaagaa 420
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<210> 167

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 167

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gcctcaacgc agctttatcg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgtcactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa cttttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
gaagaaaaga ccaaccatct cctaaaagaa gaaaaaactt gggcaaagat tggtgaagaa 420
ggaggagaag aatcctaa 438

<210> 168

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 168

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa cttttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
gaagaaaaga ctaaccatct cctaaaagaa gaaaaaactt gggcaaagat tgttgaagaa 420
ggaggagaag aatcctaa 438
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<210> 169

<211> 441

<212> DNA

<213> 非洲猪瘟病毒

<400> 169

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cctatagggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgttactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa cttttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
gaagaaaaga ccaaccatct cctaaaagaa gaaaaaactt gggcaaagat tgttgaagaa 420
ggaggaggag aagaatccta a 441
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<210> 170

<211> 438

<212> DNA

<213> 非洲猪瘟病毒

<400> 170

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gcctcaacgc agctttaccg cagcatacaa cagctgtttt taacgatgta taagctagat 180
cccattgggt ttattaacta tattaaaacg agtaaacaag agtatttatg cctgttgatt 240
aatcctaaac tcgtcactaa gtttttaaaa ataacgagct ttaaaattta cattaatttc 300
agactgaaaa cttttttatat aagtcctaata aagtataata atttttacac cgctccctct 360
gaagaaaaga ccaaccatct cctaaaagaa gaaaaaactt gggcaaagat tgttgaagaa 420
ggaggagaag aatcctaa 438
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<210> 171

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 171

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Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1           5           10           15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
           20           25           30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
           35           40           45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
           50           55           60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65           70           75           80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
           85           90           95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
           100          105          110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
           115          120          125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
130          135          140

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Ser

145

<210> 172

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 172

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Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1           5           10           15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
           20           25           30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
           35           40           45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
           50           55           60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65           70           75           80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
           85           90           95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr

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	100		105		110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu					
115		120		125	
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu					
130		135		140	
Ser					
145					
<210> 173					
<211> 145					
<212> PRT					
<213> 非洲猪瘟病毒					
<400> 173					
Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Lys Lys Leu Glu					
1	5		10		15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe					
20		25		30	
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser					
35		40		45	
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe					
50		55		60	
Val Asn Tyr Ile Lys Ala Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile					
65	70		75		80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile					
85		90		95	
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr					
100		105		110	
Asn Asn Phe Tyr Ile Ala Pro Ser Glu Glu Lys Ala Asn His Leu Leu					
115		120		125	
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu					
130		135		140	
Ser					
145					
<210> 174					
<211> 145					
<212> PRT					
<213> 非洲猪瘟病毒					
<400> 174					
Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Lys Lys Leu Glu					
1	5		10		15

Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
 20 25 30
 Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
 35 40 45
 Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
 50 55 60
 Val Asn Tyr Ile Lys Ala Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
 65 70 75 80
 Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
 85 90 95
 Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
 100 105 110
 Asn Asn Phe Tyr Ile Ala Pro Ser Glu Glu Lys Ala Asn His Leu Leu
 115 120 125
 Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
 130 135 140

Ser

145

<210> 175

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 175

Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Lys Lys Leu Glu
 1 5 10 15
 Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
 20 25 30
 Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
 35 40 45
 Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
 50 55 60
 Val Asn Tyr Ile Lys Ala Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
 65 70 75 80
 Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
 85 90 95
 Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
 100 105 110
 Asn Asn Phe Tyr Ile Ala Pro Ser Glu Glu Lys Ala Asn His Leu Leu
 115 120 125

Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
130 135 140

Ser

145

<210> 176

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 176

Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1 5 10 15

Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
20 25 30

Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
35 40 45

Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
50 55 60

Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65 70 75 80

Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
85 90 95

Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
100 105 110

Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
115 120 125

Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
130 135 140

Ser

145

<210> 177

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 177

Met Asp His Tyr Leu Lys Lys Leu Glu Asp Ile Tyr Lys Lys Leu Glu
1 5 10 15

Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
20 25 30

Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser

35	40	45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe		
50	55	60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile		
65	70	75
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile		
85	90	95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr		
100	105	110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Ala Asn His Leu Leu		
115	120	125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu		
130	135	140
Ser		
145		
<210> 178		
<211> 146		
<212> PRT		
<213> 非洲猪瘟病毒		
<400> 178		
Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu		
1	5	10
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe		
20	25	30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser		
35	40	45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe		
50	55	60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile		
65	70	75
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile		
85	90	95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr		
100	105	110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu		
115	120	125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Gly Glu		
130	135	140
Glu Ser		

145

<210> 179

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 179

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Met Asp His Tyr Leu Lys Lys Leu Gln Glu Ile Tyr Thr Lys Leu Glu
1           5           10           15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
           20           25           30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
           35           40           45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
           50           55           60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65           70           75           80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
           85           90           95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
           100          105          110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
           115          120          125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
           130          135          140

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Ser

145

<210> 180

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 180

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Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1           5           10           15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
           20           25           30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
           35           40           45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
           50           55           60

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Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65 70 75 80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
85 90 95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
100 105 110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
115 120 125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
130 135 140

Ser

145

<210> 181

<211> 146

<212> PRT

<213> 非洲猪瘟病毒

<400> 181

Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1 5 10 15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
20 25 30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
35 40 45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
50 55 60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65 70 75 80

Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
85 90 95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
100 105 110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
115 120 125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Gly Glu
130 135 140

Glu Ser

145

<210> 182

<211> 145

<212> PRT

<213> 非洲猪瘟病毒

<400> 182

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Met Asp His Tyr Leu Lys Lys Leu Gln Asp Ile Tyr Thr Lys Leu Glu
1           5           10           15
Gly His Pro Phe Leu Phe Ser Pro Ser Lys Thr Asn Glu Lys Glu Phe
           20           25           30
Ile Thr Leu Leu Asn Gln Ala Leu Ala Ser Thr Gln Leu Tyr Arg Ser
           35           40           45
Ile Gln Gln Leu Phe Leu Thr Met Tyr Lys Leu Asp Pro Ile Gly Phe
           50           55           60
Ile Asn Tyr Ile Lys Thr Ser Lys Gln Glu Tyr Leu Cys Leu Leu Ile
65           70           75           80
Asn Pro Lys Leu Val Thr Lys Phe Leu Lys Ile Thr Ser Phe Lys Ile
           85           90           95
Tyr Ile Asn Phe Arg Leu Lys Thr Phe Tyr Ile Ser Pro Asn Lys Tyr
           100          105          110
Asn Asn Phe Tyr Thr Ala Pro Ser Glu Glu Lys Thr Asn His Leu Leu
           115          120          125
Lys Glu Glu Lys Thr Trp Ala Lys Ile Val Glu Glu Gly Gly Glu Glu
130          135          140

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Ser

145

<210> 183

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 183

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gaattgcctg ccccttttga cttttctctc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaaag cctcgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgtg ccctcctttt catcacttgg aaaaaaatac aatccattga gataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378

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<210> 184

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 184

atggcggttt atgcgaagga tcttgataat aacaaagagt taaacaaaa attaattaac 60
gatcagctta aaattattga cacgctcttg ctggcagaaa aaaaaactt tttggtgtat 120
gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag cctcgaggag cgcggggtta ctgtcaaaat atgtatgaaa 240
ggggatcgtg ccctcctttt catcacctgg aaaaaatac aatccattga gataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378

<210> 185

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 185

atggcggttt atgcgaagga tcttgataat aacaaagagt taaacaaaa attaattaac 60
gatcagctta aaattattga cacgctcttg ctggcagaaa aaaaaactt tttggtgtat 120
gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag cctcgaggag cgcggggtta ctgtcaaaat atgtatgaaa 240
ggggatcgtg ccctcctttt catcacctgg aaaaaatac aatccattga gataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378

<210> 186

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 186

atggcggttt atgcgaagga ccttgataat aacaaagagt taaacaaaa attgatcaac 60
gatcagctta aaatcattga cacgcttttg ctagcagaaa aaaaaactt tttggtgtac 120
gaactacctg cccattttga cttttcctcc ggcgaccctt tgggcagtca gcgcgacatt 180
tactatgcca tcataaaaag tctcgaggag cgcggtttta ctgtcaaaat atgtatgaag 240
ggagaccgcg cccttctttt catcacctgg aaaaaatac aatccattga gatcaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcgtt ttattgtaaa 360
tttttagagt ctagatga 378

<210> 187

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 187

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gatcagctta aaattattga cacgcttttg ctggcagaaa aaaaaactt tttggtgtac 120

gaactacctg cccattttga cttttcctcc ggcgaccctt tgggcagtca gcgcgacatt 180
tactatgcca tcataaaaag tctcgaggag cgcggtttta ctgtcaaaat atgtatgaag 240
ggagaccgcg cccttctttt catcacctgg aaaaaaatac aatccattga gatcaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcggt ttattgtaaa 360
tttttagagt ctagatga 378

<210> 188

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 188

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gatcagctta aaatcattga cacgtttttg ctagcagaaa aaaaaactt tttggtgtac 120
gaactacctg cccattttga cttttcctcc ggcgaccctt tgggcagtca gcgcgacatt 180
tactatgcca tcataaaaag tctcgaggag cgcggtttta ctgtcaaaat atgtatgaag 240
ggagaccgcg cccttctttt catcacctgg aaaaaaatac aatccattga gatcaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcggt ttattgtaaa 360
tttttagagt ctagatga 378

<210> 189

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 189

atggcggttt atgcgaagga tcttgataat aacaaagagt taaacaaaa attaattaac 60
gatcagctta aaattattga cacgtctttg ctagcagaaa aaaaaactt tttggtgtat 120
gaattgcctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag cctcgaggag cgcggtttta ctgtcaaaat atgtatgaaa 240
ggggatcggt ccctcctttt catcacttgg aaaaaaatac aatccattga gataaacaaa 300
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tttttagagt ctagatga 378

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<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 190

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gaactacctg cccactatga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag tctcgaggag cgcggtttta ctgtcaaaat ttgtatgaaa 240
ggagatcgcg cccttctttt catcacctgg aaaaaaatac aatccattga gataaacaaa 300

aaagaagaat atctgcgcat gcacttcata caagatgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378
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<213> 非洲猪瘟病毒
<400> 191
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gaattgcctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag cctcgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgtg ccctcctttt catcacttgg aaaaaatac aatccattga gataaacaaa 300
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tttttagagt ctagatga 378
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<212> DNA
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gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaag tctcgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgcg ccctcctttt catcacctgg aaaaaatac aatccattga gataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378
<210> 193
<211> 378
<212> DNA
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<400> 193
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gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgtgacata 180
tactatgcca tcataaaaag tcttgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgtg ccctcctttt catcacctgg aaaaaatac aatccattga aataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaatcatt ttattgtaaa 360
tttttagagt ctagatga 378
<210> 194

<211> 378

<212> DNA

<213> 非洲猪瘟病毒

<400> 194

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gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaaag tctcgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgcg ccctcctttt catcacctgg aaaaaaatac aatccattga gataaacaaa 300
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tttttagagt ctagatga 378
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<210> 195

<211> 378

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<213> 非洲猪瘟病毒

<400> 195

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gaactacctg ccccttttga cttttcctcc ggcgaccctt tggccagtca gcgcgacata 180
tactatgcca tcataaaaaag tctcgaggag cgcggggttta ctgtcaaaat atgtatgaaa 240
ggggatcgcg ccctcctttt catcacctgg aaaaaaatac aatccattga gataaacaaa 300
aaagaagaat atctgcgcat gcacttcata caagacgaag agaaagcatt ttattgtaaa 360
tttttagagt ctagatga 378
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<210> 196

