(19)国家知识产权局

(12)发明专利

(10)授权公告号 CN 112673115 B
(45)授权公告日 2025.02.18

(21)申请号 201980027332.X
(22)申请日 2019.02.21
(65)同一申请的已公布的文献号
申请公布号 CN 112673115 A
(43)申请公布日 2021.04.16
(30)优先权数据
62/633675 2018.02.22 US
(85)PCT国际申请进入国家阶段日
2020.10.21
(86)PCT国际申请的申请数据
PCT/US2019/018878 2019.02.21
(87)PCT国际申请的公布数据
WO2019/165021 EN 2019.08.29

(73)专利权人 液体活检研究有限责任公司
地址 圣基茨和尼维斯联邦查理斯镇
(72)发明人 I·M·莫林 M·基德
I·德罗斯多夫
(74)专利代理机构 中国专利代理(香港)有限公司 72001
专利代理师 罗文锋 黄希贵

(51)Int.Cl.
C12Q 1/6886(2006.01)
(56)对比文件
CN 105658810 A,2016.06.08
US 2010303795 A1,2010.12.02
审查员 曹晓聪

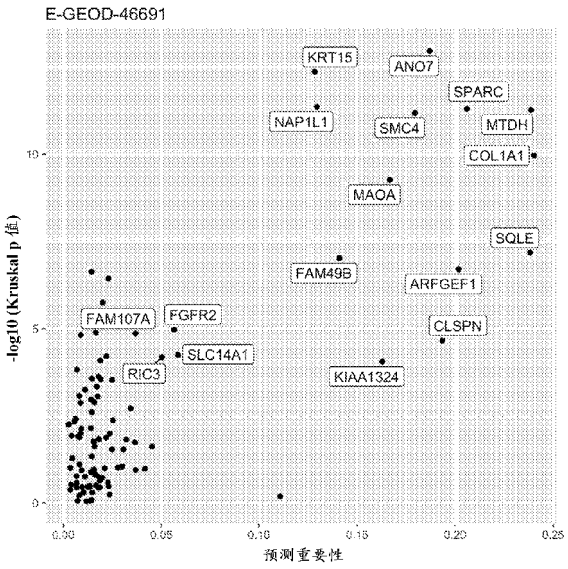
权利要求书3页 说明书105页
序列表83页 附图11页

(54)发明名称

用于前列腺癌检测和治疗的方法

(57)摘要

本发明涉及用于检测前列腺癌的方法,用于确定前列腺癌是稳定的还是进行性的、低还是高Gleason评分的方法,用于区分良性前列腺增生(BPH)与前列腺癌的方法,用于确定手术完全性的方法,以及评估对前列腺癌疗法的反应的方法。



CN 112673115 B

1.多种检测38种生物标志物的表达的试剂在制备试剂盒中的用途,所述试剂盒用于通过以下方法在需要它的受试者中检测前列腺癌,所述方法包括:

通过使来自所述受试者的血液样品与多种特异性检测38种生物标志物的表达的试剂接触来确定来自所述血液样品的所述38种生物标志物的表达水平,其中所述38种生物标志物为AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因,其中所述管家基因为TOX4;

针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;

将每个标准化表达水平输入到算法中以生成概率分数,其中所述算法是使用XGB算法生成的预测模型;

比较所述概率分数与第一预定截止值,其中第一预定截止值按0-100%的比例为至少33%;和

当所述概率分数等于或大于第一预定截止值时,则鉴定所述受试者中存在前列腺癌,或者当所述概率分数小于第一预定截止值时,则鉴定所述受试者中不存在前列腺癌。

2.多种检测38种生物标志物的表达的试剂在制备试剂盒中的用途,所述试剂盒用于通过以下方法确定在根治性前列腺切除术后是否已从受试者完全移除前列腺癌肿瘤,所述方法包括:

通过使根治性前列腺切除术之后来自所述受试者的血液样品与多种特异性检测38种生物标志物的表达的试剂接触来确定来自所述血液样品的所述38种生物标志物的表达水平,其中所述38种生物标志物为AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因,其中所述管家基因为TOX4;

针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;

将每个标准化表达水平输入到算法中以生成概率分数,其中所述算法是XGB算法生成的预测模型;

比较所述概率分数与第一预定截止值,其中第一预定截止值按0-100%的比例为至少33%;和

当所述概率分数等于或大于第一预定截止值时,则鉴定所述前列腺癌肿瘤未被完全移除,或者当所述概率分数小于第一预定截止值时,则鉴定所述前列腺癌肿瘤被完全移除。

3.多种检测38种生物标志物的表达的试剂在制备试剂盒中的用途,所述试剂盒用于通过以下方法在患有前列腺增大的受试者中区分良性前列腺增生与前列腺癌,所述方法包括:

通过使来自所述受试者的血液样品与多种特异性检测38种生物标志物的表达的试剂接触来确定来自所述血液样品的所述38种生物标志物的表达水平,其中所述38种生物标志物为AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因,其中所述管家基因为TOX4;

针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;

将每个标准化表达水平输入到算法中以生成概率分数,其中所述算法是使用XGB算法生成的预测模型;

比较所述概率分数与第一预定截止值,其中第一预定截止值按0-100%的比例为至少33%;和

当所述分数等于或大于第一预定截止值时,则鉴定所述受试者中存在前列腺癌,或者当所述概率分数小于第一预定截止值时,则鉴定所述受试者中存在良性前列腺增生。

4.根据权利要求1-3中任何一项所述的用途,其中第一预定截止值按0-100%的比例为至少50%。

5.根据权利要求1所述的用途,其具有a)至少92%的用于检测前列腺癌的灵敏度;或b)至少95%的用于检测前列腺癌的特异性。

6.根据权利要求1-3和5中任何一项所述的用途,其中所述38种生物标志物中的至少一种为RNA、cDNA或蛋白。

7.根据权利要求6所述的用途,其中当所述生物标志物为RNA时,将所述RNA反转录以产生cDNA,并且检测所产生的cDNA表达水平。

8.根据权利要求6所述的用途,其中通过在所述生物标志物和标记的探针或引物之间形成复合物来检测所述生物标志物的表达水平。

9.根据权利要求1-3和5中任何一项所述的用途,其中第一预定截止值从自不具有前列腺癌的受试者获得的多个血液样品中得出。

用于前列腺癌检测和治疗的方法

[0001] 相关申请的交叉参考

[0002] 本申请要求2018年2月22日提交的美国临时申请号62/633675的优先权和权益,其内容通过参考以其全部结合至本文中。

[0003] 序列表

[0004] 本申请含有序列表,其经EFS-Web以ASCII格式提交,并且特此通过参考以其全部结合。所述ASCII副本于2019年2月19日创建,命名为“LBIO-005_001WO_SeqList.txt”,并且大小为299KB。

发明领域

[0005] 本发明涉及前列腺癌的检测。

[0006] 发明背景

[0007] 前列腺癌(PCA)为全球第四大最常被诊断的癌症,也是男性第二大最常见的癌症。尽管发病率和患病率一直在下降,但美国每年将有~200000名男性被诊断患有PCA。包括年龄和家族史、遗传易感性和种族在内的多种因素均助于该疾病的高发病率。尽管90%的PCA在局部(未播散)时被诊断出,但肿瘤的临床行为高度可变,并且范围从可通过观察等待或主动监测(例如生物标志物和6个月直肠指检)监测的惰性到恶性演变和雄激素抵抗疾病、转移性播散和死亡。

[0008] 已经开发了结合临床数据和病理信息(例如Gleason评分)的多重风险分层系统。这些风险分层系统(包括最近开发的下一代工具)对于预测结果准确性仅为~70%。

[0009] 分子遗传信息正越来越多地用于告知病理学和更好地会告知癌症亚型。该信息已被用作预后工具以及对患者进行分层用于不同的治疗干预。已经检查了前列腺癌,并且已经鉴定出突变、DNA拷贝数改变、重排和基因融合。这些可能与某些病理特征有关。例如,低Gleason肿瘤几乎没有DNA拷贝数改变,而高级别肿瘤则表现出显著的全基因组拷贝数改变。相比之下,体细胞点突变相对罕见,突变频率在1%(IDH1)至11%(SPOP)的范围内。最常见的异常为ERG和其他ETS家族成员的雄激素调控融合(占肿瘤的~50%)。然而,在前列腺切除术之后,带有融合的肿瘤与融合阴性的肿瘤没有明显不同的预后。相比之下,雄激素受体变体7(AR-V7)与去势抵抗性前列腺癌(CRPC)的进展有关,并且被认为潜在地用作治疗选择的生物标志物。然而,总体而言,对于支撑PCA发病机制的分子机制尚不完全了解,并且缺乏可用于预测对治疗剂的敏感性的基于分子的生物标志物。因此,开发更准确地定义疾病状态,确定对疗法的敏感性并可最终用于更好地监测疾病进展的诊断方法至关重要。

[0010] 监测仍然是在早期阶段监测PCA并检测复发的基础方法。在可能的治愈性切除之后,可通过测量血液生物标志物和/或成像(如CT)来进行监测,以更早地检测无症状的转移性疾病。目前用于监测的生物标志物为前列腺特异性抗原(PSA)(也是γ-精浆蛋白(gamma-seminoprotein)或激肽释放酶-3)。该糖蛋白酶由KLK3基因编码,并由前列腺中的上皮细胞分泌。然而,其不是前列腺癌的唯一指标,但也可检测前列腺炎或良性前列腺增生(BPH)。单独使用PSA会导致没有癌症的男性不必要的活检,或者导致患有重大疾病的男性诊断不足。

这是基于低灵敏度(20-40％)和特异性(70-90％)范围,因此阳性预测值仅为25-40％。美国预防服务工作组(United States Preventive Services TaskForce)(USPSTF)不建议将PSA用于前列腺癌。然而,PSA包括在临床列线图中,例如,针对前列腺癌风险的UCSF-CAPRA评分,其在预测手术之后无病生存期方面具有一定实用性。

[0011] 仍然需要基于生物标志物的工具来准确诊断PCA。

[0012] 发明概述

[0013] 本公开提供一种用于在需要它的受试者中检测前列腺癌的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0014] 本公开提供一种用于在需要它的受试者中检测前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,

或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0015] 本公开还提供一种用于确定受试者中的前列腺癌是稳定的还是进行性的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则鉴定前列腺癌为进行性的,或者当分数小于第一预定截止值时,则鉴定前列腺癌为稳定的。

[0016] 本公开提供一种用于确定受试者中的前列腺癌是稳定的还是进行性的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为进行性的,或者当分数小于第一预定截止值时,则鉴定前列腺癌为稳定的。

[0017] 本公开还提供一种用于确定受试者中的前列腺癌为低等级还是高等级的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、

HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高等级,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低等级。

[0018] 本公开提供一种用于确定受试者中的前列腺癌为低等级还是高等级的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高等级,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低等级。

[0019] 本公开还提供一种用于确定受试者中的前列腺癌为低Gleason评分(≤6)前列腺癌还是高Gleason评分(≥7)前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、

NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高Gleason评分前列腺癌,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低Gleason评分前列腺癌。

[0020] 本公开提供一种用于确定受试者中的前列腺癌为低Gleason评分(≤6)前列腺癌还是高Gleason评分(≥7)前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高Gleason评分前列腺癌,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低Gleason评分前列腺癌。

[0021] 本公开还提供一种用于在患有前列腺癌的受试者中确定手术完全性的方法,所述方法包括:通过使手术之后来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、

PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则鉴定前列腺癌未被完全移除,或者当分数小于第一预定截止值时,则鉴定前列腺癌被完全移除。

[0022] 本公开提供一种用于在患有前列腺癌的受试者中确定手术完全性的方法,所述方法包括:(a)通过使手术之后来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌未被完全移除,或者当分数小于第一预定截止值时,则鉴定前列腺癌被完全移除。

[0023] 本公开还提供一种用于在患有前列腺增大的受试者中区分良性前列腺增生与前列腺癌的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中存在良性前列腺增生。

[0024] 本公开提供一种用于在患有前列腺增大的受试者中区分良性前列腺增生与前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中存在良性前列腺增生。

[0025] 本公开提供一种用于评估患有前列腺癌的受试者对第一疗法的反应的方法,所述方法包括:(1)在第一时间点:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成第一分数;(2)在第二时间点,其中第二时间点在第一时间点之后和在给予受试者第一疗法之后:(d)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平;(e)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、

TRIM29、UNC45A和XPC中每一种的表达水平标准化，从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平；(f)将每个标准化表达水平输入到算法中以生成第二分数；(3)比较第一分数与第二分数；和(4)当第二分数与第一分数相比较显著降低时，则将受试者鉴定为对第一疗法有反应，或者当第二分数与第一分数相比较未显著降低时，则将受试者鉴定为对第一疗法无反应。

[0026] 前述方法可进一步包括当第二分数与第一分数相比较显著降低时继续给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时停止给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时给予受试者第二疗法。

[0027] 本公开提供一种用于评估患有前列腺癌的受试者对第一疗法的反应的方法，所述方法包括：(1)在第一时间点：(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平，其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因；(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化，从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平；(c)将每个标准化表达水平输入到算法中以生成第一分数；(2)在第二时间点，其中第二时间点在第一时间点之后和在给予受试者所述疗法之后：(d)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平；(e)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化，从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平；(f)将每个标准化表达水平输入到算法中以生成第二分数；和(3)比较第一分数与第二分数；和(4)产生报告，其中所述报告当第二分数与第一分数相比

较显著降低时,则鉴定受试者对第一疗法有反应,或者当第二分数与第一分数相比较未显著降低时,则鉴定受试者对第一疗法无反应。

[0028] 前述方法可进一步包括当第二分数与第一分数相比较显著降低时继续给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时停止给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时给予受试者第二疗法。

[0029] 本公开还提供一种用于在需要它的受试者中治疗前列腺癌的方法,所述方法包括:通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;将每个标准化表达水平输入到算法中以生成分数;比较分数与第一预定截止值;和当分数等于或大于第一预定截止值时,则给予受试者至少第一疗法,或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0030] 在本公开的方法中,管家基因可选自ALG9、SEPN、YWHAQ、VPS37A、PRRC2B、DOPEY2、NDUFB11、ND4、MRPL19、PSMC4、SF3A1、PUM1、ACTB、GAPD、GUSB、RPLP0、TFRC、MORF4L1、18S、PPIA、PGK1、RPL13A、B2M、YWHAZ、SDHA、HPRT1、TOX4和TPT1。管家基因可为TOX4。

[0031] 在本公开的方法中,预定的截止值可按0-100%的比例为至少33%,或者按0-100%的比例为至少50%。第一预定截止值可按0-100%的比例为至少33%,或者按0-100%的比例为至少50%。

[0032] 本公开的方法可进一步包括给予受试者疗法。本公开的方法可进一步包括给予受试者第一疗法。本公开的方法可进一步包括给予受试者第二疗法。

[0033] 在本公开的方法中,疗法可包括主动监测、放射疗法、手术、冷冻疗法、激素疗法、化学疗法、疫苗治疗、骨定向治疗或其任何组合。第一疗法可包括主动监测、放射疗法、手术、冷冻疗法、激素疗法、化学疗法、疫苗治疗、骨定向治疗或其任何组合。第二疗法可包括主动监测、放射疗法、手术、冷冻疗法、激素疗法、化学疗法、疫苗治疗、骨定向治疗或其任何组合。

[0034] 在一些方面,激素疗法可包括雄激素抑制疗法。在一些方面,化学疗法可包含多西他赛(docetaxel)、卡巴他赛(cabazitaxel)、米托蒽醌(mitoxantrone)、雌莫司汀(estramustine)或其组合。在一些方面,疫苗治疗可包含西普鲁塞-T(Sipuleucel-T)。在一

些方面,骨定向治疗可包含双膦酸盐(bisphosphonate)、地诺单抗(denosumab)、皮质类固醇或其组合。

[0035] 在本公开的方法中,算法可为XGB、RF、glmnet、cforest、CART、treebag、knn、nnet、SVM-径向、SVM-线性、NB或mlp。算法可为XGB。

[0036] 在本公开的方法中,第一时间点可在给予受试者疗法之前或之后。第一时间点可在给予受试者第一疗法之前或之后。

[0037] 在本公开的方法中,当第二分数比第一分数小至少25%时,第二分数与第一分数相比较显著降低。

[0038] 本公开的方法可具有至少92%的灵敏度。本公开的方法可具有至少95%的特异性。

[0039] 在本公开的方法中,至少38种生物标志物中的至少一种可为RNA、cDNA或蛋白。

[0040] 在本公开的方法中,当生物标志物为RNA时,可将RNA反转录以产生cDNA,并且可检测所产生的cDNA表达水平。

[0041] 在本公开的方法中,可通过在生物标志物和标记的探针或引物之间形成复合物来检测生物标志物的表达水平。

[0042] 在本公开的方法中,当生物标志物为蛋白时,可通过在蛋白和标记的抗体之间形成复合物来检测蛋白。标记可为荧光标记。

[0043] 在本公开的方法中,当生物标志物为RNA或cDNA时,可通过在RNA或cDNA和标记的核酸探针或引物之间形成复合物来检测RNA或cDNA。例如,标记可为荧光标记。RNA或cDNA和标记的核酸探针或引物之间的复合物可为杂交复合物。