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 196

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1           5           10           15
Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala
          20           25           30
Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe
          35           40           45
Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile
          50           55           60
Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys
65           70           75           80
Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile
```

	85		90		95
Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp					
100		105		110	
Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg					
115		120		125	

<210> 197

<211> 125

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<213> 非洲猪瘟病毒

<400> 197

Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln					
1	5		10		15
Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala					
20		25		30	
Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe					
35		40		45	
Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile					
50		55		60	
Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys					
65	70		75		80
Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile					
85		90		95	
Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp					
100		105		110	
Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg					
115		120		125	

<210> 198

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 198

Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln					
1	5		10		15
Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala					
20		25		30	
Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala His Phe Asp Phe					
35		40		45	
Ser Ser Gly Asp Pro Leu Gly Ser Gln Arg Asp Ile Tyr Tyr Ala Ile					
50		55		60	

35	40	45
Ser Ser Gly Asp Pro Leu Gly	Ser Gln Arg Asp Ile Tyr Tyr Ala Ile	
50	55	60
Ile Lys Ser Leu Glu Glu Arg Gly	Phe Thr Val Lys Ile Cys Met Lys	
65	70	75
Gly Asp Arg Ala Leu Leu Phe Ile	Thr Trp Lys Lys Ile Gln Ser Ile	
85	90	95
Glu Ile Asn Lys Lys Glu Glu Tyr	Leu Arg Met His Phe Ile Gln Asp	
100	105	110
Glu Glu Lys Ala Phe Tyr Cys Lys	Phe Leu Glu Ser Arg	
115	120	125

<210> 201

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 201

Met Ala Val Tyr Ala Lys Asp Leu	Asp Asn Asn Lys Glu Leu Asn Gln
1	5 10 15
Lys Leu Ile Asn Asp Gln Leu Lys	Ile Ile Asp Thr Leu Leu Leu Ala
20	25 30
Glu Lys Lys Asn Phe Leu Val Tyr	Glu Leu Pro Ala Pro Phe Asp Phe
35	40 45
Ser Ser Gly Asp Pro Leu Ala Ser	Gln Arg Asp Ile Tyr Tyr Ala Ile
50	55 60
Ile Lys Ser Leu Glu Glu Arg Gly	Phe Thr Val Lys Ile Cys Met Lys
65	70 75 80
Gly Asp Arg Ala Leu Leu Phe Ile	Thr Trp Lys Lys Ile Gln Ser Ile
85	90 95
Glu Ile Asn Lys Lys Glu Glu Tyr	Leu Arg Met His Phe Ile Gln Asp
100	105 110
Glu Glu Lys Ala Phe Tyr Cys Lys	Phe Leu Glu Ser Arg
115	120 125

<210> 202

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 202

Met Ala Val Tyr Ala Lys Asp Leu	Asp Asn Asn Lys Glu Leu Asn Gln
1	5 10 15

Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala
 20 25 30
 Glu Lys Lys Asn Phe Leu Val His Glu Leu Pro Ala His Tyr Asp Phe
 35 40 45
 Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile
 50 55 60
 Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys
 65 70 75 80
 Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile
 85 90 95
 Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp
 100 105 110
 Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg
 115 120 125

<210> 203

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 203

Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln
 1 5 10 15
 Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala
 20 25 30
 Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe
 35 40 45
 Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile
 50 55 60
 Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys
 65 70 75 80
 Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile
 85 90 95
 Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp
 100 105 110
 Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg
 115 120 125

<210> 204

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 204

Met	Ala	Val	Tyr	Ala	Lys	Asp	Leu	Asp	Asn	Asn	Lys	Glu	Leu	Asn	Gln
1				5					10					15	
Lys	Leu	Ile	Asn	Asp	Gln	Leu	Lys	Ile	Ile	Asp	Thr	Leu	Leu	Leu	Ala
			20					25					30		
Glu	Lys	Lys	Asn	Phe	Leu	Val	Tyr	Glu	Leu	Pro	Ala	Pro	Phe	Asp	Phe
		35					40					45			
Ser	Ser	Gly	Asp	Pro	Leu	Ala	Ser	Gln	Arg	Asp	Ile	Tyr	Tyr	Ala	Ile
	50					55				60					
Ile	Lys	Ser	Leu	Glu	Glu	Arg	Gly	Phe	Thr	Val	Lys	Ile	Cys	Met	Lys
65				70					75					80	
Gly	Asp	Arg	Ala	Leu	Leu	Phe	Ile	Thr	Trp	Lys	Lys	Ile	Gln	Ser	Ile
			85					90					95		
Glu	Ile	Asn	Lys	Lys	Glu	Glu	Tyr	Leu	Arg	Met	His	Phe	Ile	Gln	Asp
		100						105				110			
Glu	Glu	Lys	Ala	Phe	Tyr	Cys	Lys	Phe	Leu	Glu	Ser	Arg			
		115					120					125			

<210> 205

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 205

Met	Ala	Val	Tyr	Ala	Lys	Asp	Leu	Asp	Asn	Asn	Lys	Glu	Leu	Asn	Gln
1				5					10					15	
Lys	Leu	Ile	Asn	Asp	Gln	Leu	Lys	Ile	Ile	Asp	Thr	Leu	Leu	Leu	Ala
			20					25					30		
Glu	Lys	Lys	Asn	Phe	Leu	Val	Tyr	Glu	Leu	Pro	Ala	Pro	Phe	Asp	Phe
		35					40					45			
Ser	Ser	Gly	Asp	Pro	Leu	Ala	Ser	Gln	Arg	Asp	Ile	Tyr	Tyr	Ala	Ile
	50					55				60					
Ile	Lys	Ser	Leu	Glu	Glu	Arg	Gly	Phe	Thr	Val	Lys	Ile	Cys	Met	Lys
65				70					75					80	
Gly	Asp	Arg	Ala	Leu	Leu	Phe	Ile	Thr	Trp	Lys	Lys	Ile	Gln	Ser	Ile
			85					90					95		
Glu	Ile	Asn	Lys	Lys	Glu	Glu	Tyr	Leu	Arg	Met	His	Phe	Ile	Gln	Asp
		100						105				110			
Glu	Glu	Lys	Ser	Phe	Tyr	Cys	Lys	Phe	Leu	Glu	Ser	Arg			
		115					120					125			

<210> 206

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 206

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Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln
1           5           10           15
Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala
          20           25           30
Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe
          35           40           45
Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile
          50           55           60
Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys
65           70           75           80
Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile
          85           90           95
Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp
          100          105          110
Glu Glu Lys Ala Phe Tyr Cys Lys Phe Leu Glu Ser Arg
          115          120          125
```

<210> 207

<211> 125

<212> PRT

<213> 非洲猪瘟病毒

<400> 207

```
Met Ala Val Tyr Ala Lys Asp Leu Asp Asn Asn Lys Glu Leu Asn Gln
1           5           10           15
Lys Leu Ile Asn Asp Gln Leu Lys Ile Ile Asp Thr Leu Leu Leu Ala
          20           25           30
Glu Lys Lys Asn Phe Leu Val Tyr Glu Leu Pro Ala Pro Phe Asp Phe
          35           40           45
Ser Ser Gly Asp Pro Leu Ala Ser Gln Arg Asp Ile Tyr Tyr Ala Ile
          50           55           60
Ile Lys Ser Leu Glu Glu Arg Gly Phe Thr Val Lys Ile Cys Met Lys
65           70           75           80
Gly Asp Arg Ala Leu Leu Phe Ile Thr Trp Lys Lys Ile Gln Ser Ile
          85           90           95
Glu Ile Asn Lys Lys Glu Glu Tyr Leu Arg Met His Phe Ile Gln Asp
          100          105          110
```