[0044] 在本公开的方法中,预定的截止值可从自不具有或没有诊断出患有肿瘤性疾病的受试者获得的多个参考样品中得出。肿瘤性疾病可为前列腺癌。

[0045] 在本公开的方法中,测试样品可为血液、血清、血浆或肿瘤性组织。参考样品可为血液、血清、血浆或非肿瘤性组织。

[0046] 在本公开的方法中,受试者可具有至少一种前列腺癌症状。在本公开的方法中,受试者可具有患前列腺癌的素因或家族史。

[0047] 在本公开的方法中,受试者可能先前已被诊断患有前列腺癌并且被测试前列腺癌的复发。

[0048] 在本公开的方法中,受试者可为人类。

[0049] 以上方面中的任何一个均可与任何其他方面相结合。

[0050] 除非另外定义,否则本文使用的所有技术和科学术语具有与本公开所属领域的普通技术人员通常理解的相同含义。在说明书中,单数形式也包括复数,除非上下文另外明确规定;作为实例,术语“一(a)”,“一个(an)”和“该(the)”应理解为单数或复数,并且术语“或”应理解为包括性的。举例来说,“要素”意指一个或多个要素。在整个说明书中,词语“包含”或变体比如“包括”或“含有”应理解为意指包括所述要素、整数或步骤,或者要素、整数或步骤的组,但不排除任何其他要素、整数或步骤,或者要素、整数或步骤的组。约可理解为所述值的10%、9%、8%、7%、6%、5%、4%、3%、2%、1%、0.5%、0.1%、0.05%或0.01%之内。除非上下文另外明确说明,否则本文提供的所有数值均由术语“约”修饰。

[0051] 尽管与本文描述的那些类似或等同的方法和材料可用于本发明的实践或测试中,

但是现在描述说明性的方法和材料。本发明的其他特征、目的和优点从说明书和权利要求将变得显而易见。在说明书和所附权利要求中,单数形式也包括复数,除非上下文另外明确规定。除非另外定义,否则本文使用的所有技术和科学术语具有与本发明所属领域的普通技术人员通常理解的相同的含义。本说明书中引用的所有专利和公开均通过参考以其全部结合至本文中。

[0052] 附图简述

[0053] 图1A-1B为显示在n＝595个组织样品的推导队列中通过随机森林算法(Random Forest algorithm)鉴定的30种推定标志物基因的可视化的图表。(图1A)E-GEOD-46691中的表达。(图1B)E-GEOD-46602中的表达。

[0054] 图2为平均预测重要性相对于Kruskal Wallis p值的散点图。竖直线和水平线分别表示0.05的p值和中位预测重要性值。

[0055] 图3为图表,其显示基因表达的分级聚类鉴定出PCA肿瘤组织和对照组织分别聚类。PCA组织中的基因表达明显更高。

[0056] 图4为显示标准化基因表达的聚类将前列腺来源的细胞系分成其起源组织(即正常、局灶性、转移性)的图表。

[0057] 图5为显示对照(n＝201)、BPH(前列腺增生,n＝26)和前列腺癌病例(n＝125)中的基因表达的图表。病例中鉴定出的表达水平(63±19%)相对于良性前列腺增生(BPH:17±13%)和对照(8±9%)显著($p<0.0001$)升高。

[0058] 图6为显示接受者操作曲线分析(receiver operator curve analysis)的图表。AUROC为0.97和Youden J指数为0.94。Z统计量高度显著(38.9;$p<0.0001$)。

[0059] 图7为显示用于确定PCA的ProstaTest的量度在92-99%范围内的图表。

[0060] 图8为Probit风险评估图,其鉴定出ProstaTest分数>30对于在血液样品中预测前列腺癌的准确性为60%。在测试分数≥34时其增加到>80%。虚线表示95%置信区间。

[0061] 图9为显示接受者操作曲线分析的图表,其比较ProstaTest与PSA的测量以预测与低等级(Gleason 5+6)肿瘤相比较的高等级(≥Gleason 7)。ProstaTest的AUROC为0.98和Youden J指数为0.87。对于PSA,AUROC为0.64和Youden J指数为0.42。ProstaTest对于预测等级显著优于PSA(Z统计量:3.05,p＝0.002)。

[0062] 图10为显示手术对ProstaTest的影响的图表。手术之前的水平升高(80±18%)。手术将水平降低至22±7%($p<0.0001$),与对照水平没有差异。

[0063] 图11为显示治疗对ProstaTest的影响的图表。治疗之前的水平升高(74±18%)。在对激素疗法产生反应的那些中,水平降低至18±7%($p<0.0001$)。在需要化学疗法的那些中,水平降低至27±10%($p<0.001$)。

[0064] 发明详述

[0065] 本发明的细节在以下随附描述中阐述。

[0066] 本文描述以高灵敏度和特异性定量(评分)循环的前列腺癌分子特征用于以下目的的方法,所述目的包括(但不限于)检测前列腺癌、确定前列腺癌是稳定的还是进行性的,区分良性前列腺增生(BPH)与前列腺癌、确定手术完全性和评估对前列腺癌疗法的反应。具体地讲,本发明基于以下发现:与健康受试者或患有BPH的受试者相比较,在患有前列腺癌的受试者中通过管家基因的表达水平标准化的AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、

COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC的表达水平升高。

[0067] 前列腺癌的症状包括小便问题、尿液或精液中的血液、勃起困难、臀部、背部(脊椎)、胸部(肋骨)或其他因已扩散到骨的癌症的区域的疼痛、腿或脚无力或麻木或者甚至因癌症压迫脊髓而丧失膀胱或肠道控制。

[0068] 如实施例中所述,对循环中的前列腺癌转录物的测量(ProstaTest)诊断出前列腺癌,并且血液中ProstaTest分数的降低与治疗干预比如手术和化学疗法的功效相关。可从患者的外周血中分离出前列腺癌RNA的靶向基因表达谱。表达谱以算法进行评估,并转换为输出(分数)。其可诊断和鉴定活动性疾病,并结合标准临床评估和成像来提供对治疗反应的评估。

[0069] 因此,本公开提供一种用于在需要它的受试者中检测前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0070] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0071] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为33%。

[0072] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0073] 本公开还提供一种用于确定受试者中的前列腺癌是稳定的还是进行性的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、

SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定前列腺癌为进行性的,或者当分数小于第一预定截止值时,则鉴定前列腺癌为稳定的。

[0074] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为进行性的,或者当分数小于第一预定截止值时,则鉴定前列腺癌为稳定的。

[0075] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为50%。

[0076] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0077] 本公开还提供一种用于确定受试者中的前列腺癌为低等级还是高等级的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高等级,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低等级。

[0078] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高等级,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低等级。

[0079] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为50%。

[0080] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0081] 在一些方面,低等级前列腺癌为Gleason评分小于或等于6的前列腺癌。在一些方面,高等级前列腺癌为Gleason评分大于或等于7的前列腺癌。

[0082] Gleason分级系统在本领域中通常用作前列腺癌的预后的参数,通常与其他预后因素或测试组合使用。例如,通过显微镜检查前列腺活检样品,并由病理学家基于前列腺肿瘤的结构模式确定Gleason评分。Gleason评分基于正常腺体组织结构(即腺体的形状、大小和分化)的丧失程度。对样品指定最常见的肿瘤模式的等级和下一个最常见的肿瘤模式的第二等级。可存在主要或最常见的模式,并且然后可存在可鉴定的次要或第二最常见的模式;或者,可能只有单个等级。Gleason模式与以下特征相关:模式1-癌性前列腺密切类似于正常前列腺组织。腺体小,形成良好,并且紧密堆积;模式2-组织仍具有形成良好的腺体,但它们较大,并且其间有更多组织;模式3-组织仍具有可识别的腺体,但细胞较暗。在高放大倍率下,这些细胞中的一些已经离开腺体并开始侵入周围组织;模式4-组织几乎没有可识别的腺体。许多细胞侵入周围组织;模式5-组织没有可识别的腺体,整个周围组织通常只有细胞片。将两个等级加在一起即得到Gleason评分,也称为Gleason总和。

[0083] 本公开还提供一种用于确定受试者中的前列腺癌为低Gleason评分(≤6)前列腺癌还是高Gleason评分(≥7)前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第二预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高Gleason评分前列腺癌,或者当分数小于第一预定截止值时,则鉴定前列腺癌为低Gleason评分前列腺。

[0084] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌为高Gleason评分前列腺癌,或者当分数小于第二预定截止值时,则鉴定前列腺癌为低Gleason评分前列腺癌。

[0085] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为50%。

[0086] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0087] 本公开还提供一种用于在患有前列腺癌的受试者中确定手术完全性的方法,所述方法包括:(a)通过使手术之后来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定前列腺癌未被完全移除,或者当分数小于第一预定截止值时,则鉴定前列腺癌被完全移除。

[0088] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定前列腺癌未被完全移除,或者当分数小于第一预定截止值时,则鉴定前列腺癌被完全移除。

[0089] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为33%。

[0090] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0091] 本公开还提供一种用于在患有前列腺增大的受试者中区分良性前列腺增生与前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则鉴定受试者中存在

前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中存在良性前列腺增生。

[0092] 在前述方法的一些方面,步骤(e)可包括产生报告,其中所述报告当分数等于或大于第一预定截止值时,则鉴定受试者中存在前列腺癌,或者当分数小于第一预定截止值时,则鉴定受试者中存在良性前列腺增生。

[0093] 在前述方法的一些方面,第一预定截止值可按0-100%的比例为33%。

[0094] 在一些方面,前述方法可进一步包括给予受试者第一疗法。前述方法可进一步包括当分数等于或大于预定的截止值时给予受试者第一疗法。

[0095] 本公开提供一种用于在需要它的受试者中治疗前列腺癌的方法,所述方法包括:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成分数;(d)比较分数与第一预定截止值;和(e)当分数等于或大于第一预定截止值时,则给予受试者至少第一疗法,或者当分数小于第一预定截止值时,则鉴定受试者中不存在前列腺癌。

[0096] 本公开还提供一种用于评估患有前列腺癌的受试者对第一疗法的反应的方法,所述方法包括:(1)在第一时间点:(a)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平,其中至少38种生物标志物包括AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A、XPC和管家基因;(b)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(c)将每个标准化表达水平输入到算法中以生成第一分数;(2)

在第二时间点,其中第二时间点在第一时间点之后和在给予受试者第一疗法之后:(d)通过使来自受试者的测试样品与多种特异性检测至少38种生物标志物的表达的试剂接触来确定来自测试样品的至少38种生物标志物的表达水平;(e)针对所述管家基因的表达水平将AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的表达水平标准化,从而获得AAMP、ANO7、AR、AR-V7、C16orf89、CHTOP、COL1A1、EDC4、FGFR2、FXYD7、FYCO1、HNRNPU、HPN、KRT15、KRT23、MAN2B2、MAX、MRPS25、NDUFS2、PPARGC1A、PPRC1、RAD23A、REPIN1、SDR39U1、SETBP1、SLC14A1、SLC18A2、SMC4、SPARC、SQLE、STRIP1、STX12、TMPRSS2_1、TMPRSS2_2、TRIM29、UNC45A和XPC中每一种的标准化表达水平;(f)将每个标准化表达水平输入到算法中以生成第二分数;(3)比较第一分数与第二分数;和(4)当第二分数与第一分数相比较显著降低时,则将受试者鉴定为对第一疗法有反应,或者当第二分数与第一分数相比较未显著降低时,则将受试者鉴定为对第一疗法无反应。

[0097] 在前述方法的一些方面,步骤(4)可包括产生报告,其中所述报告当第二分数与第一分数相比较显著降低时,则鉴定受试者对第一疗法有反应,或者当第二分数与第一分数相比较未显著降低时,则鉴定受试者对第一疗法无反应。

[0098] 在一些方面,前述方法可进一步包括当第二分数与第一分数相比较显著降低时继续给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时停止给予受试者第一疗法。前述方法可进一步包括当第二分数与第一分数相比较未显著降低时给予受试者第二疗法。

[0099] 在前述方法的一些方面,当第二分数比第一分数小至少约10%,或比第一分数小至少约20%,或比第一分数小至少约25%,或比第一分数小至少约30%,比第一分数小至少约40%,比第一分数小至少约50%,或比第一分数小至少约60%,或比第一分数小至少约70%,或比第一分数小至少约75%,或比第一分数小至少约80%,或比第一分数小至少约90%,或比第一分数小至少约95%或者比第一分数小至少约99%时,第二分数与第一分数相比较显著降低。在一些方面,当第二分数与第一分数相比较未显著降低时,认为受试者对所述疗法无反应。

[0100] 在前述方法的一些方面,第一时间点可在给予受试者第一疗法之前。第一时间点可在给予受试者第一疗法之后。

[0101] 在本公开方法的一些方面,管家基因包括(但不限于)ALG9、SEPN、YWHAQ、VPS37A、PRRC2B、DOPEY2、NDUFB11、ND4、MRPL19、PSMC4、SF3A1、PUM1、ACTB、GAPD、GUSB、RPLP0、TFRC、MORF4L1、18S、PPIA、PGK1、RPL13A、B2M、YWHAZ、SDHA、HPRT1、TOX4和TPT1。在一些方面,管家基因为TOX4。

[0102] 在本公开方法的一些方面,预定的截止值可按0-100%的比例为约33%。在本公开方法的一些方面,预定的截止值可按0-100%的比例为约50%。预定的截止值可按0-100%的比例为约60%。预定的截止值可按0-100%的比例为约10%、或约20%、或约30%、或约40%、或约70%、或约80%、或约90%。

[0103] 本公开的方法可具有至少约50%、或至少约60%、或至少约70%、或至少约75%、

或至少约80％、或至少约85％、或至少约90％、或至少约95％、或至少约99％的灵敏度。本公开的方法可具有大于约50％、或大于约60％、或大于约70％、或大于约75％、或大于约80％、或大于约85％、或大于约90％、或大于约95％、或大于约99％的灵敏度。

[0104] 本公开的方法可具有至少约50％、或至少约60％、或至少约70％、或至少约75％、或至少约80％、或至少约85％、或至少约90％、或至少约95％、或至少约99％的特异性。本公开的方法可具有大于约50％、或大于约60％、或大于约70％、或大于约75％、或大于约80％、或大于约85％、或大于约90％、或大于约95％、或大于约99％的特异性。

[0105] 本公开的方法可具有至少约50％、或至少约60％、或至少约70％、或至少约75％、或至少约80％、或至少约85％、或至少约90％、或至少约95％、或至少约99％的准确性。本公开的方法可具有大于约50％、或大于约60％、或大于约70％、或大于约75％、或大于约80％、或大于约85％、或大于约90％、或大于约95％、或大于约99％的准确性。

[0106] 在本公开方法的一些方面,预定的截止值,例如第一预定截止值,从自不具有或没有诊断出患有肿瘤性疾病的受试者获得的多个参考样品中得出。多个参考样品可为约2-500、2-200、10-100或20-80个。每个参考样品使用算法产生分数,并且第一预定截止值可为例如这些分数的算术平均值。每个参考样品可为血液、血清、血浆或非肿瘤性组织。在一些方面,每个参考样品为血液。在一些方面,每个参考样品具有与测试样品相同的类型。

[0107] 在本公开方法的一些方面,测试样品可包含获自受试者的任何生物流体。在一些方面,测试样品包含血液、血清、血浆、肿瘤性组织或其任何组合。在一些方面,测试样品包含血液。在一些方面,测试样品包含血清。在一些方面,测试样品包含血浆。

[0108] 在本公开方法的一些方面,测试样品可包含获自受试者的任何生物流体。在一些方面,参考样品包含血液、血清、血浆、肿瘤性组织或其任何组合。在一些方面,参考样品包含血液。在一些方面,参考样品包含血清。在一些方面,参考样品包含血浆。

[0109] 本文公开的每种生物标志物可具有一个或多个转录物变体。本文公开的方法可测量每种生物标志物的任何一种转录物变体的表达水平。

[0110] 表达水平可以多种方式来测量,包括(但不限于):测量由所选基因编码的mRNA;测量由所选基因编码的蛋白的量;和测量由所选基因编码的蛋白的活性。

[0111] 生物标志物可为RNA、cDNA或蛋白。当生物标志物为RNA时,可将RNA反转录以产生cDNA(比如通过RT-PCR),并检测所产生的cDNA表达水平。可通过在生物标志物和标记的探针或引物之间形成复合物来检测生物标志物的表达水平。当生物标志物为RNA或cDNA时,通过在RNA或cDNA和标记的核酸探针或引物之间形成复合物来检测RNA或cDNA。RNA或cDNA和标记的核酸探针或引物之间的复合物可为杂交复合物。