Glu	Glu	Lys	Ala	Phe	Tyr	Cys	Lys	Phe	Leu	Glu	Ser	Arg
115				120				125				

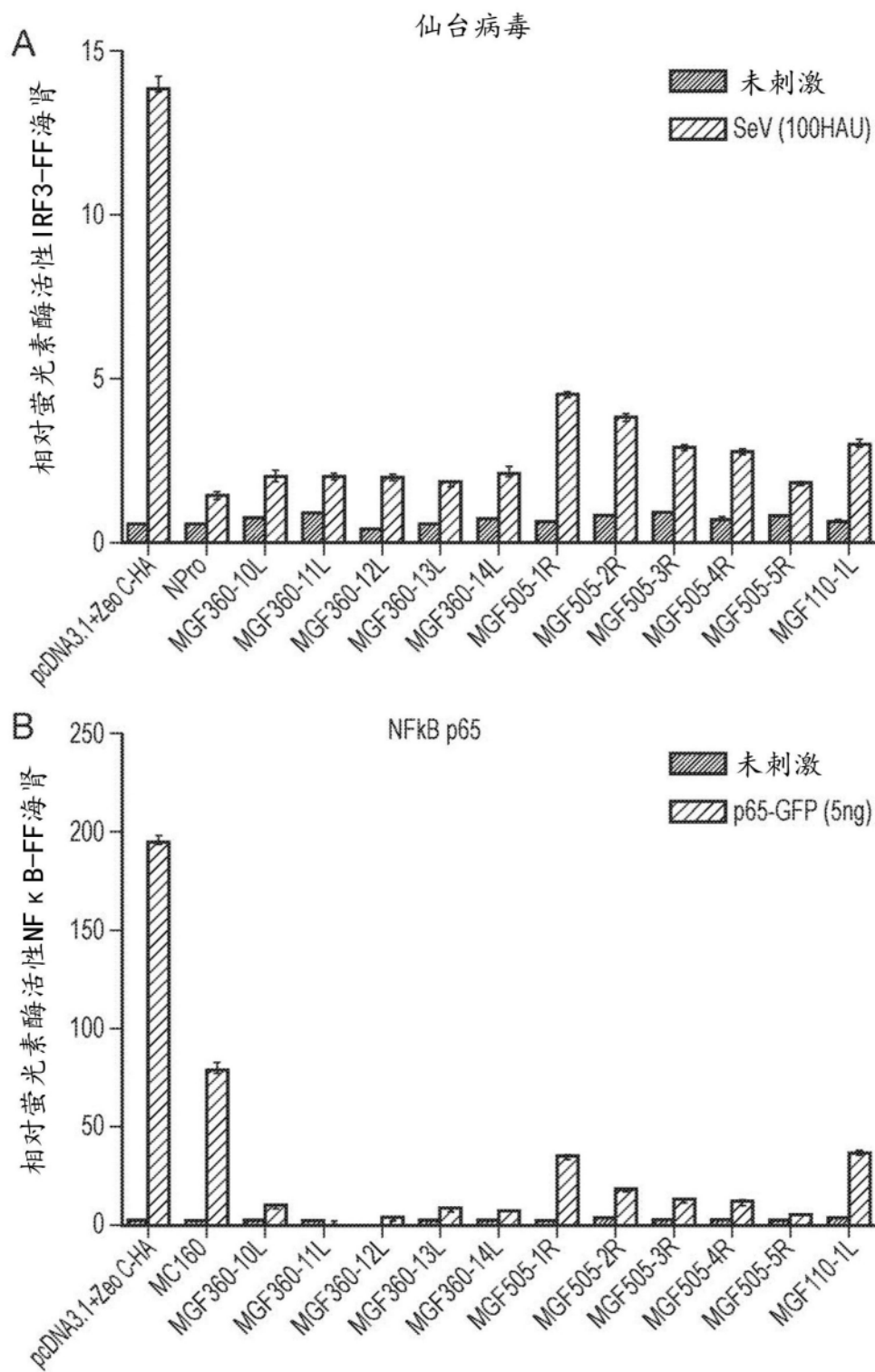


图1

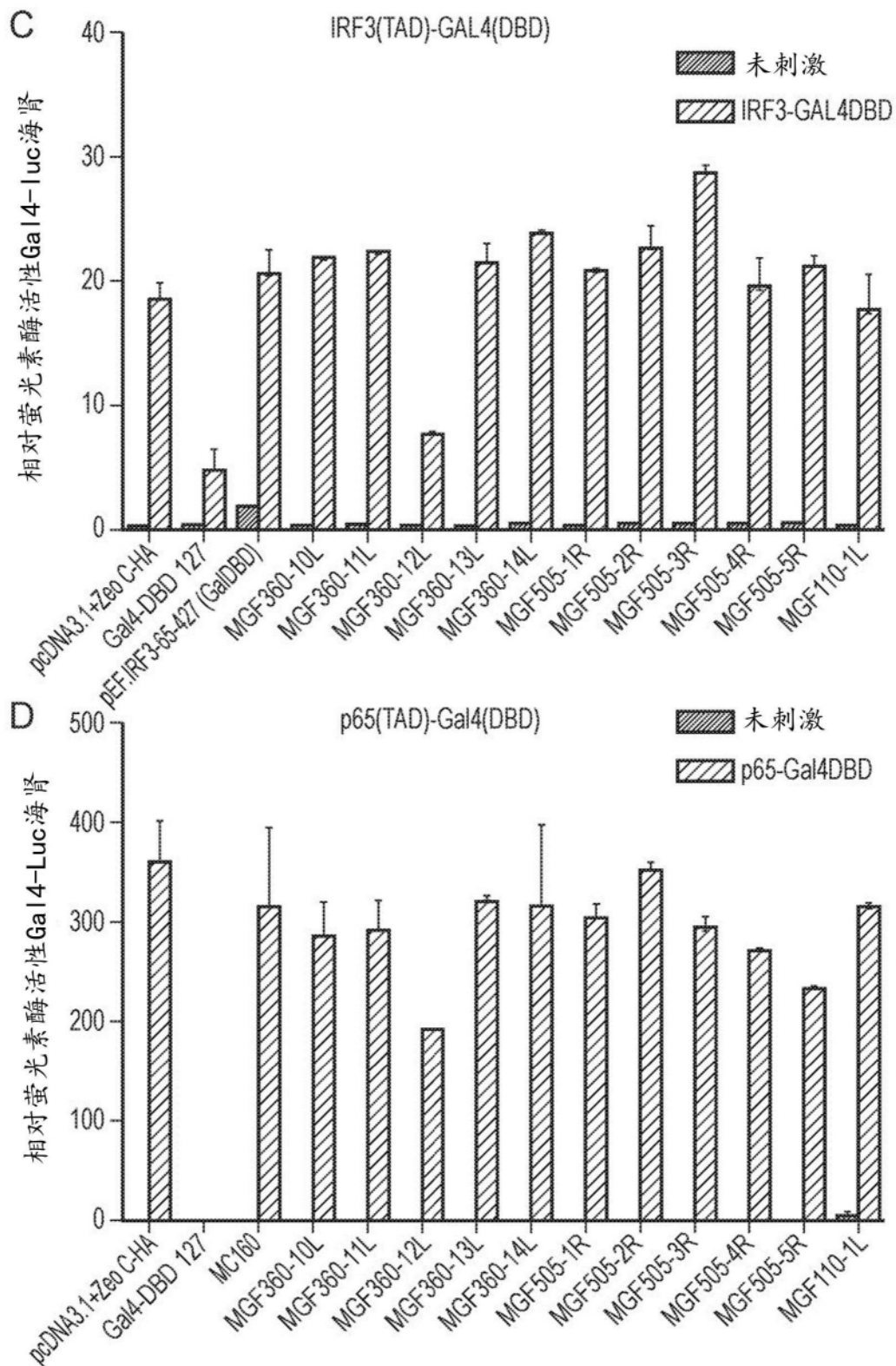
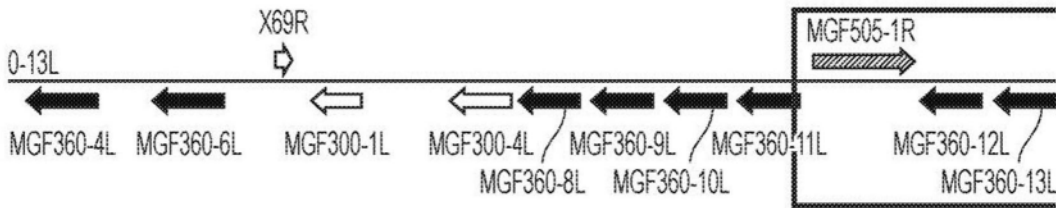


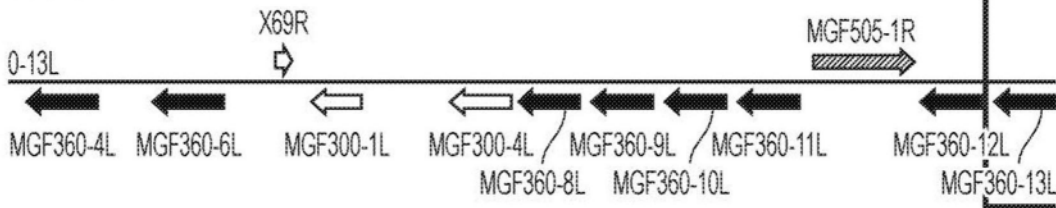
图1 (续)

MGF A



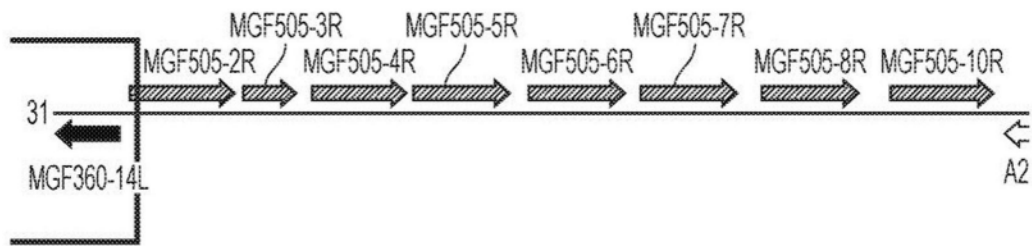
基因	基序	互作物		
			IRF3	NFkB
MGF505-1R	Ank, BC Box (x2) FBox		505中最弱	505中最弱
MGF360-12L	Ank, TRAF6 结合	TRAF3 TRAF6	最强抑制剂	最强抑制剂
MGF360-13L	Ank	IRF3, TRAF6	强	强
MGF360-14L	Ank		强	强

MGF B

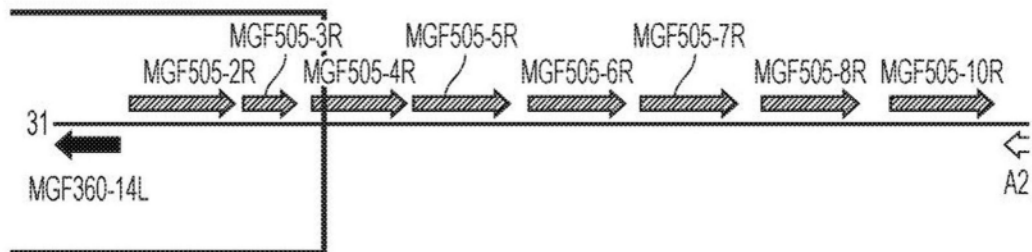


基因	基序	互作物		
			IRF3	NFkB
MGF360-13L	Ank	IRF3, TRAF6	强	强
MGF360-14L	Ank		强	强
MGF505-2R	BC Box, Fbox, CCCH?		505 增加 w. no.	505 增加 w. no.
MGF505-3R	BC Box, Fbox, CCCH? CuB	TRAF6	505 增加 w. no.	505 增加 w. no.

图2

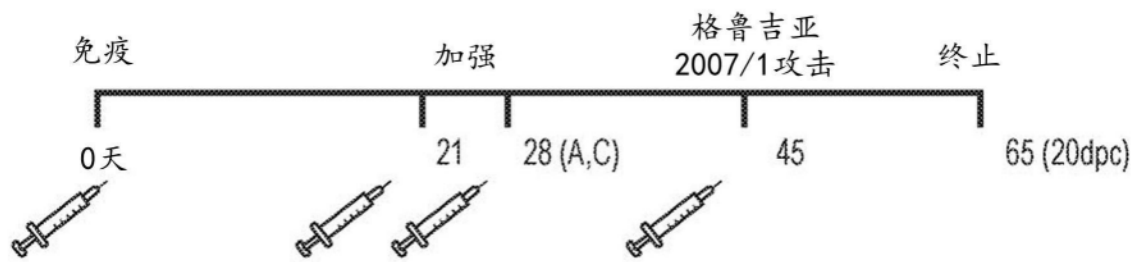


萤光素酶		定位
IRF3 - Gal.tk.Luc	p65 - Gal.tk.Luc	
无	无	细胞质、细胞核（刺激时可能从细胞核移除？）
抑制	抑制	细胞质、细胞核相等
无	无	细胞质、细胞核相等
无	无	主要为细胞质



萤光素酶		定位
IRF3 - Gal.tk.Luc	p65 - Gal.tk.Luc	
无	无	细胞质、细胞核相等
无	无	主要为细胞质
无	弱	细胞质
无	无	细胞质、细胞核稍强

图2 (续)



- 猪：大白猪/长白猪，除A组（8头）外，每组6头
- 年龄：>8周；体重>20 kg
- 免疫途径：肌内
- 免疫和加强：
 - C组： 10^4 TCID₅₀/ml 格鲁吉亚 Δ K145R Δ MGF (A)
 - D组： 10^4 TCID₅₀/ml 格鲁吉亚 Δ K145R Δ MGF (B)
- 对C组额外加强免疫(10^5 TCID₅₀/ml)
- AR001051 BA组
 - 免疫： 10^4 TCID₅₀/ml 格鲁吉亚 Δ B125R Δ MGF (A)
 - 加强：第14天 10^5 TCID₅₀/ml 格鲁吉亚 Δ B125R Δ MGF (A)
 - 攻击：第35天 10^3 HAD₅₀/ml 格鲁吉亚2007/1