[0112] 基因表达也可通过微阵列分析来检测。也可使用微阵列技术鉴定或确认差异基因表达。因此,可使用微阵列技术测量新鲜或固定组织中的表达谱生物标志物。在这种方法中,将目标多核苷酸序列(包括cDNA和寡核苷酸)铺板或排列在微芯片基底上。然后将排列的序列与来自目标细胞或组织的特定DNA探针杂交。mRNA的来源一般地为从生物样品中分离的总RNA,并且相应的正常组织或细胞系可用于确定差异表达。

[0113] 在微阵列技术的一些实施方案中,将PCR扩增的cDNA克隆插入物以密集阵列施加于基底。在一些实施方案中,将至少10000个核苷酸序列施加于基底。微阵列化的基因,以每个10000个单元固定于微芯片上,适合于在严格条件下杂交。荧光标记的cDNA探针可经反转

录从目标组织中提取的RNA,通过掺入荧光核苷酸来产生。施加于芯片的标记的cDNA探针与阵列上的每个DNA斑点特异性杂交。在严格洗涤以去除非特异性结合的探针之后,通过装置(比如共聚焦激光显微术)或通过另一种检测方法(比如CCD摄像机)扫描微阵列芯片。每个排列单元的杂交的定量允许评价相应的mRNA丰度。利用双色荧光,将从两种RNA来源产生的分别标记的cDNA探针与阵列成对杂交。因此,同时确定来自两个来源的对应于每个指定基因的转录物的相对丰度。可按照制造商的方案通过市售设备进行微阵列分析。

[0114] 在一些实施方案中,可使用qRT-PCR检测生物样品中的生物标志物。通过RT-PCR进行基因表达概况分析的第一步为从生物样品中提取RNA,然后将RNA模板反转录为cDNA,并通过PCR反应进行扩增。根据表达概况分析的目标,通常使用特异性引物、随机六聚体或寡聚-dT引物引发反转录反应步骤。两种常用的反转录酶为禽成髓细胞瘤病毒反转录酶(avilo myeloblastosis virus reverse transcriptase)(AMV-RT)和莫洛尼鼠白血病病毒反转录酶(Moloney murine leukemia virus reverse transcriptase)(MLV-RT)。

[0115] 当生物标志物为蛋白时,可通过在蛋白和标记的抗体之间形成复合物来检测蛋白。标记可为任何标记,例如荧光标记、化学发光标记、放射性标记等。用于蛋白检测的示例性方法包括(但不限于)酶免疫测定(EIA)、放射免疫测定(RIA)、Western印迹分析和酶联免疫吸附测定(ELISA)。例如,可以ELISA检测生物标志物,其中使生物标志物抗体结合于固相,并且采用酶-抗体缀合物检测和/或量化样品中存在的生物标志物。或者,可使用western印迹测定,其中使溶解和分离的生物标志物结合于硝酸纤维素纸上。高特异性的稳定的液体缀合物与灵敏生色底物的组合允许快速准确地鉴定样品。

[0116] 在本公开方法的一些方面,本文描述的方法可具有至少75%、80%、85%、90%、91%、92%、93%、94%、95%、96%、97%、98%或99%的特异性、灵敏度和/或准确性。

[0117] 在本公开方法的一些方面,标记的探针、标记的引物、标记的抗体或标记的核酸可包含荧光标记。

[0118] 可通过评估样品值落在使用不同技术(例如决策树)生成的预测模型上的位置而为样品生成分数的任何算法,均可用于本文公开的方法。算法分析数据(即表达水平)并然后指定分数。在一些实施方案中,算法可为机器学习算法。可用于本文公开的方法的示例性算法可包括(但不限于)XGBoost(XGB)、随机森林(RF)、glmnet、cforest、用于机器学习的分类与回归树(Classification and Regression Trees for Machine Learning)(CART)、treebag、K-最近邻(K-Nearest Neighbors)(kNN)、神经网络(nnet)、径向支持向量机(Support Vector Machine radial)(SVM-径向)、线性支持向量机(Support Vector Machine linear)(SVM-线性)、朴素贝叶斯(NB)、多层感知机(mlp)或其任何组合。

[0119] 在本公开方法的一些方面,算法可为XGB(也称为XGBoost)。XGB是为速度和性能而设计的梯度提升决策树(gradient boosted decision trees)的实现。

[0120] 在本公开方法的一些方面,疗法,例如第一疗法或第二疗法,可包括主动监测、手术、放射疗法、冷冻疗法、激素疗法、化学疗法、疫苗治疗、骨定向治疗、免疫疗法或其任何组合。

[0121] 在本公开方法的一些方面,主动监测可包括大约每6个月进行的具有前列腺特异性抗原血液测试和直肠指检的医生拜访。主动监测还可包括前列腺活检,可以每年进行。

[0122] 在本公开方法的一些方面,手术可包括根治性前列腺切除术。

[0123] 在本公开方法的一些方面,放射疗法可包括外射束放射(external beamradiation)和近距离放射疗法。

[0124] 冷冻疗法,也称为冷冻手术或冷冻消融,为使用非常冷的温度来冷冻和杀死前列腺癌细胞。

[0125] 在本公开方法的一些方面,激素疗法可包括雄激素剥夺疗法或雄激素抑制疗法。目的是减少体内称为雄激素的雄性激素水平,或阻止其影响前列腺癌细胞。激素疗法可包括睾丸切除术。激素疗法还可包括给予降低雄激素水平的化合物,比如促黄体生成激素释放激素(LHRH)激动剂,LHRH拮抗剂和CYP17抑制剂。已知的LHRH激动剂包括(但不限于)亮丙瑞林(leuprolide)、戈舍瑞林(goserelin)、曲普瑞林(triptorelin)和组氨瑞林(histrelin)。已知的LHRH拮抗剂包括地加瑞克(degarelix)。已知的CYP17抑制剂包括阿比特龙(abiraterone)。激素疗法还可包括给予抗雄激素,比如氟他胺(flutamide)、比卡鲁胺(bicalutamide)、尼鲁米特(nilutamide)和恩杂鲁胺(enzalutamide)。激素疗法还可包括给予雄激素抑制药物,比如雌激素和酮康唑(ketoconazole)。

[0126] 在本公开方法的一些方面,化学疗法可包含多西他赛、卡巴他赛、米托蒽醌、雌莫司汀或其组合。

[0127] 在本公开方法的一些方面,疫苗治疗可包含西普鲁塞-T。

[0128] 如果癌症已生长出前列腺,则预防或减缓癌症向骨的扩散为治疗的主要目标。骨定向治疗可包含双膦酸盐(例如唑来膦酸)、地诺单抗、皮质类固醇、外部放射疗法、放射性药物(例如锶-89、钐-153或镭-223)和止痛药。

[0129] 还可通过比较在疗法的不同时间点由相同算法确定的分数来评估患有前列腺癌的受试者对疗法的反应。例如,第一时间点可在给予受试者疗法之前或之后;第二时间点在第一时间点之后和在给予受试者疗法之后。在第一时间点生成第一分数,和在第二时间点生成第二分数。当第二分数与第一分数相比较显著降低时,认为受试者对疗法有反应。在一些实施方案中,当第二分数比第一分数小至少10%,例如比第一分数小至少20%,比第一分数小至少25%,比第一分数小至少40%,比第一分数小至少50%,比第一分数小至少75%或比第一分数小至少90%时,第二分数与第一分数相比较显著降低。当第二分数与第一分数相比较未显著降低时,认为受试者对疗法无反应。

[0130] 前列腺癌生物标志物和管家基因的序列信息如表1所示。

[0131] 表1.前列腺癌生物标志物/管家序列信息

[0132]

基因名称	RefSeq登录号	序列	SEQ ID NO:
AAMP	NM_001087.4	ctgctggggagtcgcctacgcctacttcctgccgggaggaggggctcgagttccgcgtc gtcgcgcagagctgactctgggaggcgtttgggcccagagaagtggatccgccgcttgc gccgcatggagtccgaatcggaaagcggggctgctgctgacacccccccactggagac cctaagcttccatggtgatgaagagattatcgaggtggtagaacttgatcccggtccgccg gacccagatgacctggcccaggagatggaagatgtggactttgaggaagaagaggagg aagagggcaacgaagagggctgggttctagaaccccaggaaggggtggtcggcagca tggagggccccgacgatagcgaggtcacctttgcattgcactcagcatctgtgttttgtgtg agcctggaccccaagaccaataccttggcagtgaccgggggtgaagatgacaaagcctt cgtatggcggctcagcgatggggagctgctctttgagtgtgcaggccataaagactctgt gacttgtgctggtttcagccatgactccactctagtggccacaggggacatgagtggcctc ttgaaagtgtggcaggtggacactaaggaggaggtctggtcctttgaagcgggagacct ggagtggatggagtggcatcctcgggcacctgtcctgttggcgggcacagctgacggca acacctggatgtggaaagtcccgaatggtgactgcaagaccttccagggtcccaactgcc cagccacctgtggccgagtcctccctgatgggaagagagctgtggtaggctatgaagat gggaccatcaggatttgggacctgaagcagggaagccctatccatgtactgaaagggac tgagggtcaccagggcccactcacctgtgttgctgccaaccaggatggcagcttgatcct aactggctctgtggactgccaggccaagctggtcagtgccaccaccggcaaggtggtgg gtgtttttagacctgagactgtggcctcccagcccagcctgggagaaggggaggagagt gagtccaactcggtggagtccttgggcttctgcagtgtgatgcccctggcagctgttggct acctggatgggaccttggccatctatgacctggctacgcagactcttaggcatcagtgtca gcaccagtcgggcatcgtgcagctgctgtgggaggcaggcactgccgtggtatatacct gcagcctggatggcatcgtgcgcctctgggacgcccggaccggccgcctgcttactgac taccggggccacacggctgagatcctggactttgccctcagcaaagatgcctccctggtg gtgaccacgtcaggagaccacaaagcgaaagtattttgtgtccaaaggcctgaccgttaat ggctgcagcccctgcctgtgtgtctggtgttgaggggacgaagggaccccctgcccctgtc tgccagcagaggcagtagggcacagagggaagaggagggtggggccctggatgactt tccagcctcttcaactgacttgctccctctccttttcttctctttagagacccagcccagggc cctcccaccccttgtccagacctggtgggcccttcagagggagggggtggacctgtttctctttt cactttcatttgctggtgtgagccatggggtgtgtatttgtatgtggggagtaggtgtttgag gttcccgttctttcccttcccaagtctctgggggtggaaaggaggaagagatactagttaaa gattttaaaaatgtaaataaaatatacttcccagaaaaaaaaaaa	1
ANO7	NM_001001891.3	aaagatagatcctgctccaggagccgggaagccttgccctggccagctgtgctgggcac ctcccctgcctgcttcctggcccacttgcaggcaaggtgagggcatgcgaatggctgcca	2

[0133]

		ctgcctgggcggggctccaagggccacccctccccaccctctgtcccgcagtgaggac gggactctactgccgagaccaggctcacgctgagaggtgggccatgacctccgagacct cttccggaagccactgtgccaggagcaggatgctgcggcgacgggcccaggaagagg acagcaccgtcctgatcgatgtgagccccctgaggcagagaagaggggctcttacgg gagcacagcccacgcctcggagccaggtggacagcaagcggccgcctgcagagctg ggagtcctgccaagccccggatcgcagacttcgtcctcgtttgggaggaggacctgaag ctagacaggcagcaggacagtgccgcccgggacagaacagacatgcacaggacctgg cgggagacttttctggataatcttcgtgcggctgggctgtgtgtagaccagcaggacgtcc aggacgggaacaccacagtgcactacgccctcctcagcgcctcctgggctgtgctctgct actacgccgaagacctgcgcctgaagctgcccttgcaggagttacccaaccaggcctcc aactggtcggccggcctgctggcatggctgggcatccccaacgtcctgctggaggttgtg ccagacgtacccccccgagtactactcctgccggttcagagtgaacaagctgccacgcttc ctcgggagtgacaaccaggacaccttcttcacaagcaccaagaggcaccaaattctgttt gagatcctggccaagacccccgtatggccacgagaagaaaaacctgcttgggatccacca gctgctggcagagggtgtcctcagtgccgccttcccccctgcatgacggccccttcaagac gcccccagagggcccgcaggctccacgcctcaaccagcgccaagtcctttccagcact gggcgcgctggggcaagtggaacaagtaccagcccctggaccacgtgcgcaggtactt cggggagaaggtggccctctacttcgcctggctcgggttttacacaggctggctcctgcc agcggcagtggtgggcacactggtgttcctggtgggctgcttcctggtgttctcagacata cccacgcaggaactgtgtggcagcaaggacagcttcgagatgtgcccactttgcctcgac tgccctttctggctgctctccagcgcctgtgccctggcccaggccggccggctgttcgacc acggcggcaccgtgttcttcagcttgttcatggcactgtgggccgtgctgctgctggagta ctggaagcggaagagcgccacgctggcctaccgctgggactgctctgactacgaggac actgaggagaggcctcggccccagtttgccgcctcagcccccatgacagccccgaacc ccatcacgggtgaggacgagccctacttccctgagaggagccgcgcgcgccgcatgct ggccggctctgtggtgatcgtggtgatggtggccgtggtggtcatgtgcctcgtgtctatca tcctgtaccgtgccatcatggccatcgtggtgtccaggtcgggcaacacccttctcgcagc ctgggcctctcgcatcgccagcctcacggggtctgtagtgaacctcgtcttcatcctcatcc tctccaagatctatgtatccctggcccacgtcctgacacgatgggaaatgcaccgcaccca gaccaagttcgaggacgccttcaccctcaaggtgttcatcttccagttcgtcaacttctactc ctcacccgtctacattgccttcttcaagggcaggtttgtgggatacccaggcaactaccaca ccttgtttggagtccgcaatgaggagtgcgcggctggaggctgcctgatcgagctggcac aggagctcctggtcatcatggtgggcaagcaggtcatcaacaacatgcaggaggtcctc atcccgaagctaaagggctggtggcagaagttccggcttcgctccaagaagaggaagg cgggagcttctgcaggggctagccaggggccctgggaggacgactatgagcttgtgcc ctgtgagggtctgtttgacgagtacctggaaatggtgctgcagttcggcttcgtcaccatctt cgtggccgcctgtccgctcgcgccgctcttcgccctgctcaacaactgggtggagatccg cttggacgcgcgcaagttcgtctgcgagtaccggcgcccggtggccgagcgcgcccag gacatcggcatctggttccacatcctggcgggcctcacgcacctggcggtcatcagcaac gccttcctcctggccttctcgtccgacttcctgccgcgcgcctactaccggtggacccgcg cccacgacctgcgcggcttcctcaacttcacgctggcgcgagccccgtcctccttcgccg ccgcgcacaaccgcacgtgcaggtatcgggctttccgggatgacgatggacattattccc agacctactggaatcttcttgccatccgcctggccttcgtcattgtgtttgagcatgtggttttc tccgttggccgcctcctggacctcctggtgcctgacatcccagagtctgtggagatcaaag tgaagcgggagtactacctggctaagcaggcactggctgagaatgaggttctttttggaac gaacggaacaaaggatgagcagcccgagggctcagagctcagctcccactggacacc cttcacggttcccaaggccagccagctgcagcagtgacgcctggaaggacatctggtgg tccttaggggagtggcccctcctgagccctgcgagcagcgtccttttcctcttccctcaggc agcggctgtgtgaaccgctggctgctgttgtgcctcatctctgggcacattgcctgcttccc cccagcgccggcttctctcctcagagcgcctgtcactccatccccggcagggagggacc gtcagctcacaaggccctctttgtttcctgctcccagacataagcccaaggggcccctgca cccaagggaccctgtccctcggtggcctccccaggcccctggacacgacagttctcctca ggcaggtgggctttgtggtcctcgccgcccctggccacatcgccctctcctcttacacctg gtgaccttcgaatgtttcagagcgcagggccgttctccctcgtgtcctctggacccacccg ccccttcctgccctgtttgcgcagggacatcacccacatgccccagctctcggaccctgca	

[0134]

		gctctgtgtcccaggccacagcaaaggtctgttgaaccctccctccattcccagttatctg ggtcctctggattcttctgtttcttgaatcaggctctgctttcccctagccactacaggcagc ctctgacagtgccgctttacttgcattctgcagcaattacatgtgtccttttgatccttgcccaa cttccctccctctcccagctcctggcccctggcccagggcccctcttgctgtttttacctctgt tccttggggcctagtacccagcaagcacccaaatgggggaggttttgggatgagaggag gaaacgtgtatacctgtaacatctggtggctcttcccccagaagtttgtgttcatacataattg ttttccacgctggatcataatgtgacgtgcagttctgccctgtgctggggagccacatgaag cttcccctggctaacttgctaccccgcagcaatcccagtgtggccgtctgcttgctaaaaaa tggatctgtgctcatctgtattgatgtccttggagttctacaagtggaacttaagtgtcaaaaa gaatatgtggtttttagctgagcgtggtggctcacacctgtaatcccaggactttgggaggc tgaggcaggaggattacaaggtcaggagttcgggactagcctgtccaacatggtgaaac cctgtctttactaaaaatgcaaaaatt	
AR	NM_000044.3	cgagatcccggggagccagcttgctgggagagcgggacggtccggagcaagcccag aggcagaggaggcgacagagggaaaaagggccgagctagccgctccagtgctgtaca ggagccgaagggacgcaccacgccagccccagcccggctccagcgacagccaacgc ctcttgcagcgcggcggcttcgaagccgccgcccggagctgcccttcctcttcggtgaa gtttttaaaagctgctaaagactcggaggaagcaaggaaagtgcctggtaggactgacgg ctgcctttgtcctcctcctctccaccccgcctcccccacccctgccttcccccctccccgt cttctctcccgcagctgcctcagtcggctactctcagccaacccccctcaccaccccttctcc ccacccgccccccgcccccgtcggcccagcgctgccagcccgagtttgcagagaggt aactccctttggctgcgagcgggcgagctagctgcacattgcaaagaaggctcttaggag ccaggcgactggggagcggcttcagcactgcagccacgacccgcctggttaggctgca cgcggagagaaccctctgttttccccccactctctctccacctcctcctgccttccccacccc gagtgcggagccagagatcaaaagatgaaaaggcagtcaggtcttcagtagccaaaaa acaaaacaaacaaaaacaaaaaagccgaaataaaagaaaaagataataactcagttctta tttgcacctacttcagtggacactgaatttggaaggtggaggattttgtttttttctttaagatct gggcatcttttgaatctacccttcaagtattaagagacagactgtgagcctagcagggcag atcttgtccaccgtgtgtcttcttctgcacgagactttgaggctgtcagagcgcttttgcgtg gttgctcccgcaagtttccttctctggagcttcccgcaggtgggcagctagctgcagcgac taccgcatcatcacagcctgttgaactcttctgagcaagagaaggggaggcggggtaag ggaagtaggtggaagattcagccaagctcaaggatggaagtgcagttagggctgggaa gggtctaccctcggccgccgtccaagacctaccgaggagctttccagaatctgttccaga gcgtgcgcgaagtgatccagaacccgggccccaggcacccagaggccgcgagcgca gcacctcccggcgccagtttgctgctgctgcagcagcagcagcagcagcagcagcagc agcagcagcagcagcagcagcagcagcagcagcagcagcaagagactagccccagg cagcagcagcagcagcagggtgaggatggttctccccaagcccatcgtagaggcccca caggctacctggtcctggatgaggaacagcaaccttcacagccgcagtcggccctggag tgccaccccgagagaggttgcgtcccagagcctggagccgccgtggccgccagcaag gggctgccgcagcagctgccagcacctccggacgaggatgactcagctgccccatcca cgttgtccctgctgggccccactttccccggcttaagcagctgctccgctgaccttaaaga catcctgagcgaggccagcaccatgcaactccttcagcaacagcagcaggaagcagtat ccgaaggcagcagcagcgggagagcgagggaggcctcgggggctcccacttcctcca aggacaattacttaggggcacttcgaccatttctgacaacgccaaggagttgtgtaaggc agtgtcggtgtccatgggcctgggtgtggaggcgttggagcatctgagtccaggggaac agcttcgggggattgcatgtacgccccacttttgggagttccacccgctgtgcgtcccac tccttgtgccccattggccgaatgcaaaggttctctgctagacgacagcgcaggcaagag cactgaagatactgctgagtattccccttcaagggaggttacaccaaagggctagaagg cgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaactg ccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagt cgcgactactacaactttccactggctctggccggaccgccgccccctccgccgcctccc catccccacgctcgcatcaagctggagaacccgctggactacggcagcgcctgggcgg ctgcggcggcgcagtgccgctatggggacctggcgagcctgcatggcgcgggtgcag cgggacccggttctgggtcaccctcagccgccgcttcctcatcctggcacactctcttcac agccgaagaaggccagttgtatggaccgtgtggtggtggtgggggtggtggcggcggc ggcggcggcggcggcggcggcggcggcggcggcggcggcgaggcgggagct	3

[0135]

		gtagccccctacggctacactcggcccctcaggggctggcgggccaggaaagcgact tcaccgcacctgatgtgtggtaccctggcggcatggtgagcagagtgccctatcccagtc ccacttgtgtcaaaagcgaaatgggccctggatggatagctactccggaccttacgggg acatgcgtttggagactgccagggaccatgttttgcccattgactattactttccaccccaga agacctgcctgatctgtggagatgaagcttctgggtgtcactatggagctctcacatgtgga agctgcaaggtcttcttcaaaagagccgctgaagggaaacagaagtacctgtgcgccag cagaaatgattgcactattgataaattccgaaggaaaaattgtccatcttgtcgtcttcggaa atgttatgaagcagggatgactctgggagcccggaagctgaagaaacttggtaatctgaa actacaggaggaaggagaggcttccagcaccaccagccccactgaggagacaaccca gaagctgacagtgtcacacattgaaggctatgaatgtcagcccatctttctgaatgtcctgg aagccattgagccaggtgtagtgtgtgctggacacgacaacaaccagcccgactcctttg cagccttgctctctagcctcaatgaactgggagagagacagcttgtacacgtggtcaagtg ggccaaggccttgcctggcttccgcaacttacacgtggacgaccagatggctgtcattca gtactcctggatggggctcatggtgtttgccatgggctggcgatccttcaccaatgtcaact ccaggatgctctacttcgcccctgatctggttttcaatgagtaccgcatgcacaagtcccgg atgtacagccagtgtgtccgaatgaggcacctctctcaagagtttggatggctccaaatca ccccccaggaattcctgtgcatgaaagcactgctactcttcagcattattccagtggatggg ctgaaaaatcaaaaattctttgatgaacttcgaatgaactacatcaaggaactcgatcgtatc attgcatgcaaaagaaaaaatcccacatcctgctcaagacgcttctaccagctcaccaagc tcctggactccgtgcagcctattgcgagagagctgcatcagttcacttttgacctgctaatca agtcacacatggtgagcgtggactttccggaaatgatggcagagatcatctctgtgcaagt gcccaagatcctttctgggaaagtcaagcccatctatttccacacccagtgaagcattgga aaccctatttccccaccccagctcatgccccctttcagatgtcttctgcctgttataactctgc actactcctctgcagtgccttggggaatttcctctattgatgtacagtctgtcatgaacatgttc ctgaattctatttgctgggctttttttttctctttctctcctttctttttcttcttccctcctatctaacc ctcccatggcaccttcagactttgcttcccattgtggctcctatctgtgttttgaatggtgttgta tgcctttaaatctgtgatgatcctcatatggcccagtgtcaagttgtgcttgtttacagcactac tctgtgccagccacacaaacgtttacttatcttatgccacgggaagtttagagagctaagatt atctggggaaatcaaaacaaaaacaagcaaacaaaaaaaaaaaagcaaaaacaaaacaa aaaataagccaaaaaaaccttgctagtgtttttttcctcaaaaataaataaataaataaataaata cgtacatacatacacacatacatacaaacatatagaaatccccaaagaggccaatagtga cgagaaggtgaaaattgcaggcccatggggagttactgatttttttcatctcctccctccacg ggagactttattttctgccaatggctattgccattagagggcagagtgaccccagagctga gttgggcaggggggtggacagagaggagaggacaaggagggcaatggagcatcagt acctgcccacagccttggtccctgggggctagactgctcaactgtggagcaattcattata ctgaaaatgtgcttgttgttgaaaatttgtctgcatgttaatgcctcacccccaaaccctttttct ctctcactctctgcctccaacttcagattgactttcaatagttttttctaagacctttgaactgaat gttctcttcagccaaaacttggcgacttccacagaaaagtctgaccactgagaagaagga gagcagagatttaaccctttgtaaggccccatttggatccaggtctgctttctcatgtgtgag tcagggaggagctggagccagaggagaagaaaatgatagcttggctgttctcctgcttag gacactgactgaatagttaaactctcactgccactacctttttccccacctttaaaagacctga atgaagttttctgccaaactccgtgaagccacaagcaccttatgtcctcccttcagtgttttgt gggcctgaatttcatcacactgcatttcagccatggtcatcaagcctgtttgcttcttttgggc atgttcacagattctctgttaagagcccccaccaccaagaaggttagcaggccaacagctc tgacatctatctgtagatgccagtagtcacaaagatttcttaccaactctcagatcgctggag cccttagacaaactggaaagaaggcatcaaagggatcaggcaagctgggcgtcttgccc ttgtccccagagatgataccctcccagcaagtggagaagttctcacttccttctttagagc agctaaaggggctacccagatcagggttgaagagaaaactcaattaccagggtgggaag aatgaaggcactagaaccagaaaccctgcaaatgctcttcttgtcacccagcatatccacc tgcagaagtcatgagaagagagaaggaacaaagaggagactctgactactgaattaaaa tcttcagcggcaaagcctaaagccagatggacaccatctggtgagtttactcatcatcctcc tctgctgctgattctgggctctgacattgcccatactcactcagattccccacctttgttgctg cctcttagtcagagggaggccaaaccattgagactttctacagaaccatggcttctttcgga aaggtctggttggtgtggctccaatactttgccacccatgaactcagggtgtgccctggga cactggttttatatagtcttttggcacacctgtgttctgttgacttcgttcttcaagcccaagtgc	

[0136]

		aagggaaaatgtccacctactttctcatcttggcctctgcctccttacttagctcttaatctcat ctgttgaactcaagaaatcaagggccagtcatcaagctgcccattttaattgattcactctgtt tgttgagaggatagtttctgagtgacatgatatgatccacaagggtttccttccctgatttctg cattgatattaatagccaaacgaacttcaaaacagctttaaataacaagggagaggggaac ctaagatgagtaatatgccaatccaagactgctggagaaaactaaagctgacaggttccct ttttggggtgggatagacatgttctggttttctttattattacacaatctggctcatgtacaggat cacttttagctgttttaaacagaaaaaaatatccaccactcttttcagttacactaggttacattt taataggtcctttacatctgttttggaatgattttcatcttttgtgatacacagattgaattatatca ttttcatatctctccttgtaaatactagaagctctcctttacatttctctatcaaatttttcatctttat gggtttcccaattgtgactcttgtcttcatgaatatatgtttttcatttgcaaaagccaaaaatca gtgaaacagcagtgtaattaaaagcaacaactggattactccaaatttccaaatgacaaaa ctagggaaaaatagcctacacaagcctttaggcctactctttctgtgcttgggtttgagtgaa caaaggagattttagcttggctctgttctcccatggatgaaaggaggaggatttttttttctttt ggccattgatgttctagccaatgtaattgacagaagtctcattttgcatgcgctctgctctaca aacagagttggtatggttggtatactgtactcacctgtgagggactggccactcagaccca cttagctggtgagctagaagatgaggatcactcactggaaaagtcacaaggaccatctcc aaacaagttggcagtgctcgatgtggacgaagagtgaggaagagaaaaagaaggagca ccagggagaaggctccgtctgtgctgggcagcagacagctgccaggatcacgaactct gtagtcaaagaaaagagtcgtgtggcagtttcagctctcgttcattgggcagctcgcctag gcccagcctctgagctgacatgggagttgttggattctttgtttcatagctttttctatgccata ggcaatattgttgttcttggaaagtttattatttttttaactcccttactctgagaaagggatatttt gaaggactgtcatatatctttgaaaaaagaaaatctgtaatacatatatttttatgtatgttcact ggcactaaaaaatatagagagcttcattctgtcctttgggtagttgctgaggtaattgtccag gttgaaaaataatgtgctgatgctagagtccctctctgtccatactctacttctaaatacatata ggcatacatagcaagttttatttgacttgtactttaagagaaaatatgtccaccatccacatga tgcacaaatgagctaacattgagcttcaagtagcttctaagtgtttgtttcattaggcacagc acagatgtggcctttccccccttctctccctgatatctggcagggcataaaggcccaggc cacttcctctgccccttcccagccctgcaccaaagctgcatttcaggagactctctccagac agcccagtaactacccgagcatggcccctgcatagccctggaaaaataagaggctgact gtctacgaattatcttgtgccagttgcccaggtgagagggcactgggccaagggagtggt tttcatgtttgacccactacaaggggtcatgggaatcaggaatgccaaagcaccagatcaa atccaaaacttaaagtcaaaataagccattcagcatgttcagtttcttggaaaaggaagtttc taccccctgatgcctttgtaggcagatctgttctcaccattaatctttttgaaaatcttttaaagca gtttttaaaaagagagatgaaagcatcacattatataaccaaagattacattgtacctgctaa gataccaaaattcataagggcaggggggggagcaagcattagtgcctctttgataagctgtc caaagacagactaaaggactctgctggtgactgacttataagagctttgtgggttttttttcc ctaataatatacatgtttagaagaattgaaaataatttcgggaaaatgggattatgggtccttc actaagtgattttataagcagaactggctttccttttctctagtagttgctgagcaaattgttga agctccatcattgcatggttggaaatggagctgttcttagccactgtgtttgctagtgcccat gttagcttatctgaagatgtgaaacccttgctgataagggagcatttaaagtactagattttgc actagagggacagcaggcagaaatccttatttctgcccactttggatggcacaaaaagtta tctgcagttgaaggcagaaagttgaaatacattgtaaatgaatatttgtatccatgtttcaaaa ttgaaatatatatatatatatatatatatatatatatatatatatatatagtgtgtgtgtgttctgatag ctttaactttctctgcatctttatatttggttccagatcacacctgatgccatgtacttgtgagag aggatgcagttttgttttggaagctctctcagaacaaacaagacacctggattgatcagttaa ctaaaagttttctcccctattgggtttgacccacaggtcctgtgaaggagcagagggataaa aagagtagaggacatgatacattgtactttactagttcaagacagatgaatgtggaaagcat aaaaactcaatggaactgactgagatttaccacagggaaggcccaaacttggggccaaa agcctacccaagtgattgaccagtggccccctaatgggacctgagctgttggaagaaga gaactgttccttggtcttcaccatccttgtgagagaagggcagtttcctgcattggaacctgg agcaagcgctctatctttcacacaaattccctcacctgagattgaggtgctcttgttactggg tgtctgtgtgctgtaattctggttttggatatgttctgtaaagattttgacaaatgaaaatgtgttt ttctctgttaaaacttgtcagagtactagaagttgtatctctgtaggtgcaggtccatttctgcc cacaggtagggtgtttttcttgattaagagattgacacttctgttgcctaggacctcccaact caaccatttctaggtgaaggcagaaaaatccacattagttactcctcttcagacatttcagct	