图3

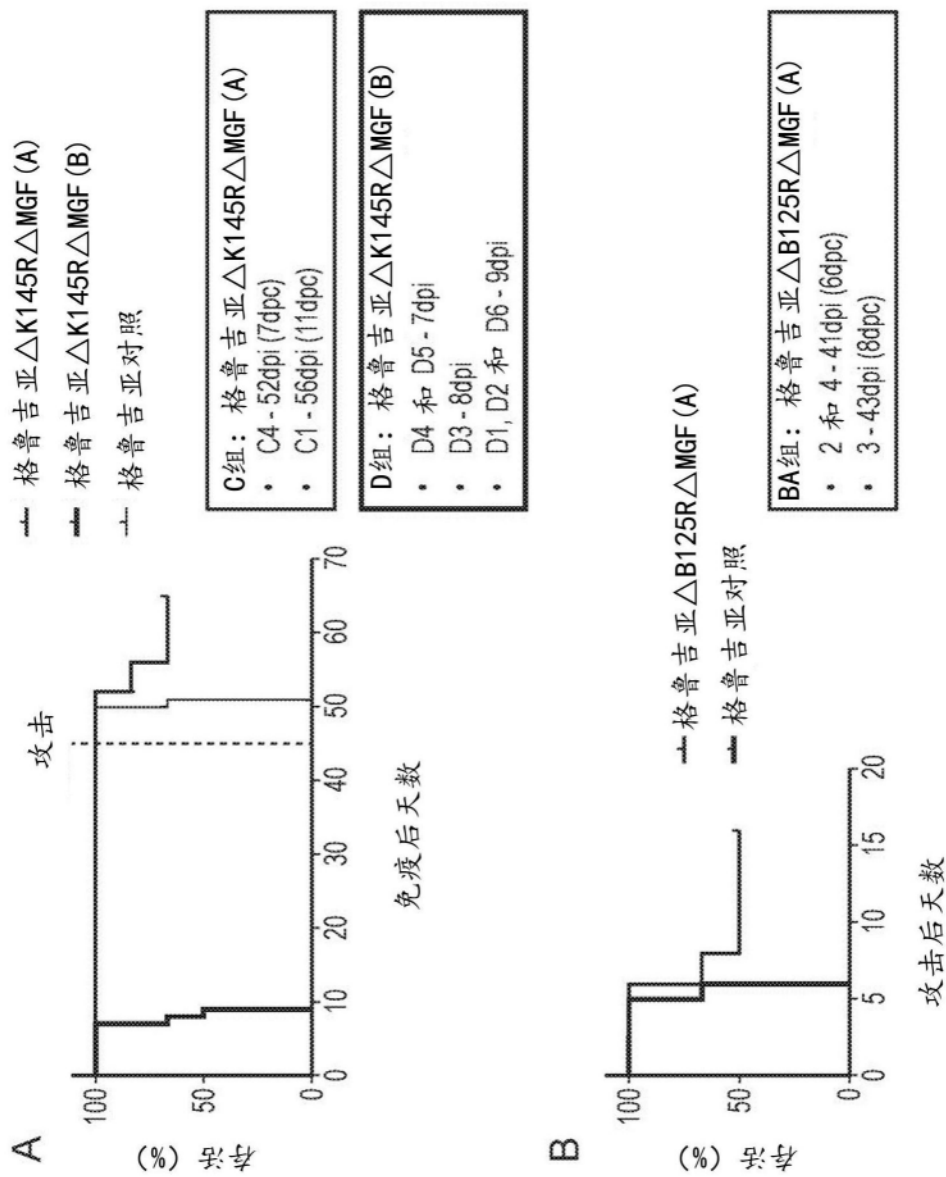


图4

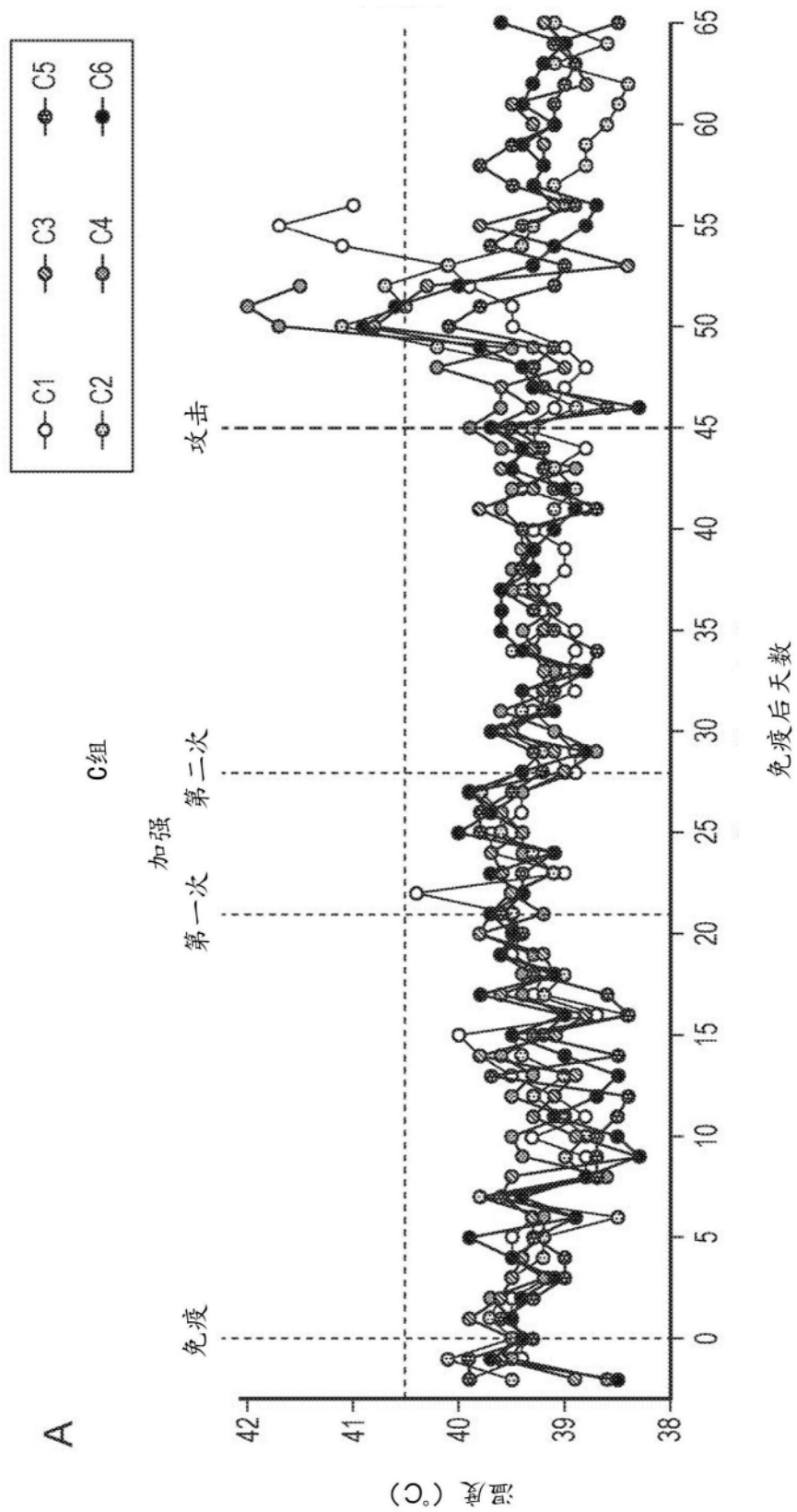


图5

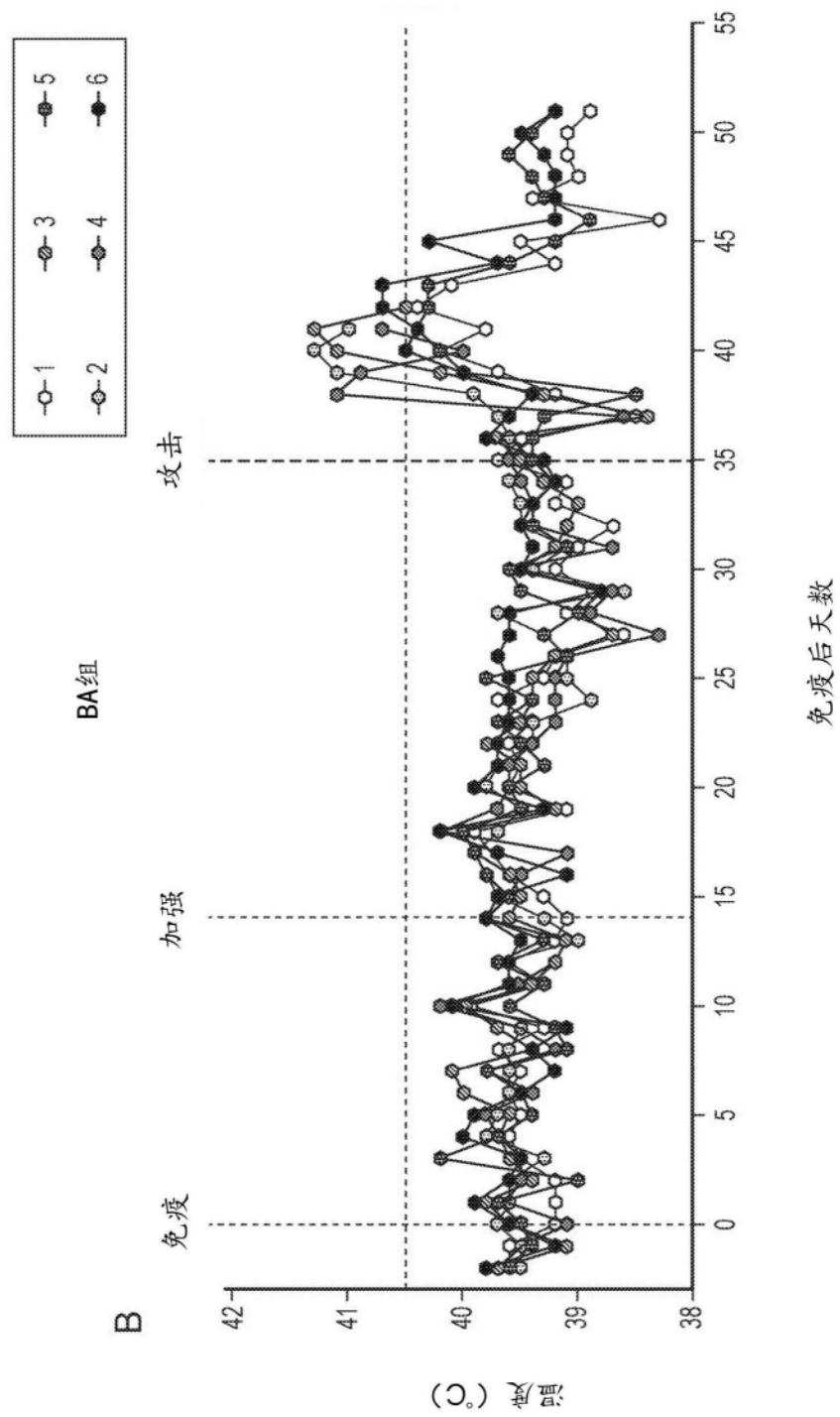


图5(续)

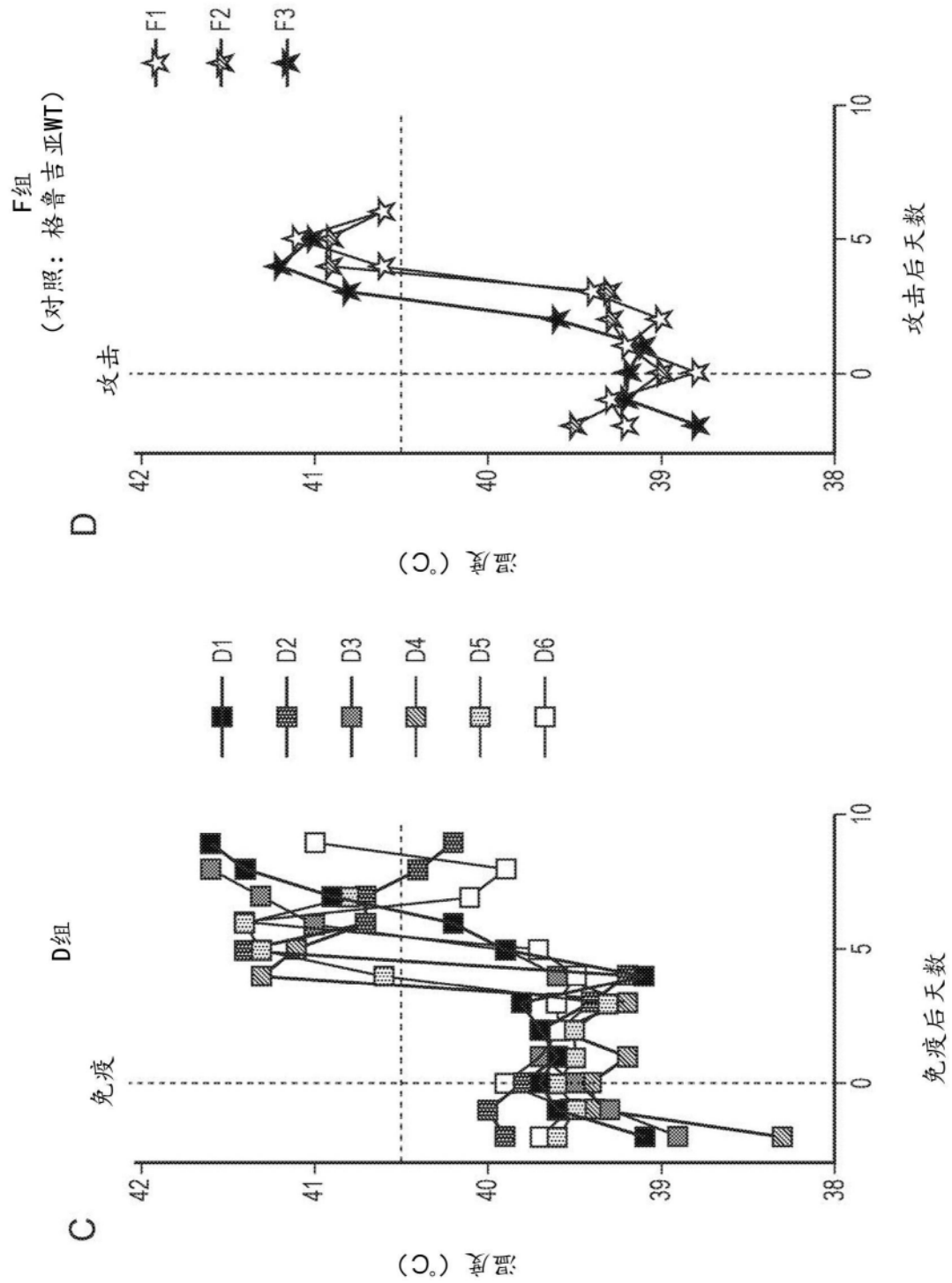


图5(续)

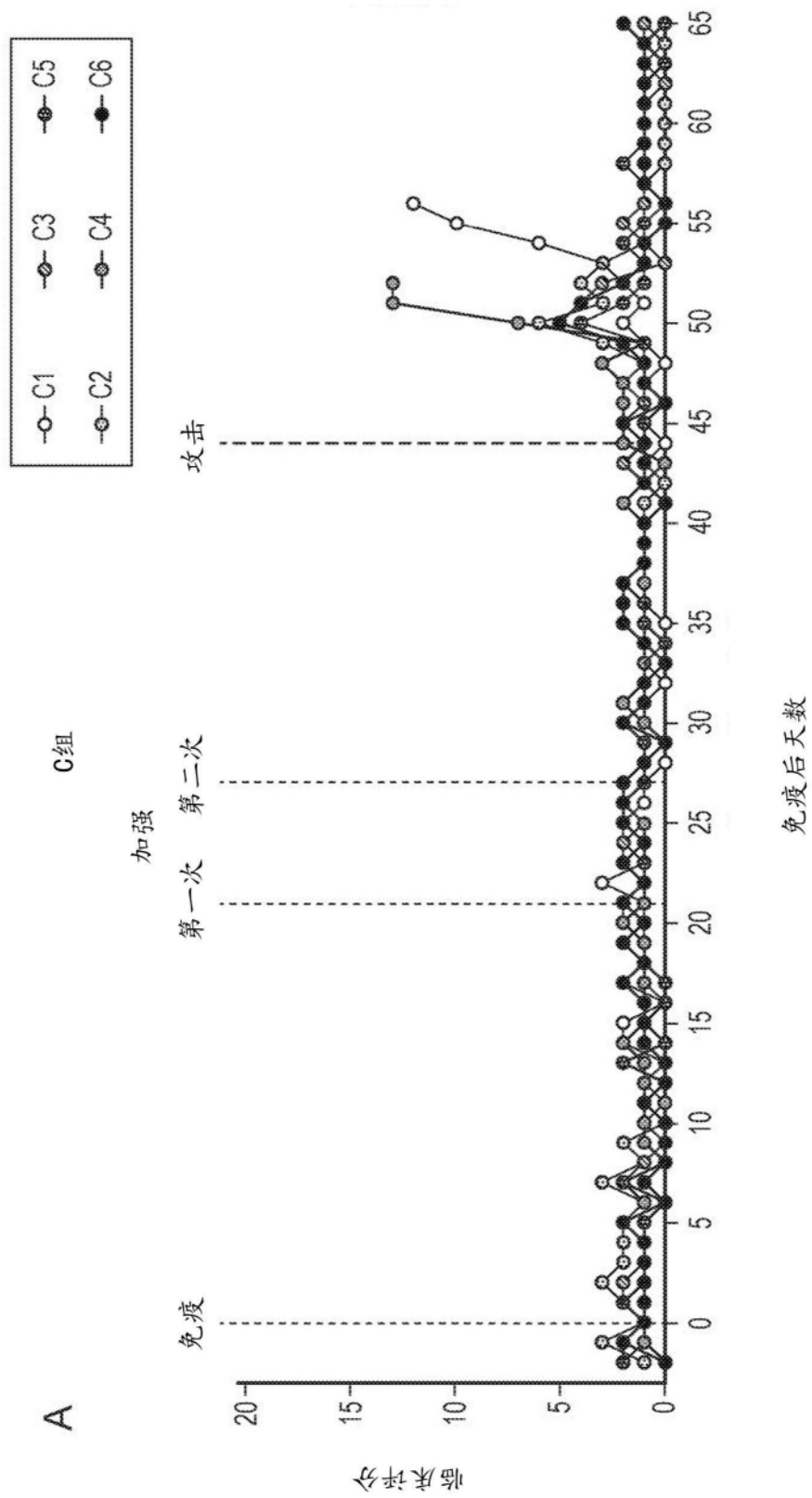


图6

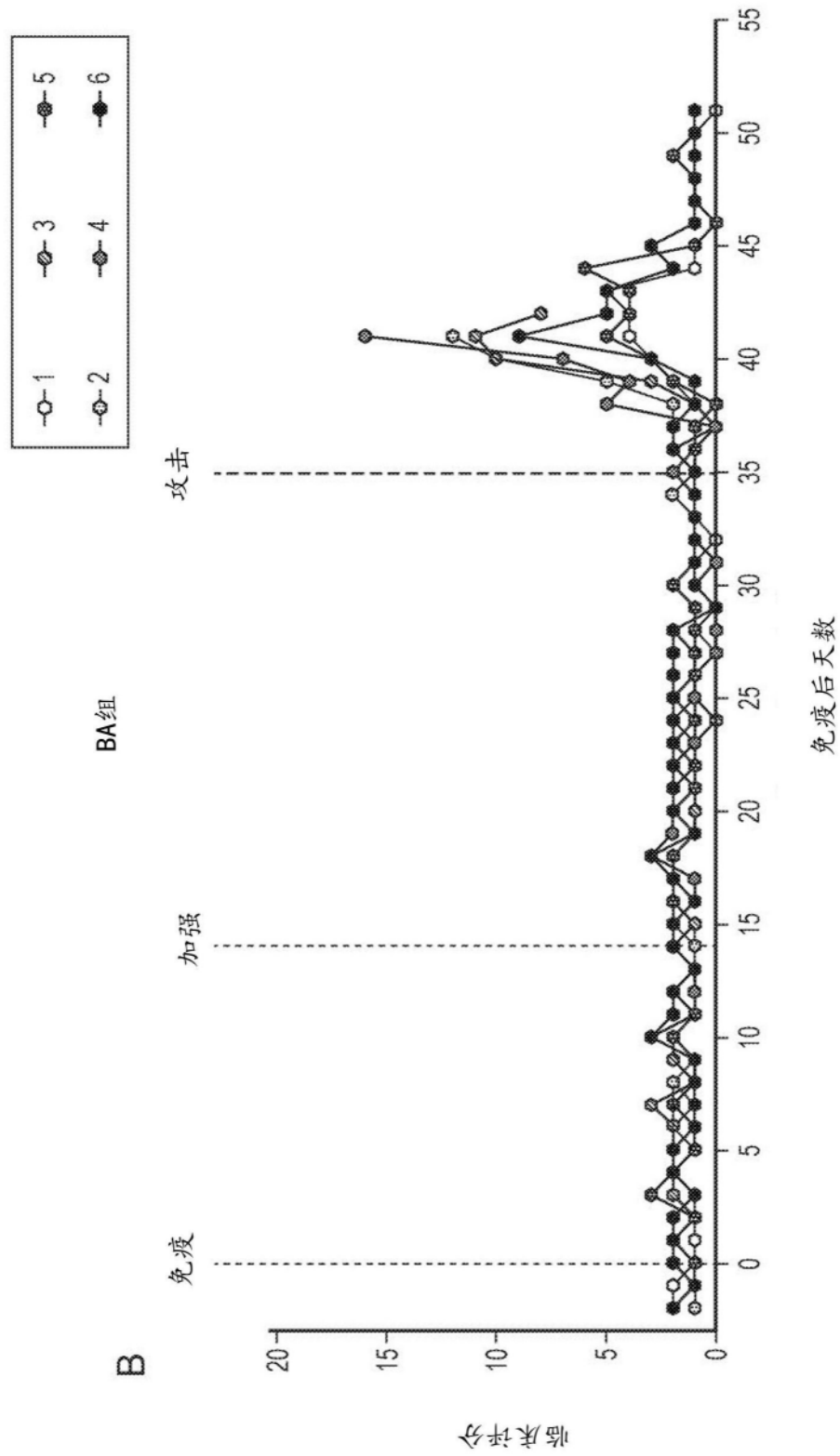


图6(续)

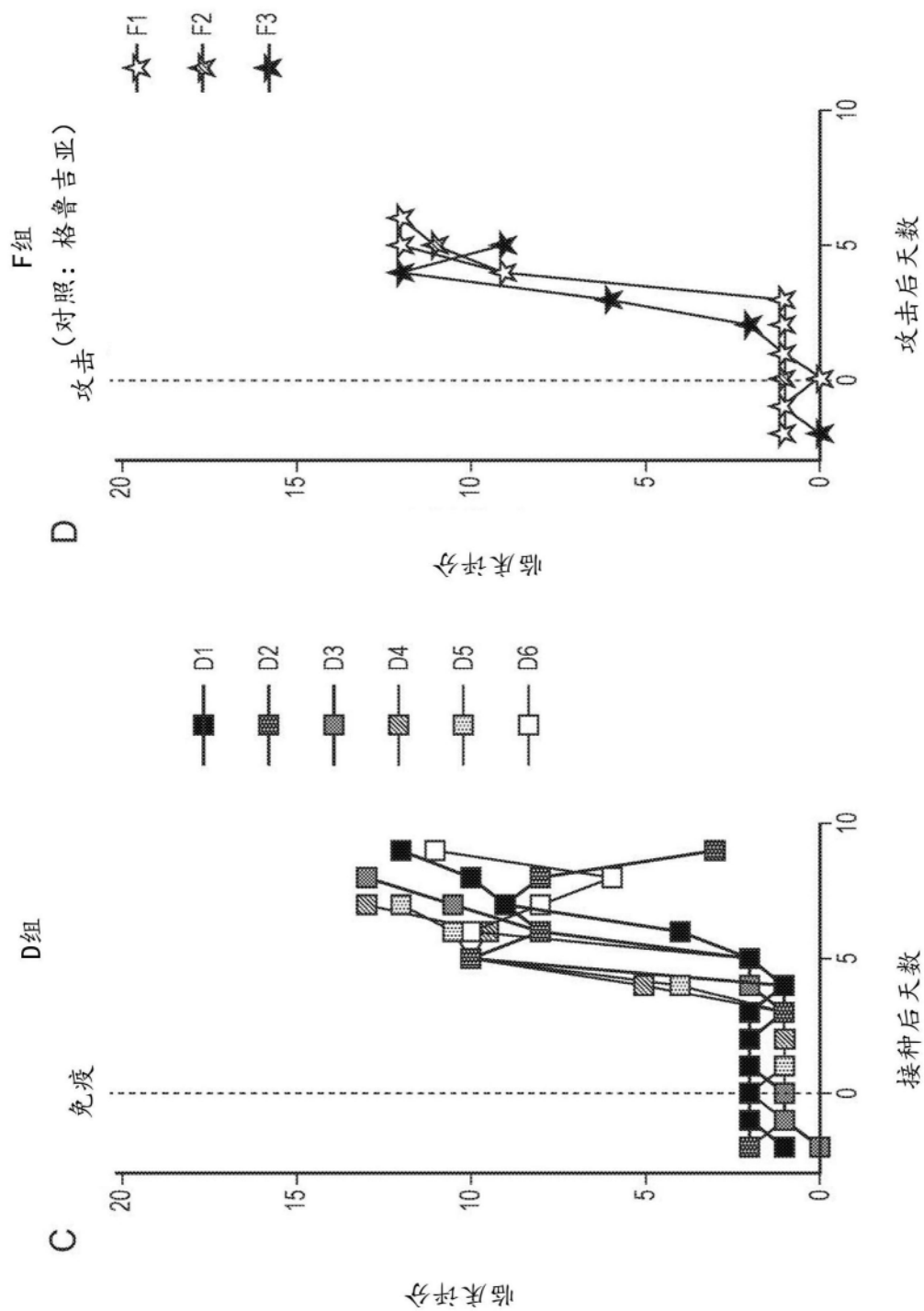


图6(续)