[0137]

		gagataacaaatcttttggaatttttcacccatagaaagagtggtagatatttgaatttagca ggtggagtttcatagtaaaaacagcttttgactcagctttgatttatcctcatttgatttggcca gaaagtaggtaatatgcattgattggcttctgattccaattcagtatagcaaggtgctaggttt tttcctttccccacctgtctcttagcctggggaattaaatgagaagccttagaatgggtggcc cttgtgacctgaaacacttcccacataagctacttaacaagattgtcatggagctgcagattc cattgcccaccaaagactagaacacacacatatccatacaccaaaggaaagacaattctg aaatgctgtttctctggtggttccctctctggctgctgcctcacagtatgggaacctgtactct gcagaggtgacaggccagatttgcattatctcacaaccttagcccttggtgctaactgtcct acagtgaagtgcctgggggggttgtcctatcccataagccacttggatgctgacagcagcc accatcagaatgacccacgcaaaaaaaagaaaaaaaaaattaaaaagtcccctcacaac ccagtgacacctttctgctttcctctagactggaacattgattagggagtgcctcagacatga cattcttgtgctgtccttggaattaatctggcagcaggagggagcagactatgtaaacaga gataaaaattaattttcaatattgaaggaaaaaagaaataagaagagagagagaaagaaa gcatcacacaaagattttcttaaaagaaacaattttgcttgaaatctctttagatggggctcatt tctcacggtggcacttggcctccactgggcagcaggaccagctccaagcgctagtgttct gttctctttttgtaatcttggaatcttttgttgctctaaatacaattaaaaatggcagaaacttgttt gttggactacatgtgtgactttgggtctgtctctgcctctgctttcagaaatgtcatccattgtg taaaatattggcttactggtctgccagctaaaacttggccacatccccctgttatggctgcagg atcgagttattgttaacaaagagacccaagaaaagctgctaatgtcctcttatcattgttgtta atttgttaaaacataaagaaatctaaaatttcaaaaaa	
	AR-V7	gacactgaatttggaaggtggaggattttgttttttttctttaagatctgggcatcttttgaatct acccttcaagtattaagagacagactgtgagcctagcagggcagatcttgtccaccgtgtg tcttcttctgcacgagactttgaggctgtcagagcgcttttgcgtggttgctcccgcaagttt ccttctctggagcttcccgcaggtgggcagctagctgcagcgactaccgcatcatcacag cctgttgaactcttctgagcaagagaaggggaggcggggtaagggaagtaggtggaag attcagccaagctcaaggatggaagtgcagttagggctgggaagggtctaccctcggcc gccgtccaagacctaccgaggagctttccagaatctgttccagagcgtgcgcgaagtgat ccagaacccgggccccaggcacccagaggccgcgagcgcagcacctcccggcgcca gtttgctgctgcagcagcagcagcagcagcagcagcagcagcagcagcagcagc agcagcagcagcagcagcagcagcagcagcagcagcagcagcaagagactagccccagg cagcagcagcagcagcagggtgaggatggttctccccaagcccatcgtagaggcccca caggctacctggtcctggatgaggaacagcaaccttcacagccgcagtcggccctggag tgccaccccgagagaggttgcgtcccagagcctggagccgccgtggccgccagcaag gggctgccgcagcagctgccagcacctccggacgaggatgactcagctgccccatcca cgttgtccctgctgggccccactttccccggcttaagcagctgctccgctgaccttaaaga catcctgagcgaggccagcaccatgcaactccttcagcaacagcagcaggaagcagtat ccgaaggcagcagcagcgggagagcgagggaggcctcgggggctcccacttcctcca aggacaattacttaggggcacttcgaccatttctgacaacgccaaggagttgtgtaaggc agtgtcggtgtccatgggcctgggtgtggaggcgttggagcatctgagtccaggggaac agcttcgggggattgcatgtacgccccacttttgggagttccacccgctgtgcgtcccac tccttgtgccccattggccgaatgcaaaggttctctgctagacgacagcgcaggcaagag cactgaagatactgctgagtattccccttcaagggaggttacaccaaagggctagaagg cgagagcctaggctgctctggcagcgctgcagcagggagctccgggacacttgaactg ccgtctaccctgtctctctacaagtccggagcactggacgaggcagctgcgtaccagagt cgcgactactacaactttccactggctctggccggaccgccgcccctccgccgcctccc catccccacgctcgcatcaagctggagaacccgctggactacggcagcgcctgggcgg ctgcggcggcgcagtgccgctatggggacctggcgagcctgcatggcgcgggtgcag cgggacccggttctgggtcaccctcagccgccgcttcctcatcctggcacactctcttcac agccgaagaaggccagttgtatggaccgtgtggtggtggtgggggtggtggcggcggc ggcggcggcggcggcggcggcggcggcggcgaggcgggagctgtagccccctacg gctacactcggcccccctcaggggctggcgggccaggaaagcgacttcaccgcacctga tgtgtggtaccctggcggcatggtgagcagagtgccctatcccagtcccacttgtgtcaaa agcgaaatgggcccctggatggatagctactccggaccttacggggacatgcgtttgga gactgccagggaccatgttttgcccattgactattactttccaccccagaagacctgcctga tctgtggagatgaagcttctgggtgtcactatggagctctcacatgtggaagctgcaaggt	4

[0138]

		cttcttcaaaagagccgctgaagggaaacagaagtacctgtgcgccagcagaaatgattg cactattgataaattccgaaggaaaaattgtccatcttgtcgtcttcggaaatgttatgaagca gggatgactctgggagaaaaattccgggttggcaattgcaagcatctcaaaatgaccaga ccctgaagaaaggctgacttgcctcattcaaaatgagggctctagagggctctagtggata gtctggagaaacctggcgtctgaggcttaggagcttaggttttgctcctcaacacagactttt gacgttggggttgggggctactctcttgattgctgactccctccagcgggaccaatagtgtt ttcctacctcacagggatgttgtgaggacgggctgtagaagtaatagtggttaccactcatg tagttgtgagtatcatgattattgtttcctgtaatgtggcttggcattggcaaagtgctttttgatt gttcttgatcacatatgatgggggccaggcactgactcaggcggatgcagtgaagctctg gctcagtcgcttgcttttcgtggtgtgctgccaggaagaaactttgctgatgggactcaagg tgtcaccttggacaagaagcaactgtgtctgtctgaggttcctgtggccatctttatttgtgtat taggcaattcgtatttccccttaggttctagccttctggatcccagccagtgacctagatctt agcctcaggccctgtcactgagctgaaggtagtagctgatccacagaagttcagtaaaca aggaccagatttctgcttctccaggagaagaagccagccaacccctctcttcaaacacact gagagactacagtccgactttccctcttacatctagccttactgtagccacactccttgattg ctctctcacatcacatgcttctcttcatcagttgtaagcctctcattcttctcccaagccagact caaatattgtattgatgtcaaagaagaatcacttagagtttggaatatcttgttctctctctgctc catagcttccatattgacaccagtttctttctagtggagaagtggagtctgtgaagccaggg aaacacacatgtgagagtcagaaggactctccctgacttgcctggggcctgtctttcccac cttctccagtctgtctaaacacacacacacacacacacacacacacacacacacacacac acgctctctctctctccccccccaacacacacacactctctctctcacacacacacacat acacacacacttctttctctttccccctgactcagcaacattctggagaaaagccaaggaagg acttcaggaggggagtttccccctctcagggcagaattttaatctccagaccaacaagaa gttccctaatgtggattgaaaggctaatgaggtttatttttaactactttctatttgtttgaatgtt gcatatttctactagtgaaattttcccttaataaagccattaatacacccaaaaaaaaaaaaa aaa	
	C16orf89	NM_001098514.2	ctacgcccaggactggcctaacctccgctgcctaaccgtcatccccctgcagccaccctt cccagagtcctttgcccaggccaccccaggcttcttggcagccctgccgggccacttgtct tcatgtctgccaggggggaggtgggaaggaggtgggaggagggcgtgcagaggcagtc tgggcttggccagagctcagggtgctgagcgtgtgaccagcagtgagcagaggccggc catggccagcctggggctgctgctcctgctcttactgacagcactgccaccgctgtggtcc tcctcactgcctgggctggacactgctgaaagtaaagccaccattgcagacctgatcctgt ctgcgctggagagagccaccgtcttcctagaacagaggctgcctgaaatcaacctggatg gcatggtgggggtccgagtgctggaagagcagctaaaaagtgtccgggagaagtgggc ccaggagcccctgctgcagccgctgagcctgcgcgtggggatgctgggggagaagct ggaggctgccatccagagatccctccactacctcaagctgagtgatcccaagtacctaag agagttccagctgaccctccagcccgggttttggaagctcccacatgcctggatccacact gatgcctccttggtgtaccccacgttcgggccccaggactcattctcagaggagagaagt gacgtgtgcctggtgcagctgctgggaaccgggacggacagcagcgagccctgcggc ctctcagacctctgcaggagcctcatgaccaagcccggctgctcaggctactgcctgtcc caccaactgctcttcttcctctgggccagaatgaggggtgcacacagggaccactccaa cagagccaggactatatcaacctcttctgcgccaacatgatggacttgaaccgcagagct gaggccatcggatacgcctaccctacccgggacatcttcatggaaaacatcatgttctgtg gaatgggcggcttctccgacttctacaagctccggtggctggaggccattctcagctggc agaaacagcaggaaggatgcttcggggagcctgatgctgaagatgaagaattatctaaa gctattcaatatcagcagcatttttcgaggagagtgaagaggcgagaaaaacaatttccag atggctgctcctcccacaacacagccacagcagtggcagccctgggtggcttcctataca tcctggcagaataccccccagcaaacagagagccacacccatccacaccgccaccacc aagcagccgctgagacggacggttccatgccagctgcctggaggaggaacagacccct ttagtcctcatcccttagatcctggagggcacggatcacatcctgggaagaaggcatctgg aggataagcaaagccaccccgacacccaatcttggaagccctgagtaggcagggccag ggtaggtgggggccgggagggacccaggtgtgaacggatgaataaagttcaactgcaa ctgaaaaaaaaaaaaaaaaaaaaaaaaaaa	5
	CHTOP	NM_001206612.1	tttcccgccctctagtcgtgcgcggatctgacgcctgacgtaattgcgtagacgccatttta gccggtcagacaagcactggacgtggcggccattttgttttggacaccgagcaggagct	6

[0139]

		ggcggccgctgcagacgaaaggcaggaaagggcaggccgggtgagcagacggatc ggccgactagacagccaaccagcaacaacgaactgagctcgcatactaccgcttacgca tctaaccaaccgcccatctagctaacccgagcccctccaccgtcaactcaggttcggccg gtccccggcccgcctgccggagccgtggtggcagccccgggaggagcactggcgtct gtttccttcgattctcgggattcgaagatggctgcacagtcagcgccgaaagttgtgctaaa aagcaccaccaagatgtctctaaatgagcgctttactaatatgctgaagaacaaacagccg acgccagtgaatattcgggcttcgatgcagcaacaacagcagctagccagtgccagaaa cagaagactggcccagcagatggagaatagaccctctgtccaggcagcattaaaacttaa gcagaagagcttaaagcagcgcctgggtaagagtaacatccaggcacggttaggccga cccataggggccctggccaggggagcaatcggaggacgaggcctacccataatccag agaggcttgcccagaggaggactacgtgggggacgtgccaccagaaccctacttaggg gcgggatgtcactccgaggtcaaaacctgctccgaggtggacgagccgtagctccccga atgggcttaagaagaggtggtgttcgaggtcgtggaggtcctgggagaggggcctag ggcgtggagctatgggtcgtggcggaatcggtggtagaggtcggggtatgataggtcgg ggaagaggggcttggaggccgaggccgaggccgtggacgagggagaggtgccctt gctcgccctgtattgaccaaggagcagctggacaaccaattggatgcatatatgtcgaaaa caaaaggacacctggatgctgagttggatgcctacatggcgcagacagatcccgaaacc aatgattgaagcctgcccatcctcccatgagagactcttgttagtcaacacatctgtaaataa ccttgagataacagatgagaagaaatctgattgatgctggatggacctatcacaataggct gtggacttacttgccaccagcttgtgcatttagtgtgttccttttacttttgatactgtgttgtat gaaaccctttgtccttgatttggtttttgttttgttttttaggggggagggggggtttcccc tcctttgcccagacttctctttgaacacaaatgcattagccttgtggctagaacacccctcttcc tacctctgtctccctcacttgtcatatgctctgacatgctaacatttctttgttcatccctgttg cccccacagaaacatcccagaaaaaccggtcagtgttccttcctccctgatccttaggtttc tgaaatagggttctgttacatcctcttcgatagcctgtttaaaatgtttagaaggtctggagct caaaaatgcgttcttccacattgataatttagtaaactgagaacattgacatcactacagggc agcataagaggttgcttacatgtggtagcagctctggtttgattcaagttgctaccatgtaca ttgacagcacatataccataaccagcgtgttgggttgaattgcactttctacctttgtatgaga tttacagactttccttctgggtttgtatcatgaccagaggggtactatagggttggtttatactg caatatagaggatcagaagccatttgatttggtaggtgtgtcagaagggagaatgatggca gacgaactgctggaagaggtcagaagatagccatgctaaaatgcaattatatcctcatgttt atcccaaactaatcttggacttttccactcattagctttgttttgcccttgtttcccttgaaggttt aagttcaaccatattctgtcaactgttcagtttcagtggaatcttgtatttctggttcattataac aaactgttcgcttaaatccaaaaaaaaaa	
COL1A1	NM_000088.3	tcgtcggagcagacgggagtttctcctcggggtcggagcaggaggcacgcggagtgtg aggccacgcatgagcggacgctaacccctccccagccacaaagagtctacatgtctag ggtctagacatgttcagctttgtggacctccggctcctgctcctcttagcggccaccgccct cctgacgcacggccaagaggaaggccaagtcgagggccaagacgaagacatcccacc aatcacctgcgtacagaacggcctcaggtaccatgaccgagacgtgtggaaacccgagc cctgccggatctgcgtctgcgacaacggcaaggtgttgtgcgatgacgtgatctgtgacg agaccaagaactgccccggcgccgaagtccccgagggcgagtgctgtcccgtctgccc cgacggctcagagtcacccaccgaccaagaaaccaccggcgtcgagggacccaaggg agacactggcccccgaggcccaaggggacccgcaggcccccctggccgagatggcat ccctggacagcctggacttcccggaccccccggaccccccggacctcccggacccccct ggcctcggaggaaactttgctccccagctgtcttatggctatgatgagaaatcaaccggag gaatttccgtgcctggccccatgggtccctctggtcctcgtggtctccctggccccctggt gcacctggtccccaaggcttccaaggtccccctggtgagcctggcgagcctggagcttc aggtcccatgggtccccgaggtccccccaggtccccctggaaagaatggagatgatggg gaagctggaaaacctggtcgtcctggtgagcgtgggcctcctgggcctcagggtgctcg aggattgcccggaacagctggcctccctggaatgaagggacacagaggtttcagtggttt ggatggtgccaagggagatgctggtcctgctggtcctaagggtgagcctggcagccctg gtgaaaatggagctcctggtcagatgggcccccgtggcctgcctggtgagagaggtcgc cctggagcccctggccctgctggtgctcgtggaaatgatggtgctactggtgctgccggg ccccctggtcccaccggccccgctggtcctcctggcttccctggtgctgttggtgctaagg gtgaagctggtccccaagggccccgaggctctgaaggtccccagggtgtgcgtggtga	7

[0140]

		gcctggccccccctggccctgctggtgctgctggccctgctggaaaccctggtgctgatgg acagcctggtgctaaaggtgccaatggtgctcctggtattgctggtgctcctggcttccctg gtgcccgaggcccctctggaccccagggccccggcggccctcctggtcccaagggtaa cagcggtgaacctggtgctcctggcagcaaaggagacactggtgctaagggagagcct ggccctgttggtgttcaaggacccccctggccctgctggagaggaaggaaagcgaggag ctcgaggtgaacccggacccactggcctgcccggaccccctggcgagcgtggtggacc tggtagccgtggtttccctggcgcagatggtgttgctggtcccaagggtcccgctggtgaa cgtggttctcctggccctgctggccccaaaggatctcctggtgaagctggtcgtcccggtg aagctggtctgcctggtgccaagggtctgactggaagccctggcagccctggtcctgatg gcaaaactggcccccctggtcccgccggtcaagatggtcgccccggaccccaggccc acctggtgcccgtggtcaggctggtgtgatgggattccctggacctaaaggtgctgctgg agagcccggcaaggctggagagcgaggtgttcccggaccccctggcgctgtcggtcct gctggcaaagatggagaggctggagctcagggaccccctggccctgctggtcccgctg gcgagagaggtgaacaaggccctgctggctccccccggattccagggtctccctggtcct gctggtcctccaggtgaagcaggcaaacctggtgaacagggtgttcctggagaccttgg cgcccctggcccctctggagcaagaggcgagagaggtttccctggcgagcgtggtgtg caaggtccccctggtcctgctggtccccgaggggccaacggtgctcccggcaacgatg gtgctaagggtgatgctggtgcccctggagctcccggtagccagggcgcccctggcctt cagggaatgcctggtgaacgtggtgcagctggtcttccagggcctaagggtgacagagg tgatgctggtcccaaaggtgctgatggctctcctggcaaagatggcgtccgtggtctgact ggccccattggtcctcctggccctgctggtgcccctggtgacaagggtgaaagtggtccc agcggccctgctggtcccactggagctcgtggtgccccccggagaccgtggtgagcctg gtccccccggccctgctggctttgctggcccccctggtgctgacggccaacctggtgcta aaggcgaacctggtgatgctggtgctaaaggcgatgctggtcccctggccctgccgga cccgctggacccccctggccccattggtaatgttggtgctcctggagccaaaggtgctcgc ggcagcgctggtcccccctggtgctactggtttccctggtgctgctggccgagtcggtcctc ctggcccctctggaaatgctggacccccctggccctcctggtcctgctggcaaagaaggc ggcaaaggtccccgtggtgagactggccctgctggacgtcctggtgaagttggtcccccct ggtcccccctggccctgctggcgagaaaggatcccctggtgctgatggtcctgctggtgct cctggtactcccgggcctcaaggtattgctggacagcgtggtgtggtcggcctgcctggt cagagaggagagagaggcttccctggtcttcctggcccctctggtgaacctggcaaaca aggtccctctggagcaagtggtgaacgtggtcccccctggtcccatgggcccccctggatt ggctggacccccctggtgaatctggacgtgaggggctcctggtgccgaaggttccccctg gacgagacggttctcctggcgccaagggtgaccgtggtgagaccggccccgctggacc ccctggtgctcctggtgctcctggtgccccctggccccgttggccctgctggcaagagtggt gatcgtggtgagactggtcctgctggtcccgccggtcctgtcggccctgttggcgcccgt ggccccgccggacccccaaggcccccgtggtgacaagggtgagacaggcgaacaggg cgacagaggcataaagggtcaccgtggcttctctggcctccagggtcccccctggccctcc tggctctcctggtgaacaaggtccctctggagcctctggtcctgctggtcccgaggtccc cctggctctgctggtgctcctggcaaagatggactcaacggtctccctggccccattgggc cccctggtcctcgcggtcgcactggtgatgctggtcctgttggtcccccggccctcctgg acctcctggtcccccctggtcctcccagcgctggtttcgacttcagcttcctgccccagccac ctcaagagaaggctcacgatggtggccgctactaccgggctgatgatgccaatgtggttc gtgaccgtgacctcgaggtggacaccaccctcaagagcctgagccagcagatcgagaa catccggagcccagagggcagccgcaagaaccccgcccgcacctgccgtgacctcaa gatgtgccactctgactggaagagtggagagtactggattgaccccaaccaaggctgca acctggatgccatcaaagtcttctgcaacatggagactggtgagacctgcgtgtaccccac tcagcccagtgtggcccagaagaactggtacatcagcaagaaccccaaggacaagagg catgtctggttcggcgagagcatgaccgatggattccagttcgagtatggcggccagggc tccgaccctgccgatgtggccatccagctgaccttcctgcgcctgatgtccaccgaggcct cccagaacatcacctaccactgcaagaacagcgtggcctacatggaccagcagactggc aacctcaagaaggccctgctcctccagggctccaacgagatcgagatccgcgccgagg gcaacagccgcttcacctacagcgtcactgtcgatggctgcacgagtcacaccggagcc tggggcaagacagtgattgaatacaaaaccaccaagacctcccgcctgcccatcatcgat gtggcccccttggacgttggtgccccagaccaggaattcggcttcgacgttggccctgtct	