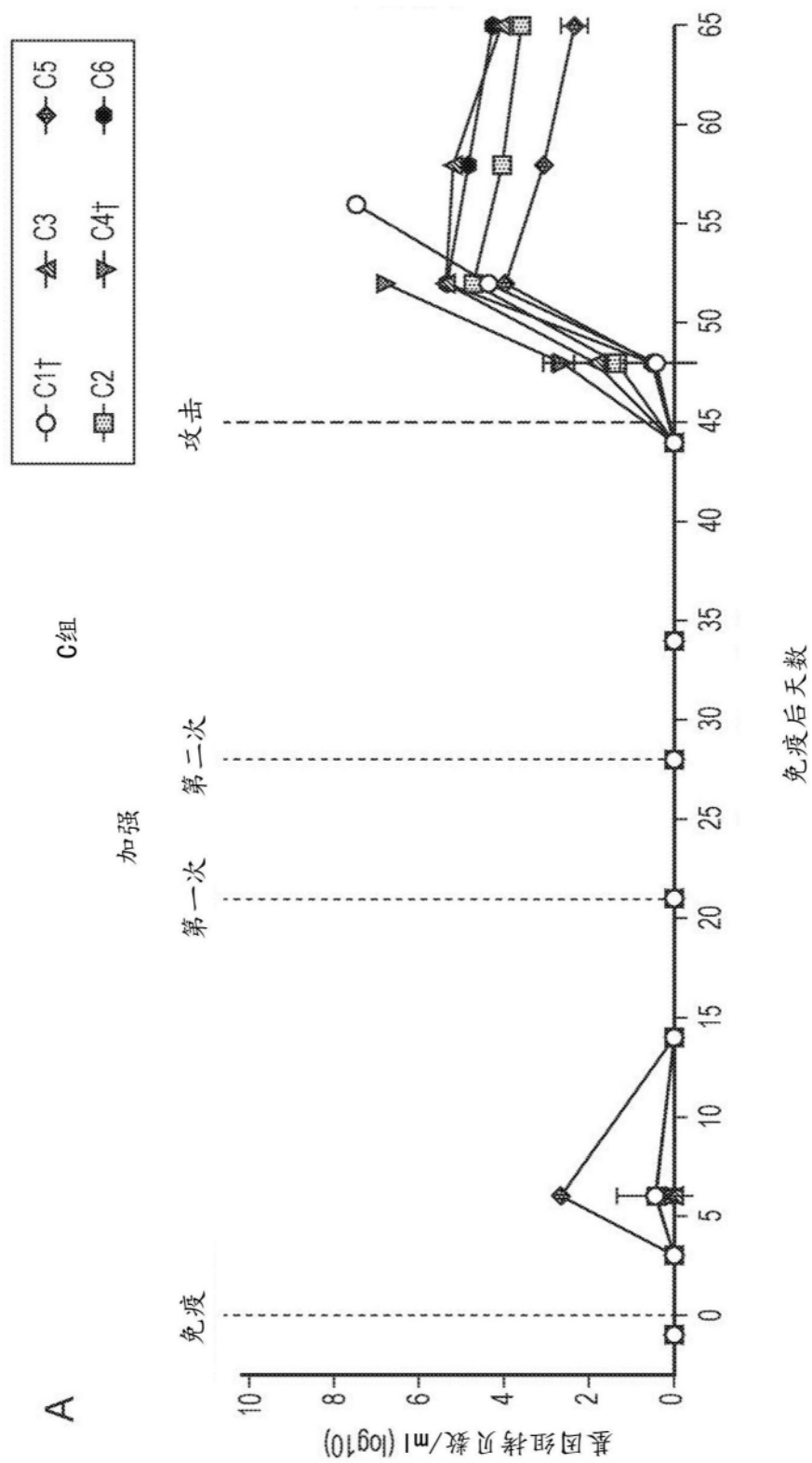


图7

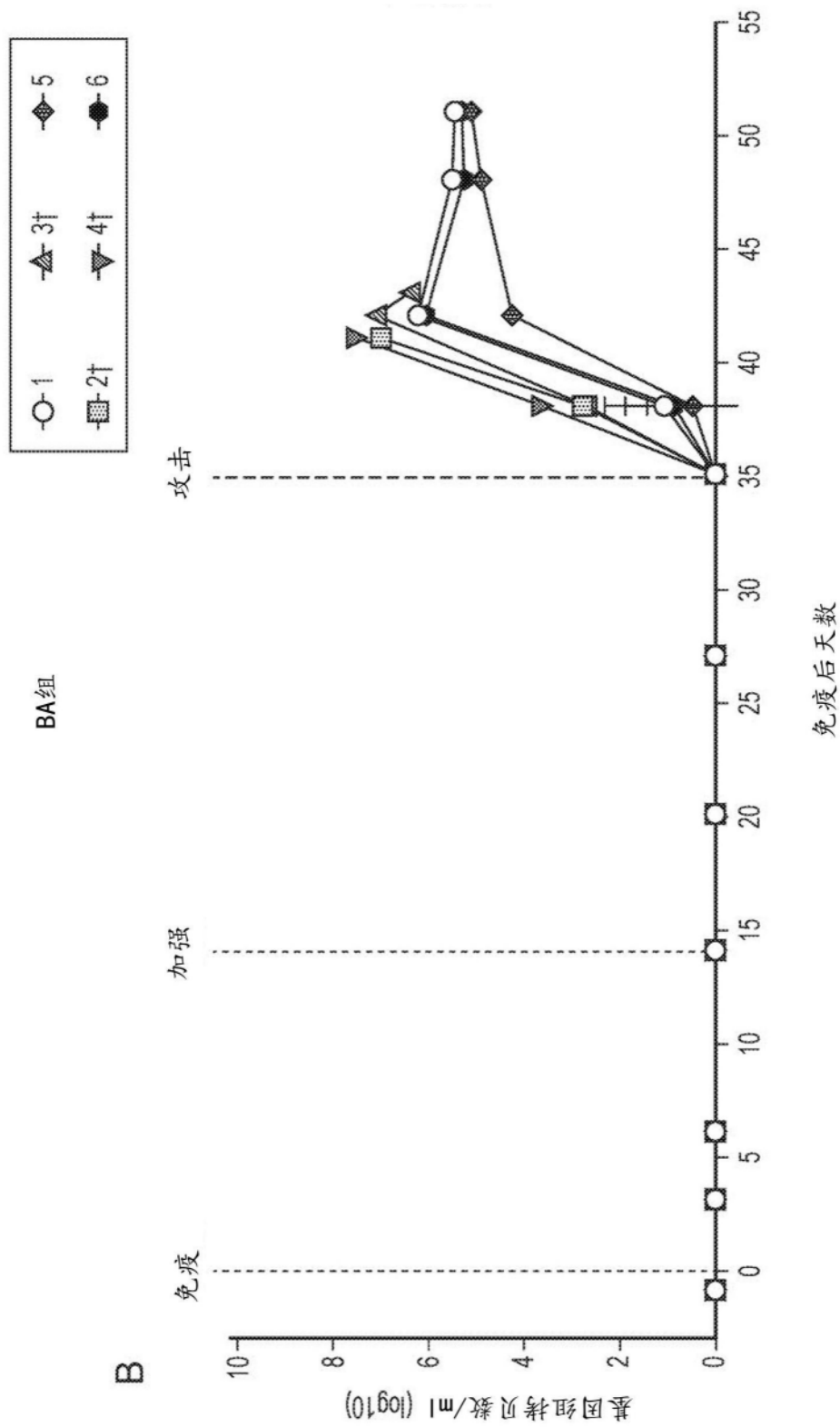


图7(续)

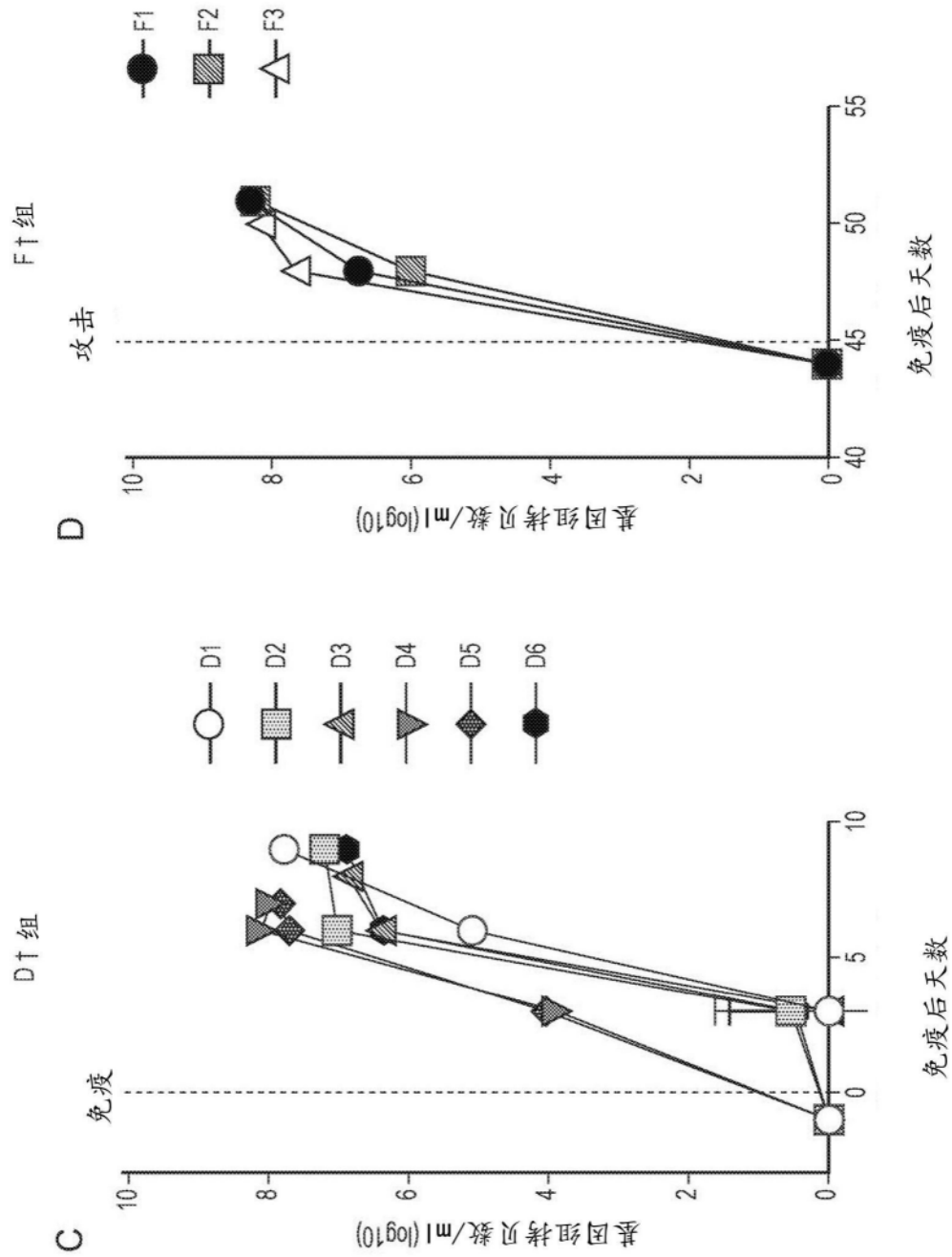


图7(续)

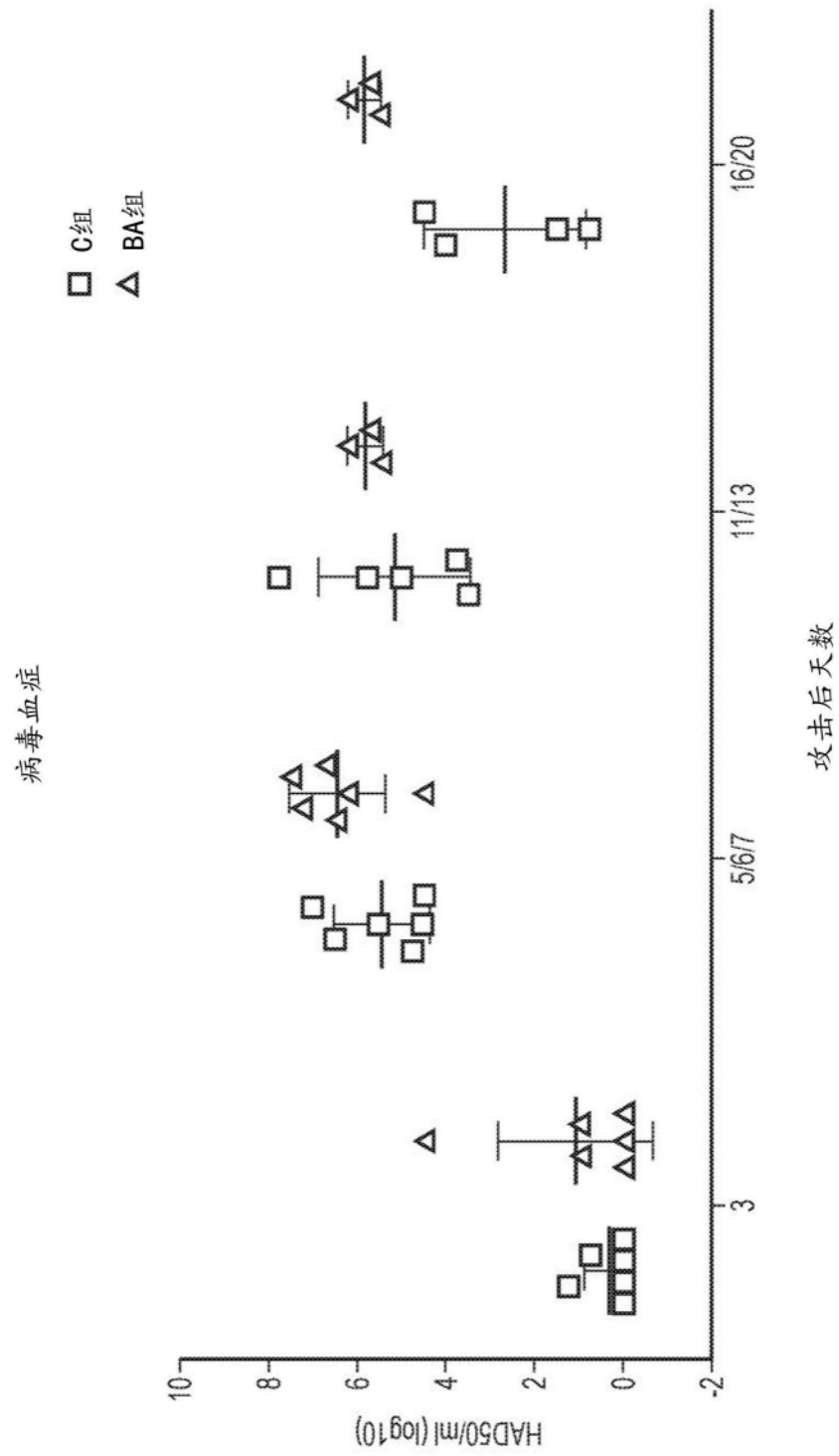


图8

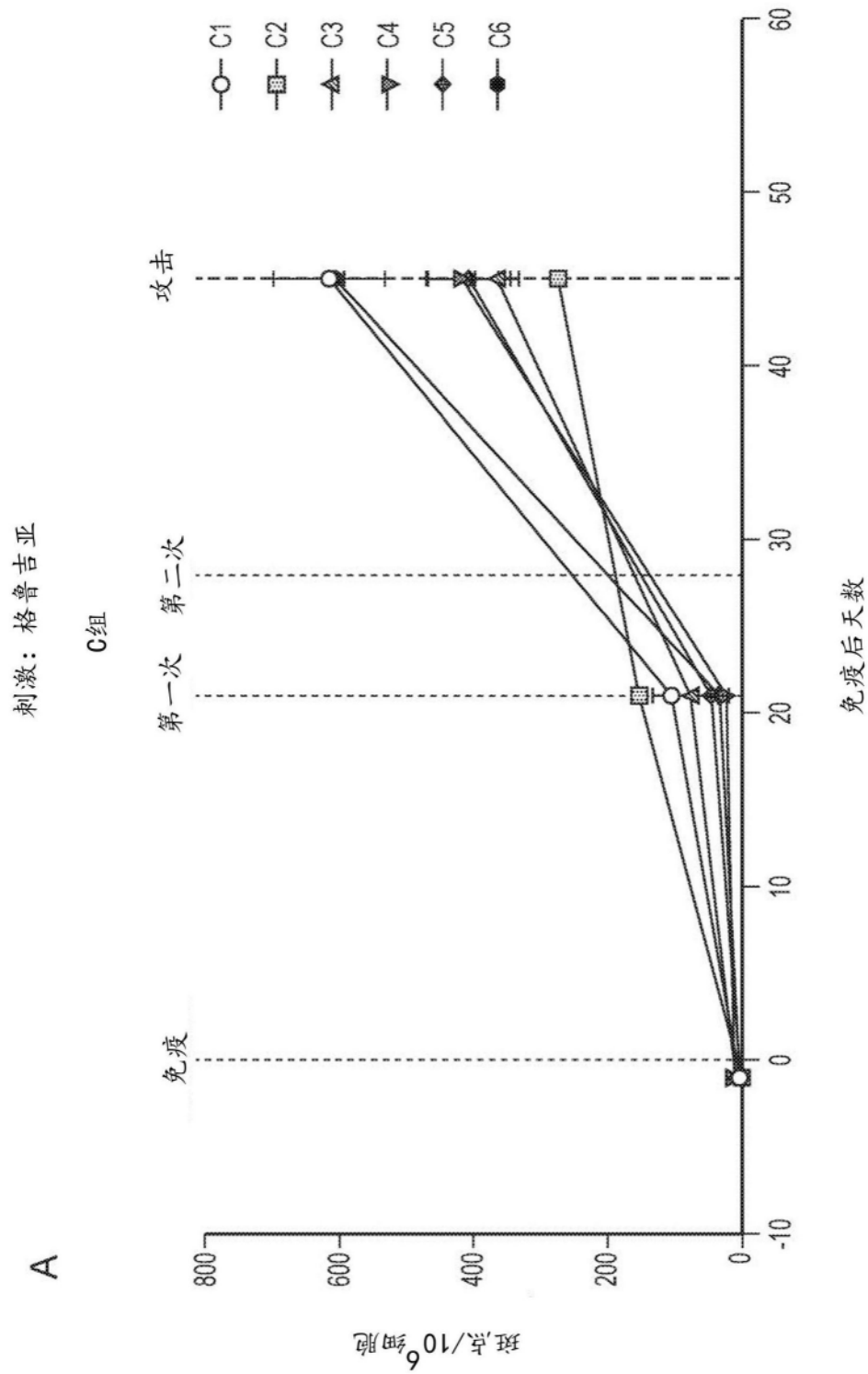


图9

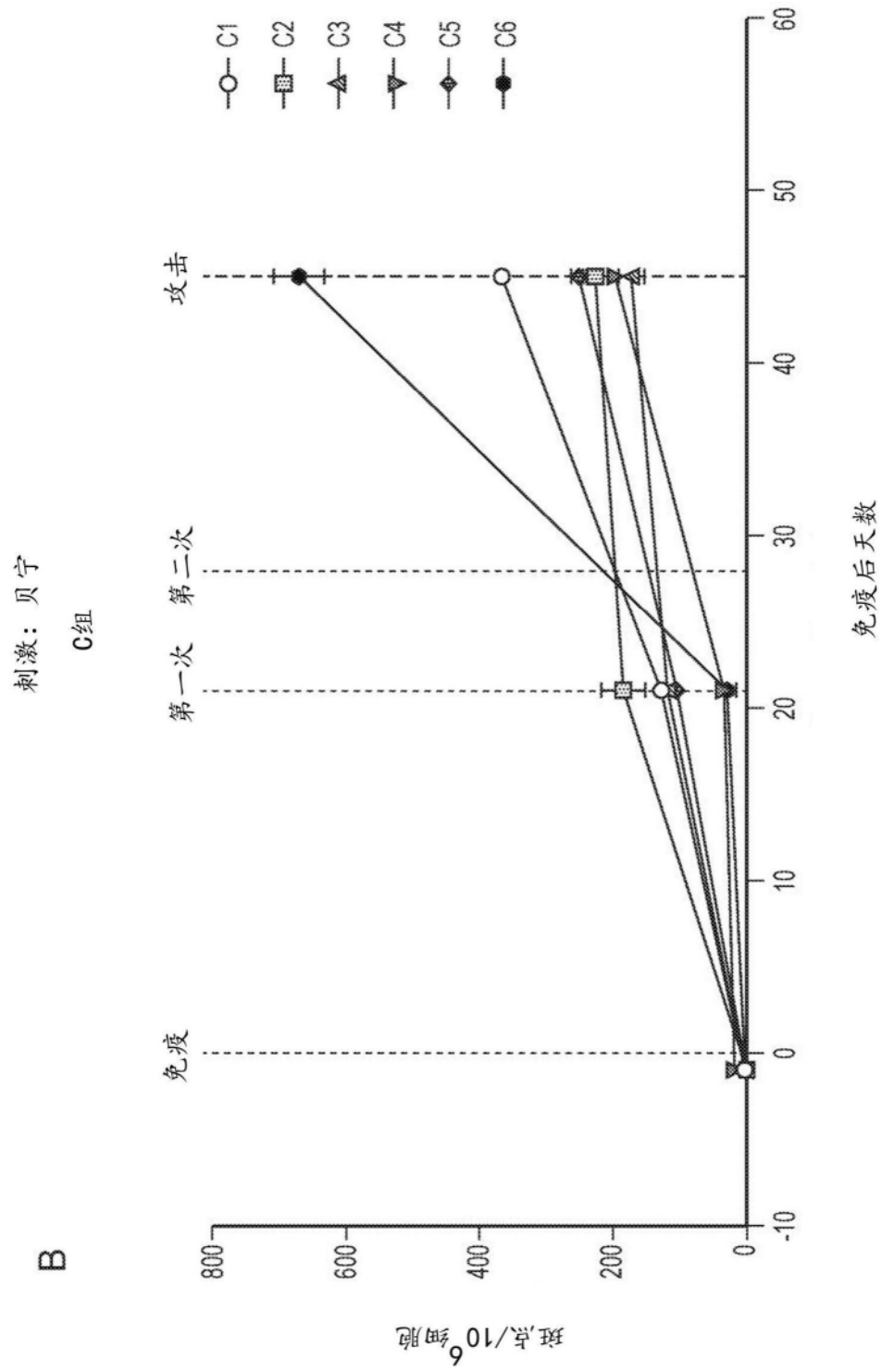


图9(续)

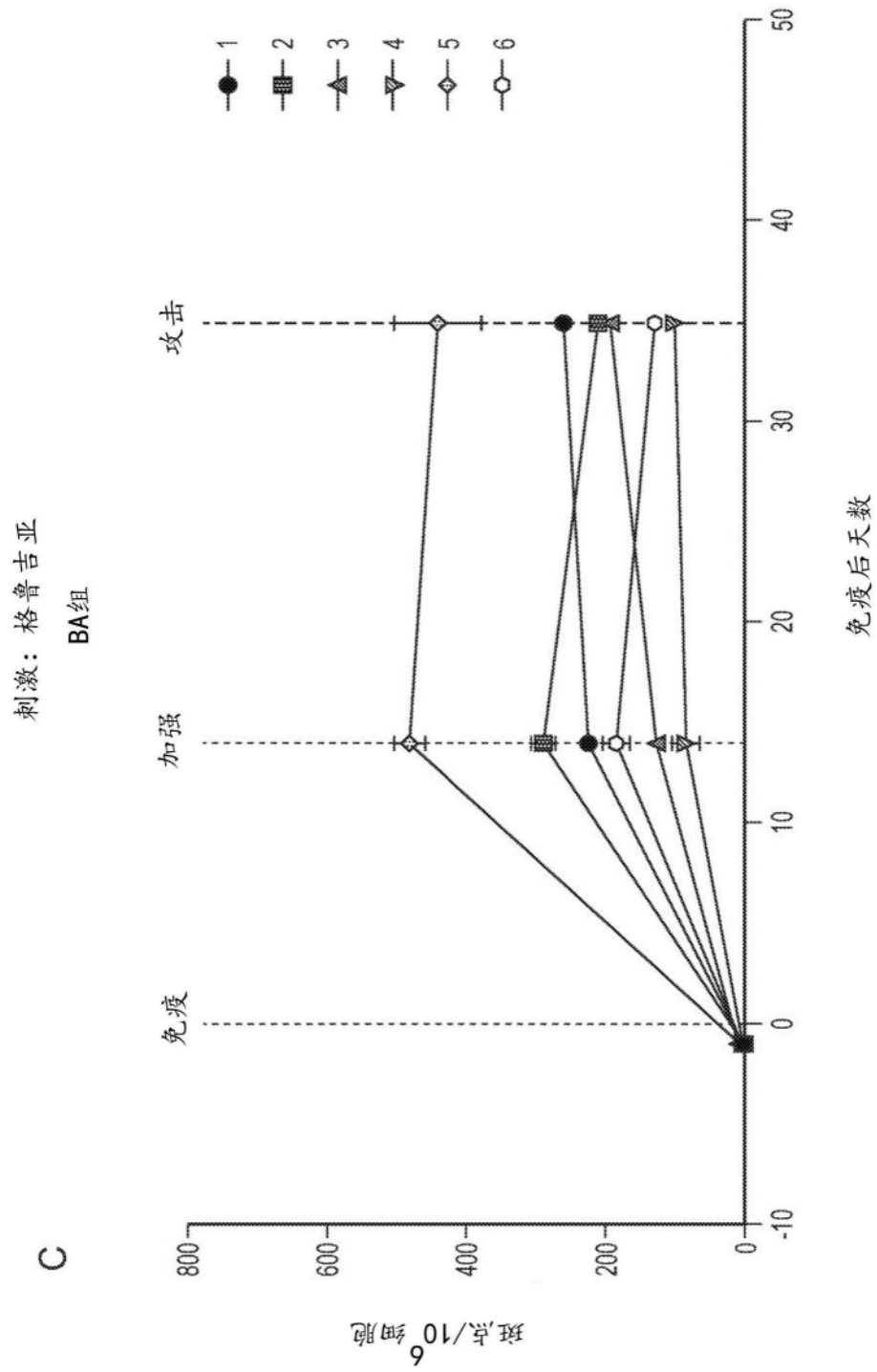


图9(续)