[0141]

		gcttcctgtaaactccctccatcccaacctggctccctcccacccaaccaactttccccccaacccggaaacagacaagcaacccaaactgaaccccctcaaaagccaaaaaatgggagacaatttcacatggactttggaaaatatttttttccttgcattcatctctcaaacttagtttttatctttgaccaaccgaacatgaccaaaaaccaaaagtgcattcaaccttaccaaaaaaaaaaaaaaaaaaagaataaataaataactttttaaaaaaggaagcttggtccacttgcttgaagacccatgcgggggtaagtccctttctgcccgttgggcttatgaaaccccaatgctgccctttctgctcctttctccacacccccctttggggcctcccctccactccttcccaaatctgtctccccagaagacacaggaaacaatgtattgtctgcccagcaatcaaaggcaatgctcaaacacccaagtggcccccacccctcagcccgctcctgcccgcccagcacccccaggccctgggggacctggggttctcagactgccaaagaagccttgccatctggcgctcccatggctcttgcaacatctccccttcgtttttgaggggtcatgccgggggagccaccagcccctcactgggttcggaggagagtcaggaagggccacgacaaagcagaaacatcggatttggggaacgcgtgtcaatcccttgtgccgcagggctgggcgggagagactgttctgttccttgtgtaactgtgttgctgaaagactacctcgttcttgtcttgatgtgtcaccggggcaactgcctgggggcggggatggggcagggtggaagcggctcccccattttataccaaaggtgctacatctatgtgatgggtggggtggggagggaatcactggtgctatagaaattgagatgccccccccaggccagcaaatgttccttttgttcaaagtctatttttattccttgatatttttctttttttttttttttttttgtggatgggga cttgtgaatttttctaaaggtgctatttaacatgggaggagagcgtgtgcggctccagcccagcccgctgctcactttccaccctctctccacctgcctctggcttctcaggcctctgctctccgacctctctcctctgaaaccctcctccacagctgcagcccatcctcccggctccctcctagtctgtcctgcgtcctctgtccccgggtttcagagacaacttcccaaagcacaaagcagtttttccccctaggggtgggaggaagcaaaagactctgtacctattttgtatgtgtataataatttgagatgtttttaattattttgattgctggaataaagcatgtggaaatgacccaaacataa	
EDC4	NM_014329.4	tttcttctccggccctggcaggttccgggagcctcggctcgtgggtgccggaagtggaggcggttggtggggttggcggggctcagcgacgctgcgcgggtggcggtttgcgaactgcgggtggactgtgtagtgaccggcgtcccgctgtctcgccccgtggcgggtgagcgagggtgcgtggtgcgcggcggcggcggaacgaacgcggtgcgggcggggcgcccgccgcagggcccatggcctcctgcgcgagcatcgacatcgaggacgccacgcagcacctgcgggacatcctcaagctggaccggcccgcgggcggccccagtgcagagagcccacggccatccagtgcctacaatggggacctcaatggacttctggtcccagacccgctctgctcaggtgatagtacctcagcaaacaagactggtcttcggaccatgccacccattaacctgcaagagaagcaggtcatctgtctctcaggagatgatagctccacctgcattgggattttggccaaggaggtggagattgtggctagcagtgactctagcatttcaagcaaggcccggggaagcaacaaggtgaaaattcagcctgtcgccaagtatgactgggaacagaagtactactatggcaacctgattgctgtgtctaactccttcttggcctatgccattcgggctgccaacaatggctctgccatggtgcgggtgatcagcgtcagcacttcggagcggaccttgctcaagggcttcacaggcagtgtggctgatctggctttcgcgcacctcaactctccacagctggcctgcctggatgaggcaggcaacctgttcgtgtggcgcttggctctggttaatggcaaaattcaagaagagatcttggtccatattcggcagccagagggcacgccactgaaccactttcgcaggatcatctggtgcccccttcatccctgaggagagcgaagactgctgtgaggagagcagcccaacagtggccctgctgcatgaagaccgggctgaggtgtgggacctggacatgctccgctccagccacagtacctggcctgtggatgttagccagatcaagcagggcttcattgtggtaaaaggtcatagcacgtgcctcagtgaaggagccctctctcctgatgggactgtgctggctactgcgagccacgatggctatgtcaagttctggcagatctacattgaggggcaagatgagccaaggtgtctgcacgagtggaaacctcatgatgggcggcccctctcctgcctcctgttctgtgacaaccataagaaacaagaccctgatgtccctttctggaggttccttattactggtgctgaccagaaccgagagttaaagatgtggtgtacagtatcctggacctgcctgcagactattcgcttctccccagatatcttcagctcagtgagtgtgccccctagcctcaaggtttgcttggacctctcagcagaatacctgattctcagcgatgtgcaacggaaggtcctctatgtgatggagctgctgcaaaaccaggaggagggccacgcctgcttcagctccatctcggagttcctgctcacccaccctgtgctgagctttggtatccaggttgtgagtcgctgccggctacggcacactgaggtgctgcctgccgaagaggaaaatgacagcctgggtgctgatggtacccatggagccggtgccatggagtctgcggccggtgtgctcatcaagctcttttgtgtgcatactaaggcactgcaagatgtgcagatccgcttccagccacagctgaaccctgatgtggtggccccactgcccacccacactgcccacgaggacttcacatttggagagtctcggcccgaactgggctctgagggcctggggtcag	8

[0142]

		ccgctcacggctcccagcctgacctccgacgaatcgtggagctgcctgcacctgccgac ttcctcagtctgagcagtgagaccaagcccaagttgatgacacctgacgccttcatgacac ctagcgcctccttgcagcagatcactgcctctcccagcagcagcagcagcggtagcagc agcagcagcagcagtagcagcagctcccttacagctgtgtctgccatgagcagcacctc agctgtggacccctccttgaccaggccacctgaggagctgaccttgagccccaagctgc agctggatggcagcctgacaatgagcagcagtggcagccttcaggcaagcccgcgtgg cctcctgcctggcctgctcccagccccagctgacaaactgactcccaaggggccgggcc aggtgcctactgccacctctgcactgtccctggagctgcaggaagtggagcccctgggg ctaccccaagcctcccctagccgcactcgttcccctgatgtcatctcctcagcttccactgc cctgtcccaggacatccctgagattgcatctgaggccctgtcccgtggttttggctcctctg caccagagggccttgagccagacagtatggcttcagccgcctcggcactgcacctgctgt ccccacggccccggccagggcccgagctcggcccccagctcgggcttgatggaggcc ctggggatggagatcggcataataccccctcctcctggaggcagccttgacccaggag gcctcgactcctgacagtcaggtttggcccacagcacctgacattactcgtgagacctgca gcaccctggcagaaagccccaggaatggccttcaggaaaagcacaagagcctggcctt ccaccgaccaccatatcacctgctgcagcaacgtgacagccaggatgccagtgctgagc aaagtgaccatgatgatgaggtggccagccttgcctctgcttcaggaggctttggcaccaa agttcctgctccacggctgcctgccaaggactggaagaccaagggatcccctcgaacct cacccaagctcaagaggaaaagcaagaaggatgatggggatgcagccatgggatccc ggctcacagagcaccaggtggcagagccccctgaggactggccagcactaatttggca acagcagagagagctggcagagctgcggcacagccaggaagagctgctgcagcgtct gtgtacccaactcgaaggcctgcagagcacagtcacaggccacgtagaacgtgcccttg agactcggcacgagcaggaacagcggcggctggagcgagcactggctgaggggcag cagcggggagggcagctgcaggagcagctgacacaacagttgtcccaagcactgtcgt cagctgtagctgggcggctagagcgcagcatacgggatgagatcaagaagacagtccc tccatgtgtctcaaggagtctggagcctatggcaggccaactgagcaactcagtggctac caagctcacagctgtggagggcagcatgaaagagaacatctccaagctgctcaagtcca agaacttgactgatgccatcgcccgagcagctgcagacacattacaagggccgatgcag gctgcctaccgggaagccttccagagtgtggtgctgccggcctttgagaagagctgcca ggccatgttccagcaaatcaatgatagcttccggctggggacacaggaatacttgcagca gctagaaagccacatgaagagccggaaggcacgggaacaggaggccagggagcctg tgctagcccagctgcggggcctggtcagcacactgcagagtgccactgagcagatggc agccaccgtggccggcagtgttcgtgctgaggtgcagcaccagctgcatgtggctgtgg gcagcctgcaggagtccattttagcacaggtacagcgcatcgttaagggtgaggtgagtg tggcgctcaaggagcagcaggccgccgtcacctccagcatcatgcaggccatgcgctc agctgctggcacacctgtcccctctgcccaccttgactgccaggcccagcaagcccatat cctgcagctgctgcagcagggccacctcaatcaggccttccagcaggcgctgacagctg ctgacctgaacctggtgctgtatgtgtgtgaaactgtggacccagcccaggtttttgggca gccaccctgcccgctctcccagcctgtgctcctttccctcatccagcagctggcatctgac cttggcactcgaactgacctcaagctcagctacctggaagaggccgtgatgcacctggac cacagtgaccccatcactcgggaccacatgggctccgttatggcccaggtgcgccaaaa gcttttttcagttcctgcaggctgagccacacaactcacttggcaaagcagctcggcgtctc agcctcatgctgcatggcctcgtgacccccagcctcccttagctgctaagcctgccttgcc caggggtgggatggcactgaaggccagcagacaggcctaggctggggcagggtcacg gctggcctttacctgctcaggcccccatctctggggtgtttgggggtcagggagcaggga gcactggccgtggtctacagcgtgtggtagtcagaaggtttagctgggcccagggcagg tattgcgcctgcttgggttctgccatgcctggagcatgaccctgagatcgtgacaccacttg agtggaattttccatgttccttttttacctctaatttggatctttttgtttttgaaaaacattgagaaa ttcaattaaatgcttttggaataaaatggagtatgtgtgtg	
FGFR2	NM_000141.4	ggcggcggctggaggagagcgcggtggagagccgagcgggcgggcggcgggtgc ggagcgggcgagggagcgcgcgcggccgccacaaagctcgggcgccgcggggctg catgcggcgtacctggcccggcgcggcgactgctctccgggctggcgggggccggcc gcgagccccgggggccccgaggccgcagcttgcctgcgcgctctgagccttcgcaact cgcgagcaaagtttggtggaggcaacgccaagcctgagtcctttcttcctctcgttcccca aatccgagggcagcccgcgggcgtcatgcccgcgctcctccgcagcctggggtacgcg	9

[0143]

		tgaagcccgggaggcttggcgccggcgaagacccaaggaccactcttctgcgtttggag ttgctccccgcaaccccgggctcgtcgctttctccatcccgacccacgcggggcgcggg gacaacacaggtcgcggaggagcgttgccattcaagtgactgcagcagcagcggcagc gcctcggttcctgagcccaccgcaggctgaaggcattgcgcgtagtccatgcccgtaga ggaagtgtgcagatgggattaacgtccacatggagatatggaagaggaccggggattgg taccgtaaccatggtcagctggggtcgtttcatctgcctggtcgtggtcaccatggcaacct tgtccctggcccggccctccttcagtttagttgaggataccacattagagccagaagagcc accaaccaaataccaaatctctcaaccagaagtgtacgtggctgcgccaggggagtcgct agaggtgcgctgcctgttgaaagatgccgccgtgatcagttggactaaggatggggtgca cttggggcccaacaataggacagtgcttattggggagtacttgcagataaagggcgccac gcctagagactccggcctctatgcttgtactgccagtaggactgtagacagtgaaacttgg tacttcatggtgaatgtcacagatgccatctcatccggagatgatgaggatgacaccgatg gtgcggaagattttgtcagtgagaacagtaacaacaagagagcaccatactggaccaac acagaaaagatggaaaagcggctccatgctgtgcctgcggccaacactgtcaagtttcgc tgcccagccgggggggaacccaatgccaaccatgcggtggctgaaaaacgggaaggag tttaagcaggagcatcgcattggaggctacaaggtacgaaaccagcactggagcctcatt atggaaagtgtggtcccatctgacaagggaaattatacctgtgtagtggagaatgaatacg ggtccatcaatcacacgtaccacctggatgttgtggagcgatcgcctcaccggcccatcct ccaagccggactgccggcaaatgcctccacagtggtcggaggagacgtagagtttgtct gcaaggtttacagtgatgcccagccccacatccagtggatcaagcacgtggaaaagaac ggcagtaaatacgggcccgacgggctgccctacctcaaggttctcaaggccgccggtgt taacaccacggacaaagagattgaggttctctatattcggaatgtaacttttgaggacgctg gggaatatacgtgcttggcgggtaattctattgggatatcctttcactctgcatggttgacagt tctgccagcgcctggaagagaaaaggagattacagcttccccagactacctggagatag ccatttactgcatagggtcttcttaatcgcctgtatggtggtaacagtcatcctgtgccgaat gaagaacacgaccaagaagccagacttcagcagccagccggctgtgcacaagctgacc aaacgtatccccctgcggagacaggtaacagtttcggctgagtccagctcctccatgaact ccaacaccccgctggtgaggataacaacacgcctctcttcaacggcagacaccccatg ctggcaggggtctccgagtatgaacttccagaggacccaaaatgggagtttccaagagat aagctgacactgggcaagcccctgggagaaggttgctttgggcaagtggtcatggcgga agcagtgggaattgacaaagacaagcccaaggaggcggtcaccgtggccgtgaagatg ttgaaagatgatgccacagagaaagaccttctgatctggtgtcagagatggagatgatga agatgattgggaaacacaagaatatcataaatcttcttggagcctgcacacaggatgggcc tctctatgtcatagttgagtatgcctctaaaggcaacctccgagaatacctccgagcccgga ggccacccgggatggagtactcctatgacattaaccgtgttcctgaggagcagatgacctt caaggacttggtgtcatgcacctaccagctggccagaggcatggagtacttggcttccca aaaatgtattcatcgagatttagcagccagaaatgttttggtaacagaaaacaatgtgatga aaatagcagactttggactcgccagagatatcaacaatatagactattacaaaaagaccac caatgggcggcttccagtcaagtggatggctccagaagccctgtttgatagagtatacact catcagagtgatgtctggtccttcggggtgttaatgtgggagatcttcactttaggggctc gccctacccagggattcccgtggaggaacttttaagctgctgaaggaaggacacagaat ggataagccagccaactgcaccaacgaactgtacatgatgatgagggactgttggcatgc agtgccctcccagagaccaacgttcaagcagttggtagaagacttggatcgaattctcact ctcacaaccaatgaggaatacttggacctcagccaacctctcgaacagtattcacctagtta ccctgacacaagaagttcttgttcttcaggagatgattctgtttttttctccagaccccatgcctt acgaaccatgccttcctcagtatccacacataaacggcagtgttaaaacatgaatgactgt gtctgcctgtccccaaacaggacagcactgggaacctagctacactgagcagggagacc atgcctcccagagcttgttgtctccacttgtatatatggatcagaggagtaaataattggaaa agtaatcagcatatgtgtaaagatttatacagttgaaaacttgtaatcttccccaggaggaga agaaggtttctggagcagtggactgccacaagccaccatgtaacccctctcacctgccgt gcgtactggctgtggaccagtaggactcaaggtggacgtgcgttctgccttccttgttaattt tgtaataattggagaagatttatgtcagcacacacttacagagcacaaatgcagtatatagg tgctggatgtatgtaaatatattcaaattatgtataaatatatattatatatttacaaggagttattt tttgtattgattttaaatggatgtcccaatgcacctagaaaattggtctctctttttttaatagctat ttgctaaatgctgttcttacacataatttcttaattttcaccgagcagaggtggaaaaatactttt	