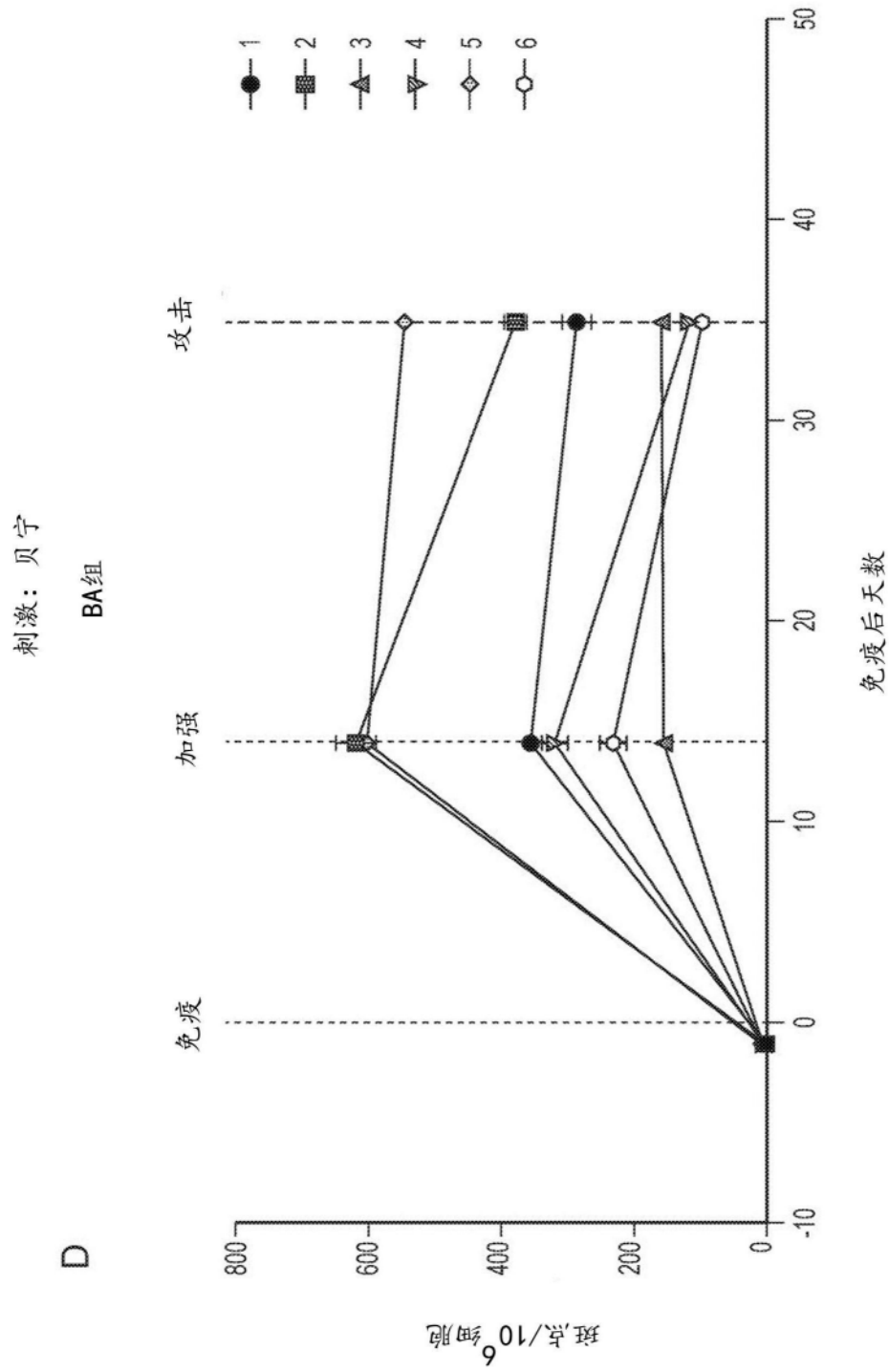


图9(续)

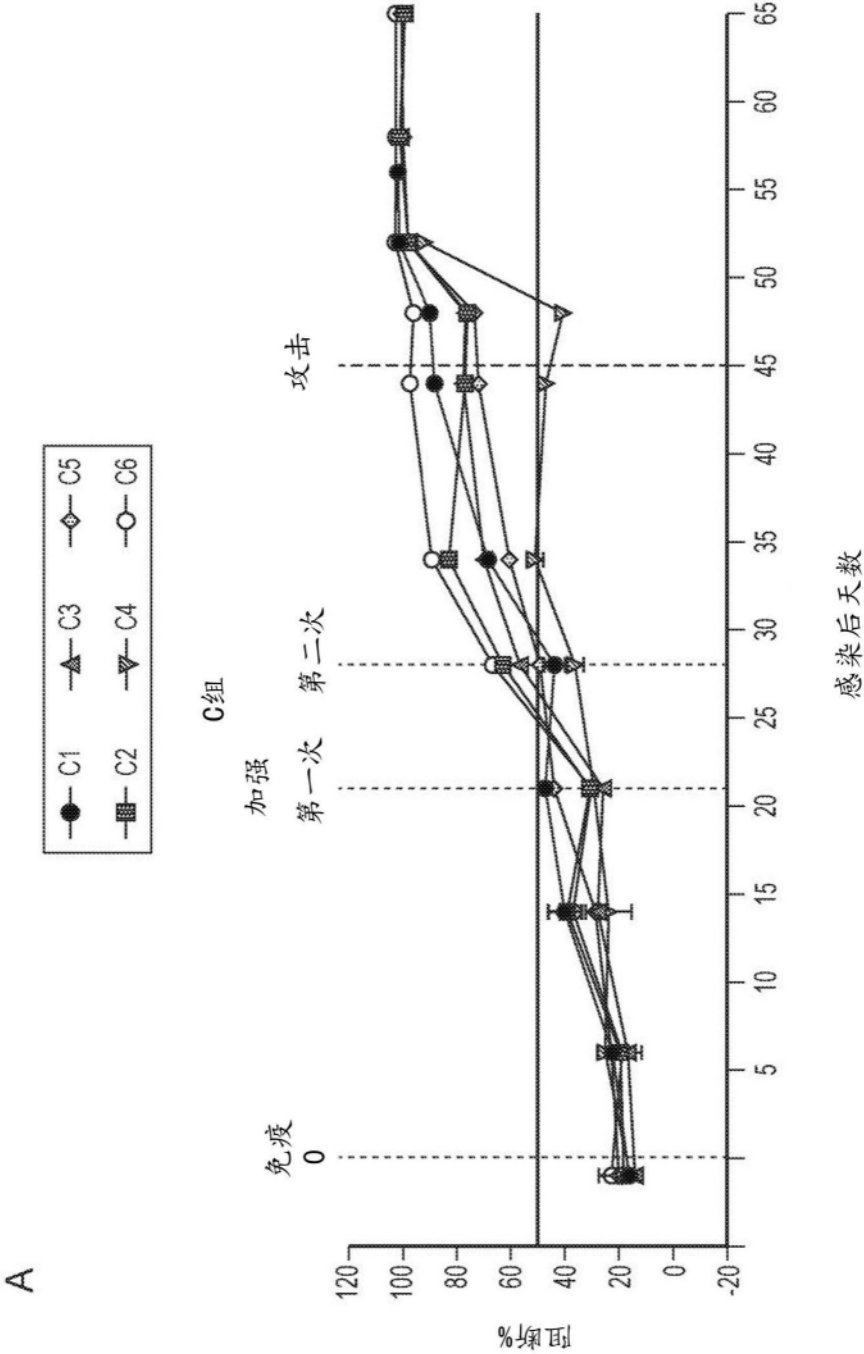


图10

B

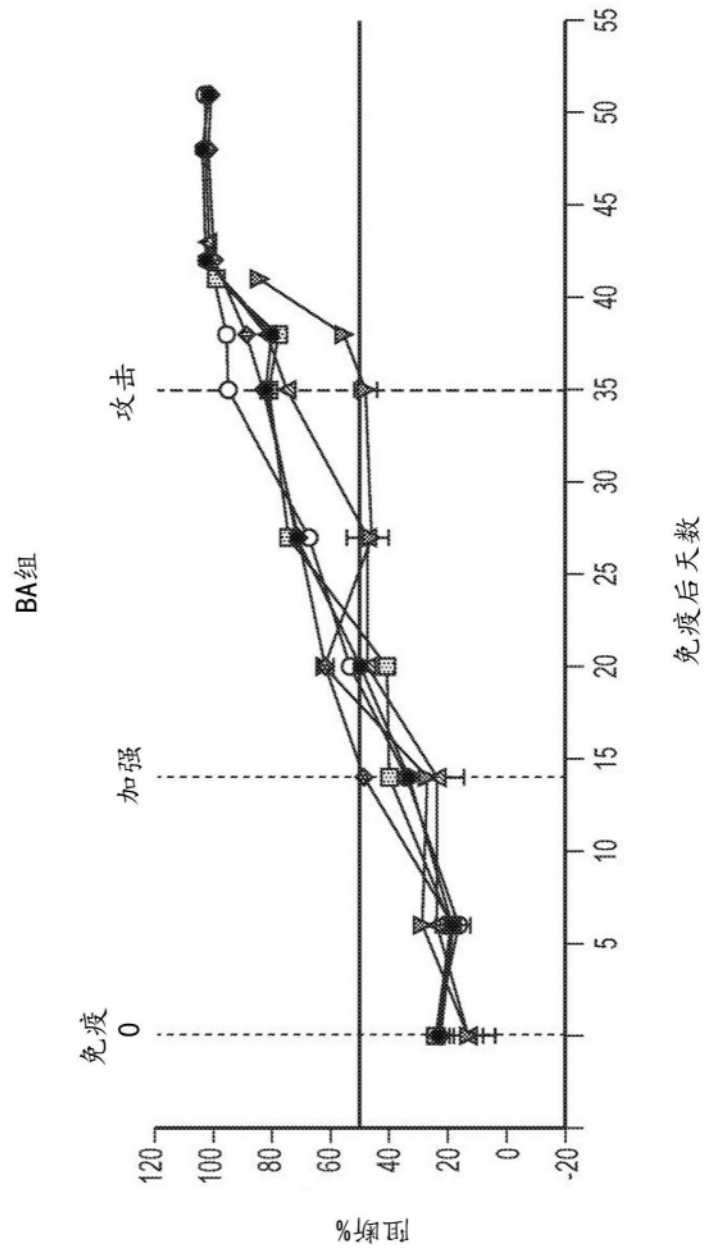


图10(续)

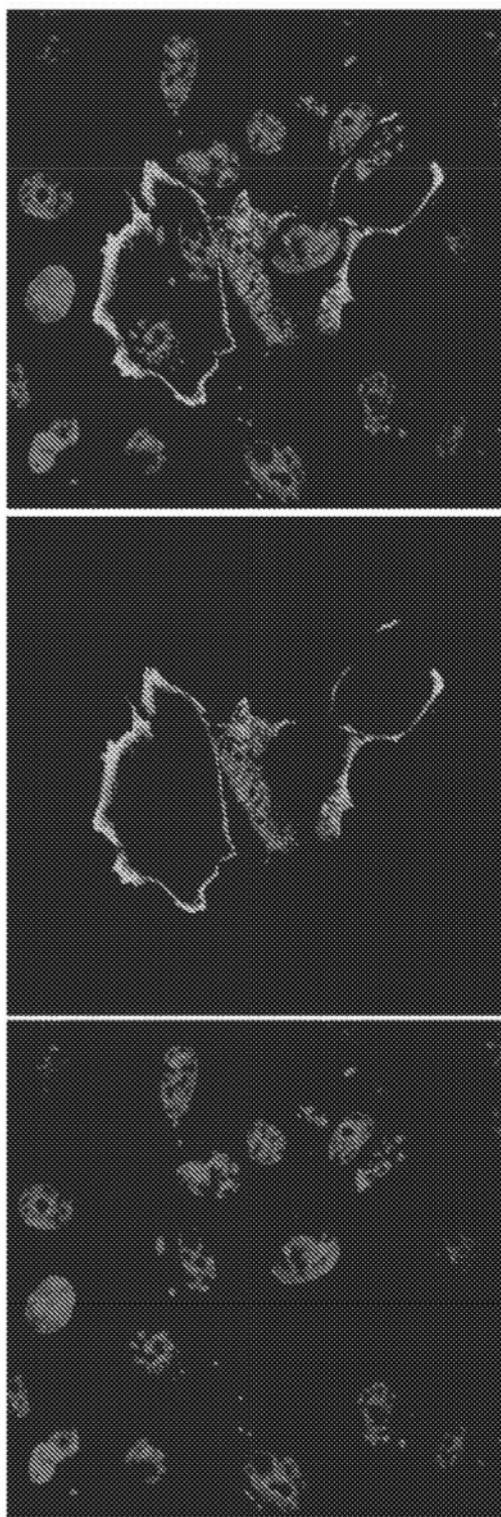


图11