[0144]

		gctttcagggaaaatggtataacgttaatttattaataaattggtaatatacaaaacaattaatc atttatagttttttttgtaatttaagtggcatttctatgcaggcagcacagcagactagttaatct attgcttggacttaactagttatcagatcctttgaaaagagaatatttacaatatatgactaatttt ggggaaaatgaagttttgatttatttgtgtttaaatgctgctgtcagacgattgttcttagacct cctaaatgccccatattaaaagaactcattcataggaaggtgtttcattttggtgtgcaaccct gtcattacgtcaacgcaacgtctaactggacttcccaagataaatggtaccagcgtcctctt aaaagatgccttaatccattccttgaggacagaccttagttgaaatgatagcagaatgtgctt ctctctggcagctggccttctgcttctgagttgcacattaatcagattagcctgtattctcttca gtgaattttgataatggcttccagactctttggcgttggagacgcctgttaggatcttcaagtc ccatcatagaaaattgaaacacagagttgttctgctgatagttttggggatacgtccatctttttt aagggattgctttcatctaattctggcaggacctcaccaaaagatccagcctcatacctaca tcagacaaaatatcgccgttgttccttctgtactaaagtattgtgttttgctttggaaacaccca ctcactttgcaatagccgtgcaagatgaatgcagattacactgatcttatgtgttacaaaattg gagaaagtatttaataaaacctgttaatttttatactgacaataaaaatgtttctacagatattaa tgttaacaagacaaaataaatgtcacgcaacttatttttttaataaaaaaaaaaaaaaaa	
FXYD7	NM_022006.1	ccccacatcggtccgtcctgcttccagctgctgcagcgcgccttcgccgccaaagcatcc agcagccccctgctccggcccagcatggcgaccccgacccagacccccacaaaggct cctgaggaacctgacccattttactatgactacaacacggtgcagactgtgggcatgactc tggcaaccatcttgttcctgctgggtatcctcatcgtcatcagcaagaaggtgaagtgcag gaaggcggactccaggtctgagagcccaacctgcaaatcctgtaagtctgagcttccctct tcagccctggtggcggcggcgtgtaacaccttcccgaggaaactccgctgccgaccct gcctgagcgcgggagcctgaggaccgggtggaggcggtggggacccagccgcgcgc cgggagcgctccccggaatgagccgccccacccaccccaaggctggagccgctgcac cctgctgtccctctccaggccttggcaatgacgatccccccaaagagcccgtctgcacccc agacccagggcctcaggcctccagctcctgggatccgggagtccatcccggcccagca cccccagcatcccgtgtatggcccccctgcacctccttgtctcatccccgaagatccgtc ccccctggcccctcagtgtccatgtcttgagcttaataaatgtgcatttggtttttcctctg	10
FYCO1	NM_024513.3	accctcttggtgtgcgcgtcatggccgtcagcaccgcgttcccgtcctcttccgcttggccc cagaaagtttcggttctgcccggcggtggacccacgagcgcgtgccaccatggagtctg accactgctgagcagacagccaccgagggccgaaattctgagccttcctctggacccag gcaggagacatacagacaagaaaggcaaactcaccatggcctccaccaatgcagagag ccagctccagagaatcatccgagacttgcaagatgctgtgacagaactaagcaaagaatt tcaggaagcaggggaacccatcacggatgacagcaccagcttgcataaattttcttataaa cttgagtatctcctgcaatttgatcagaaagagaaggccacccctcctgggcaacaagaag gactactgggattacttctgtgcctgcctggccaaggtgaaaggagccaatgatgggatc cgctttgtcaagtctatctcagagctccgaacatccttggggaaaggaagagcatttattcg ctactccttggtgcaccagaggttggcagacaccttacagcagtgcttcatgaacaccaaa gtgaccagtgactggtactatgcaagaagccccttttctgcagccaaagctgagctcggac attgtgggccaactctatgagctgactgaggttcagtttgacctggcgtcgaggggctttga cttggatgctgcctggccaacatttgccaggaggacgctgaccactggctcttctgcttacc tgtggaaaccccctagccgcagctccagcatgagcagcttggtgagcagctacctgcag actcaagagatggtgtccaactttgacctgaacagccccctaaacaacgaggcattggag ggctttgatgagatgcgactagagctggaccagttggaggtgcgggagaagcagctacg ggagcgcatgcagcagctggacagagagaaccaggagctgagggcagctgtcagcca gcaaggggagcaactgcagacagagagggagagggggcgcactgcagcggaggac aacgttcgcctcacttgcttggtagctgagctccagaagcagtgggaggtcacccaggcc acccagaacactgtgaaggagctgcagacatgcctgcagggcctggagctaggagcag cagagaaggaggaggactaccacacagccctgcggcggctggagtccatgctgcagc ccttggcacaggagcttgaggccacacgggactcactggacaagaaaaaccagcattta gccagcttcccaggctggctagccatggctcagcagaaggcagatacggcatcagaca caaagggccggcaagaacctattcccagtgatgcggcccaggagatgcaggagctagg ggagaagcttcaagccctagaaagggagagaaccaaggtcgaggaggtcaacagaca gcagagtgcccaactggaacagctggtcaaggagcttcagctgaaagaggatgcccgg gccagcctggagcgcctggtgaaggagatggccccactccaggaggagttgtctggga agggacaggaggcagaccagctctggcgacggctgcaggagttgctggcccacacga	11

[0145]

		gctcctgggaggaggagctagcagagttgaggcgggagaaaaaacagcaacaggag gagaaggagctgctggagcaggaggtcaggtctctgacccggcagctgcagttcctgg agacccagctggcacaggtgagccaacatgtgagtgacctggaggagcagaagaagc agctcattcaggacaaagaccacctcagccagcaggtgggtatgctcgagcggcttgct gggccgcctggcccagaactgccagtggcaggtgagaagaatgaggccctggtccctg tgaactccagtctgcaagaggcctgggggaagccagaggaggagcagaggggcctgc aggaggcacagttagacgataccaaggtgcaagagggcagccaggaggaagagctcc ggcaggccaacagggagctggagaaggagctacagaatgtggtcgggcgtaaccagc tcctggagggcaagctgcaagccctgcaggccgattaccaggctttgcagcagcggga atcagccatccagggctccttggcctccctggaggccgagcaggccagcatccggcact tgggtgaccagatggaggcgagcttgctggctgtaaggaaggccaaggaggccatgaa agcccagatggcagagaaggaggccattctacagagcaaggagggcgagtgtcagca gctgcgggaggaggtggagcagtgccagcaactggcagaagcccggcacagagagc ttagggctctcgagagccagtgccagcagcagacccagctgattgaggtcctcacagca gagaaaggccaacagggagttggcccacccactgacaatgaagcccgtgagctggctg cccagctagccctgtctcaggcgcagctggaagtccatcagggggaggtccaacggct gcaggctcaggtggtggacctccaggccaagatgcgggcagccctggatgaccagga caaggtgcagagccagctaagcatggctgaggccgtcctgagggagcacaaaaccctt gtgcagcagctgaaggagcagaatgaagcccttaacagagcccatgtccaggagctgct gcaatgctcggagcgtgaaggggcactgcaggaggagagggccgatgaggcccagc agagggaggaggagctgcgggccctgcaggaggagctgtcccaggccaaatgcagct ccgaggaagcacagctggagcacgctgagctgcaagagcagctgcaccgggccaaca cagacacagctgagctgggcatccaggtttgcgcactgaccgtggaaaaggagcgagt ggaggaggcactggcctgtgctgtccaggagctccaggacgccaaagaggcagcctca agggagcgagagggcctggagcgccaagtagctgggctgcagcaagagaaggagag cttgcaggagaagctgaaggcggccaaggcagcagccggctcactgcctggcctgcag gcccagctcgcccaggcagagcagcgggcccagagcctccaagaggctgcacacca ggagctcaacaccctcaagttccagctgagtgctgaaatcatggactaccagagcagact taagaatgctggtgaagagtgcaagagcctcaggggccagcttgaggagcaaggccgg cagctgcaggctgctgaggaagctgtggagaagctgaaggccacccaagcagacatgg gagagaagctgagctgcactagcaaccatcttgcagagtgccaggcggccatgctgag gaaggacaaggaggggggctgccctgcgtgaagacctagaaaggacccagaaggaact cgaaaaagccacaacaaaaatccaagagtattacaacaaactctgccaggaggtgacaa atcgtgagaggaatgaccagaagatgcttgctgacctggatgacctcaacagaaccaag aagtatctcgaggagcggctgatagagctgctcagggacaaggatgctctctggcagaa gtcagatgccctggaattccagcagaagctcagtgctgaggagagatggctcggagaca cagaggcaaaccactgcctcgactgtaagcgggagttcagctggatggtgcggcggca ccactgcaggatatgtggccgcatcttctgttactactgctgcaacaactacgtcctgagca agcacggtggcaaaaaggagcgctgctgccgagcctgtttccagaagctcagtgaagg ccctggctcccctgatagcagtggctcaggcactagccagggagagcccagccctgca ctgtcaccagcctcacctgggccccaggccacaggaggccaaggagcaaatacagact acaggccaccggacgacgctgtgtttgatatcatcacagatgaggaattgtgccagatac aggagtccggctcctctttgcctgaaacacccactgaaactgattctctcgacccaaatgc ggctgaacaggatactacatcaacctcgctaacgcctgaggacactgaagacatgcccgt ggggcaggattcggaaatctgcctgctgaagtctggagaactgatgatcaaagtaccct cacagtggatgagatcgccagcttcggggagggtagcagggagctgtttgtgaggtcca gcacctacagcctgatcccatcactgtggccgaggcaggcctcaccatcagctgggtct tctcctctgaccccaagagcatctccttcagtgtggtcttccaggaggccgaggacacacc gctggatcagtgtaaggtcctcattcccacgacccgatgcaactcccacaaggagaacat ccagggccagctcaaggttcgcacacccggcatctacatgctcatcttcgacaatacctttc tcaaggtttgtctctaaaaaggtattttatcacttgacggttgatcggcctgtgatctacgatg gaagtgatttcctgtagcttcagcacctcagtaacttcacttcatccacaggaaacactgctc ttcctcacctgtcacataaagcatttttttaaaaagtcagctgctccaaaatcatcaactcagc ccctgggctgcccctcagaggcggtgtctggggaggactttgtgctcagcactctgcacc ggccactcttagcccccgaggcgttgaagggctcaggcaatgtttccattaagtagagact	

[0146]

		cagctgttgtcacacccaaagggatgctctgccaaaggtttaaacacccaggagaccatc agcctctcctgggagcacagttggctacaggcctcttgtggagagtttcacgggcagggg tgattccaacttctgcctgtggagagattttctgccctgccccaccagggccctgcatgttg gagactgagctgggtgcactggccatgccctgtgaatcctcaggctgtgacgccctcagg tactcctgggaaaaggaggtacacagccatcatgcgagtcggtgccaggggacccccc ggagatcctgaccagctcctccagtcatgctcttgtccctcactgccccagtaagctggag gctgctccagaactcagcagtgttggaggggcctctaagctgcactctctttctggccctttt gtctgggtgattctgtcctcaaataaagcccttcactcagccagacctctccacagctcaaa gcattgccctaagaatcagaagtaaagataatccaagagcaaaacccactgtacttgggg cctgcaatggctgtgtgtacactacatctaatgcccaaatgccagccagtgtggatgttgtg accacagagcaggattgtgcattggctttagagctactcctcagctgatggcccacttttgtt tatataaataagagcttctgccccacctgcagacatgtttactaatgatcatagccaggatta gaaccactttcaaacattggggccttcttaacaaaagtctttgataacttaagaaccaaagta acagagtaaacagaggcatgatggatccctgggccccactcccctcctgacaggttcccc aacagcccatttgcccacttcccactgctcagcccacaccagacctccaggagacatccc cccttgaggcagagagatcctgttccctattcccagacaagaattatttaatcttccctgttct ctgtggtccttttcttccccaacaacagatagctcaccttggacagctcttcgtcccttgttcat ggaaccagctgcctgcagtcaggccccaggttcttccatgggtgaacagagcatctgaca aaaggtcccagtttggccaggggtgagggagagagcaccagacaggctatccgagaat ctgagagctgggcccggcagttcctccagctacccttgtgacctaagtccagtcacacatt tcccaaagtttctctttgtcataaccctggtctggctggttttgagggcttgagaatgggtcag ggactccaggccaagtccaacagagaccccaaacccaccacacaccagcagccacaa cctcaccaccaacaaagaggacttttgtggggccacaagtaagaggtcatttctggaatg gactcagacctttaaacaggagagttgagcacttccagtcagtttttaagcaaggcatggg gaacagggaatagaacctttcaaagaggttgcccagagaaaagctgggcctcttgcattc ggcttccttggagcagcctcttctggcagaaagccatcaggtgctcaatcatcttctcctgg ccaaggctctgaccatgcttagtactggaatagaggtggccaggcccccagcgactcttc ttggcctgatgtttgtcctcacaggcatgccacgtggcctgagatgattcagaacaaatcat gctaactttgaatccatccagccacttgcaaatgataatcagaagtcagcttgttcactgtta gaaagaaactaacaaaagagaacccagagcaatctagaatctttgagtgcttggctttcca aggatactgcggagactctggccaagctgatgaccttctgaagtgtcactggcaccatatg caacaagaaccaccattcactgagtagctaatgggtttggggcctgggacattccatctga ggtccttcctgaacatgtcactccacagcagaggaccggttgcagcttacccagaaccac tcctccaggagagctggatgttttgcgtgcaacaccttgagcactgactgctattgttcaaa aaaagcctttgctgcattcggaggactgccccgtgccctgaggtgacttcctaactatgtg gtttcattagcgaatttatttttgtgctgggtggacatttgtattttgttaggttgctgtttaagct caagtttgctgtgctctctgcagctacaaaacatcttggcatatttaagagtggctttataaat agctttattctgatattaatcagattcccaactttactgagaattaaggactggggtactttaaa gaaatgcaaatagcaattgaagaaccactgctgcaggtggtagccctggctagactgaat tacactagaaatcagccagaaggaagcgtccttgggatcccagatcactctttttttttttttt aaaaggggcagccccttgatggctcatctctctgaataacagttacgtcttcatatcgatac cagatgccttcttcatcatgccactgaagccactcaccaccttcaagaacatgccaacctct gtcagattcacttacccacaaacaaggaggcacgtttggcacaaagtgttgtcctccaggt ccaagtggactctacagagtgcttgacctcaacacactggattccaggtggactggacca agagcaggcaaagacacgggaactgaaaaactccacagggtttggagaatagaaatga aaagccacgtcatataactcaagaataaatggtgttttggaaatttaaaattatcatcgaag gtggtgaaactatttcaggcccaaatgaaaggaaatcgccagttggggatgaaatcacag agcctgtgttttatgatatggttggatgtccactgatgaaatttaaaggagtttcagttttaaa agtgcgcatgattctacatatgagaattctttaggccaagaaactgtccttggctcagaggt gttgggaattaaagcagagagaagccattcgtgatgcttagaaccaaggatggtcatgtac acaaagaccatcgagacggccattcttgtttacaaaacacttaccaagaaagcactttgtag gggaactttagtaagttcttctcatttcattatgtttcttccaaggaaacaggagagactgaatt aataattctctctttcctcttaagcacttttaaaataataaagtacatcttgaaatttggggagg catctctgatttaaaaaaagaaaaaggctgcttgatgtatgttatgcagagacactctgcctc tggtggctgcagagcaatacccaagcctcatttggaaggctcaacatttggaattgcacttt	

[0147]

		aattgattaatcctcaattcatgtggccttacgggatggtgggtctgggaccccaattcattct tatctgccaaagaattatctagaagcacatcaaataccagcaccccacctgctcaatgggg gtggaaaacttttgtatccctaagcatattatttttatagtgtctgccatgccatgtggaaatact ttatttttaacctcaggatttaaataaagtaaacactatgacatttagaca	
HNRNPU	NM_004501.3	ctcgcgccaggcgagtctccgcgtctccctcgcgaactcggtgaaaggaattggcgccg ttcgacaccaggcggatccgctctgcagcacgaacccatctccagccgcagccgcagc cgccgcccgggccgaggagcagccgcagcagccgccaccagtggccgagtgagcg gagccgagtttgaggcagcgcctagcggtgaatcggggccctcaccatgagttcctcgc ctgttaatgtaaaaaagctgaaggtgtcggagctgaaagaggagctcaagaagcgacgc ctttctgacaagggtctcaaggccgagctcatggagcgactccaggctgcgctggacga cgaggaggccgggggccgccccgccatggagcccgggaacggcagcctagacctgg gcggggattccgctgggcgctcgggagcaggcctcgagcaggaggccgcggccggc ggcgatgaagaggaggaggaagaggaagaggaggaggaaggaatctccgctctgga cggcgaccagatggagctaggagaggagaacggggccgcgggggcggccgactcg ggcccgatggaggaggaggaggccgcctcggaagacgagaacggcgacgatcagg gtttccaggaaggggaagatgagctcggggacgaagaggaaggcgcgggcgacgag aacgggcacggggagcagcagcctcaaccgccggcgacgcagcagcaacagcccca acagcagcgcgggggccgccaaggaggccgcggggaagagcagcggccccacctcg ctgttcgcggtgacggtggcgccgcccggggcgaggcagggccagcagcaggcggg aggggacggcaaaacagaacagaaaggcggagataaaaagaggggtgttaaaagacc acgagaagatcatggccgtggatattttgagtacattgaagagaacaagtatagcagagc caaatctcctcagccacctgttgaagaagaagatgaacacttcgatgacacagtggtttgtc ttgatacttataattgtgatctacattttaaaatatcaagagatcgtctcagtgcttcttcccttac aatggagagttttgcttttctttgggctggaggaagagcatcctatggtgtgtcaaaaggca aagtgtgttttgagatgaaggttacagagaagatcccagtaaggcatttatatacaaaagat attgacatacatgaagttcgtattggctggtcactaactacaagtggaatgttacttggtgaa gaagaattttcttatgggtattctctaaaaggaataaaaacatgcaactgtgagactgaagat tatggagaaaagtttgatgaaaatgatgtgattacatgttttgctaactttgaaagtgatgaag tagaactctcgtatgctaagaatggacaagatcttggcgttgccttcaaaatcagtaaggaa gttcttgctggacggccactgttcccgcatgttctctgccacaactgtgcagttgaatttaatt ttggtcagaaggaaaagccatattttccaatacctgaagagtatactttcatccagaacgtcc ccttagaggatcgagttagaggaccaaaggggcctgaagagaagaaagattgtgaagtt gtgatgatgattggcttgccaggagctggaaaaactacctgggttactaaacatgcagcag aaaatccagggaaatataacattcttggcacaaatactattatggataagatgatggtggca ggttttaagaagcaaatggcagatactggaaaactgaacacactgttgcagagagccccc cagtgtcttgggaaatttattgagattgctgcccgaaagaagcgaaattttattctggatcag acaaatgtgtctgctgctgcccagaggagaaaaatgtgcctgtttgcaggcttccagcgaa aagctgttgtagtttgcccaaaagatgaagactataagcaaagaacacagaagaaagcag aagtagaggggaaagacctaccagaacatgcggtcctcaaaatgaaaggaaactttacc ctcccagaggtagctgagtgctttgatgaaataacctatgttgaacttcagaaggaagaag cccaaaaactcttggagcaatataaggaagaaagcaaaaaggctcttccaccagaaaag aaacagaacactggctcaaagaaaagcaataaaaataagagtggcaagaaccagtttaa cagaggtggtggccatagaggacgtggaggattcaatatgcgtggtggaaatttcagag gaggagcccctgggaatcgtggcggatataataggaggggcaacatgccacagagag gtggtggcggtggaggaagtggtggaatcggctatccataccctcgtgcccctgtttttcct ggccgtggtagttactcaaacagagggaactacaacagaggtggaatgcccaacagag ggaactacaaccagaacttcagaggacgaggaaacaatcgtggctacaaaaatcaatct cagggctacaaccagtggcagcagggtcaattctggggtcagaagccatggagtcagc attatcaccaaggatattattgaatacccaaataaaacgaactgatacatatttctccaaaac cttcacaagaagtcgactgttttctttagtaggctaacttttaaacattccacaagaggaagt gcctgcgggttccttttttagaagctttgtgggttgatttttttttctttttttgtacatttttaatt gcagtttaaaagtgaatcgtaagagaacctcagcattgtgcacgataagagaatgtgtcag tatttcagggttctacattttatctgtaaaatgtgacttttttttttttttatcacaacagaagtaaaa tgttgctttgtacctggtgtcttttattaagaatttactcccccccatttctcacagagaataacag tcgggagtcattgtcacaatataatagaaatgttagcaaccagattcatgtaaggactaagt	12

[0148]

		ggtcctcatgaattgcattaagactctgtactgctcatattacactccatcctctctgtagtttg ctgggtagtggaggggtaagctaaatcatagtttctgacaataactgggaaggttttttctt aaaataacaatggaattggtataattgggattgaaaactaaaacttggaactaagatagaga agatggagtgtatgtagaagggctgttaaaaatgtaaaacttggttgcattatttgtggaggc tcaaacttgtgaaggttaataccataatttttccatttgttctgcattttgattctgaaaagaaag ctggctttgcccatttcttattaaaaaaacttgttgtaaatccagttgtctaatgggatctatatg aagttagccatgtctgtatgcccttctcccacaaaatactgtataactagtgtgcttgtagtag ttaactccaccatctttgtaagctaatgaaattgtgagtcacccatttatatcttaatttttaatca tgtcagttcttgaatgggtatctccttagcctgctgatttctttttctttctaaagaaagtgggtg gagaaattaatttagacgtttgtttgcaataaaaagaattcattttactcttgttttgggattctcg ccatcaaggttcaaaatccctttatataactcccaagaggagaaatttattaagtgtgtgcttt ctggacagcttattctttactctgcatagaacatttaggttttaaaaacttaaatgtatactgac aattgatacataattatgaagtaaagttgaattcttcccttccctcccccccagacaactttta acatatttaatgaggggaaaaggtactggctgggagaagttaacactgagtttatcatcttta cagaatgctaatgctgtcctcaactgattattttatatacatatatatgatacatgaaactctgg gatcagatgcttttagaagccatcatgcaagccagtcattgatgtcactgctacacaacact gctaacttgactgtagctatgtaataacattagatccccttaattgtaattatattgggtttgcac agaacactttaatcttcccctcaccaatgtgaagtgaggaatcaggagtcaaactgtagaa ctaaaatttgacttcagtctagcgtttccttggtgtttttaggttgctttggtaagtttaggtttgct atatttctgattgcttagaattttgttttagccctttaaaatcagatcataaatatgaattcatactt ctaaggaattttcttgctataagctggagtttaggtgatgtataggttcagttgagacatttttg gaacaggcaaatccttagttaacataagatatttaacagttgaagatagtgtcatggatttttta tctttttagcaagtaatgctaagaaccactggcctgagctactactcttcagtatacattatta ggattgcatagacttactagaggaacagtttcaggttttgatgctaatcagtgttgtgtcctaa agttgtcctttgtgcctttaaaaagttttggatatatcttctagtttaaaattgcttattaaggaatt cattttataattgcagtgggaaagtaatggtcaagtaacactaggtagactatcatgcctgttt agcccagagaatttgggggggagagagaatagataaaaatggcacccagaaaaatgttaa aatctttagtcaagactagaattaatacaattgtctacacttgtatggcagaaataaccttata aagtgtttaaggaattcagagaagggaatgtaccaaataagcaacagggagaaaattagg taagaagtaagatacgaacgagaaacctgatttattgctcatccttcccttgcctccctaatg gcaagcaaaactctgaacatctgaaaaggatgtagttctggacaaatcctgactacccaga ggaaactcactgtgagattgctgttgatttgaagggtgctttcactaaggttatattttaaagta gaataacacatgctgagtgtaaactggctttggattggtcagctgcagtagtacaaaaaca gcatagaatttgagaaaactaaaactgctatgagatagctatgagaaaactaaaactgctat gagatagaaatgatgtaaaattatgtggaaagttttccctcatatactcacatacagcctttga agggctctggctctgaccggttgatggccttgagcgagatgaaatcatgaaattgagtcaa atcaatttgacattgaaatgacaagaggaaactcttaaatacataaaaacaagctctcatttg cctaggatagatactgtcttaaaaataaagactgaacctagatgttctgagcactagcaaca aggtattttaacaagtttaaaggaattctctgaaaaagttataaaattattctaggaaacataa ccataatagtgttttaagggactttcacctggggattttatattcatgaacagagtgtattctgt atttaaaatgtctcatttgtgggaattggatgacatgttttttgataaatttattcacaatataaatt gacttttattctaggaccatgtgaataatgggttccattgcacaaatacaaatattttaatagc ttcttaggcagtggtgtagacatcttggatataaataattgtagatcttgtatatttgatttttaaa aaactagaataaacagagaggcataaacatatcttagagtccaagtggtagtgtttagcatt ggatataataaatggatgttttacaaagtgtttccataattctcttcctatacataaatgtcttgtt ttcaaaagtggatggaacttggctgggtgtggtggctcacgcctgtaatcctagcactttgg gaggccaaggcgggaggatcacttgagctcaggagtttgagaccatcctgggcaacata gtgagacctggtctcttgaaaaaaaaaaagtggatggaacttgtagcagagaattttatcta cttctcaacctgcttcagaatacccatttgagatgttcccctggaaagatgaacacaatactg catctgaagccatttcttcccacctaacattcttaaaatgattagagtctaaactttgtcattcat tcctaattctggagctctgaggttgaggtgttcagagtttggtgaataattgggtttaagtttta acattttagtaataataaaagcaaacacatacatgttaaggcctgacaataggttgcaatac ccatgcattgggactcatacccagcataaatggtgagggactgaacattagtgctttgagc aagaattggttaactacctgagatctctaaaacagtaatttgaattactaatacataaaccac aagtctcttcgaattgttaattgcctaaatttaccctaaaacttagttaacgctgcagtgccttt	

[0149]

		attaaagctttttttttgggggggggtgtgggcacagctactccataactttaaattttaaagca tgaaggtgatctagctagtgttagtgcttgagttggtagttacataggctgctcttgaatcgtc ctgttttctttgcctagtattagcaccacaggtacatatttgtaaaataagcattaaaagtacttt gtccagc	
HPN	NM_002151.2	tcgagcccgctttccagggaccctacctgagggcccacaggtgaggcagcctggcctag caggccccacgccaccgcctctgcctccaggccgcccgctgctgcggggccaccatgc tcctgcccaggcctggagactgacccgaccccggcactacctcgaggctccgccccca cctgctggaccccagggtcccaccctggcccaggaggtcagccagggaatcattaacaa gaggcagtgacatggcgcagaaggagggtggccggactgtgccatgctgctccagacc caaggtggcagctctcactgcggggaccctgctacttctgacagccatcggggcggcat cctgggccattgtggctgttctcctcaggagtgaccaggagccgctgtacccagtgcagg tcagctctgcggacgctcggctcatggtctttgacaagacggaagggacgtggcggctg ctgtgctcctcgcgctccaacgccagggtagccggactcagctgcgaggagatgggctt cctcagggcactgacccactccgagctggacgtgcgaacggcgggcgccaatggcac gtcgggcttcttctgtgtggacgaggggaggctgccccacacccagaggctgctggagg tcatctccgtgtgtgattgccccagaggccgtttcttggccgccatctgccaagactgtggc cgcaggaagctgcccgtggaccgcatcgtgggaggccgggacaccagcttgggccgg tggccgtggcaagtcagccttcgctatgatggagcacacctctgtgggggatccctgctct ccggggactgggtgctgacagccgcccactgcttcccggagcggaaccgggtcctgtc ccgatggcgagtgtttgccggtgccgtggcccaggcctctccccacggtctgcagctgg gggtgcaggctgtggtctaccacgggggctatcttccctttcgggaccccaacagcgag gagaacagcaacgatattgccctggtccacctctccagtcccctgcccctcacagaatac atccagcctgtgtgcctcccagctgccggccaggccctggtggatggcaagatctgtacc gtgacgggctggggcaacacgcagtactatggccaacaggccggggtactccaggag gctcgagtccccataatcagcaatgatgtctgcaatggcgctgacttctatggaaaccaga tcaagcccaagatgttctgtgctggctaccccgagggtggcattgatgcctgccagggcg acagcggtggtccctttgtgtgtgaggacagcatctctcggacgccacgttggcggctgt gtggcattgtgagttggggcactggctgtgccctggcccagaagccaggcgtctacacc aaagtcagtgacttccgggagtggatcttccaggccataaagactcactccgaagccagc ggcatggtgacccagctctgaccggtggcttctcgctgcgcagcctccagggcccgagg tgatcccggtggtgggatccacgctgggcctaggatgggacgtttttcttcttgggcccgg tccacaggtccaaggacaccctccctccagggtcctctcttccacagtggcgggcccact cagccccgagaccacccaacctcaccctcctgacccccatgtaaatattgttctgctgtctg ggactcctgtctaggtgcccctgatgacgggatgctctttaaataataaagatggttttgatt aaaaaaaaaaaaaaaaaaaaaaaaaa	13
KRT15	NM_002275.3	cactcaaggtgtgcaggcagctgtgtttgtcaggaaggcagaaggagttggctttgcttta ggggaggagacgaggtcccacaacaccctctgaagggtatataaggagccccagcgtg cagcctggcctggtacctcctgccagcatctcttgggtttgctgagaactcacgggctcca gctacctggccatgaccaccacatttctgcaaacttcttcctccacctttgggggtggctca acccgaggggggttccctcctggctgggggaggtggctttggtgggggggagtctctctgg gggaggtggaagccgaagtatctcagcttcttctgctaggtttgtctcttcagggtcaggag gaggatatgggggtggcatgagggtctgtggctttggtggaggggctggtagtgttttcg gtggaggctttggaggggcgttggtgggggttttggtggtggctttggtggtggcgatg gtggtctcctctctggcaatgagaaaattaccatgcagaacctcaatgaccgcctggcctc ctacctggacaaggtacgtgccctggaggaggccaatgctgacctggaggtgaagatcc atgactggtaccagaagcagaccccaaccagcccagaatgcgactacagccaatacttc aagaccattgaagagctccgggacaagatcatggccaccaccatcgacaactcccgggt catcctggagatcgacaatgccaggctggctgcggacgacttcaggctcaagtatgaga atgagctggccctgcgccagggcgttgaggctgacatcaacggcttgcgccgagtcctg gatgagctgaccctggccaggactgacctggagatgcagatcgagggcctgaatgagg agctagcctacctgaagaagaaccacgaagaggagatgaaggagttcagcagccagct ggccggccaggtcaatgtggagatggacgcagcaccgggtgtggacctgacccgtgtg ctggcagagatgagggagcagtacgaggccatggcggagaagaaccgccgggatgtc gaggcctggttcttcagcaagactgaggagctgaacaaagaggtggcctccaacacaga aatgatccagaccagcaagacggagatcacagacctgagacgcacgatgcaggagctg	14

[0150]

		gagatcgagctgcagtcccagctcagcatgaaagctgggctggagaactcactggccga gacagagtgccgctatgccacgcagctgcagcagatccaggggctcattggtggcctgg aggcccagctgagtgagctccgatgcgagatggaggctcagaaccaggagtacaagat gctgcttgacataaagacacggctggagcaggagatcgctacttaccgcagcctgctcga gggccaggatgccaagatggctggcattggcatcagggaagcctcttcaggaggtggtg gtagcagcagcaatttccacatcaatgtagaagagtcagtggatggacaggtggtttcttc ccacaagagagaaatctaagtgtctattgcaggagaaacgtcccttgccactccccactct catcaggccaagtggaggactggccagagggcctgcacatgcaaactccagtccctgc cttcagagagctgaaaagggtccctcggtcttttatttcagggctttgcatgcgctctattccc cctctgcctctccccaccttctttggagcaaggagatgcagctgtattgtgtaacaagctcat ttgtacagtgtctgttcatgtaataaagaattacttttccttttgcaaataaaaaaaaaaaaaaa aaaaaaa	
[0150]	*KRT23*	NM_001282433.1	aactagcacgtggctcccgccccagactgcttctttattcattcctaacctttaccttggca gatgaaatataagattcatcaaccacatttgacagcccatggcaggtttcctgttttccatcgt ccctctgcaggtcacagacacacagagcccagccgtggcaggctcagccggggtccg gggctgctaacaacggctacattcctcccccagggccaagggaaatcctgagcgcagg ccagggttgtttggttttgaggtgtgctgggatgaaaggcaccctggaagtggaaggttcg gtcattcattaattaattacatctataattgagggtttgttcttaagagcgagtcctttgaaagta ctttccttcaaacagtgactgccacaaaggcatcagatattcaccaccttctcggctgcctc agcacagcaagctttattctgggacctgagatcctgttctgagctggctttcccttctccagg ctcgctcaccctccctttagagatagtggatggtaagatgaccaatgctcagattattcttctc attgacaatgccaggatggcagtggatgacttcaacctcaagtatgaaaatgaacactcctt taagaaagacttggaaattgaagtcgagggcctccgaaggaccttagacaacctgaccat tgtcacaacagacctagaacaggaggtggaaggaatgaggaaagagctcattctcatga agaagcaccatgagcaggaaatggagaagcatcatgtgccaagtgacttcaatgtcaatg tgaaggtggatacaggtcccagggaagatctgattaaggtcctggaggatatgagacaa gaatatgagcttataataaagaagaagcatcgagacttggacacttggtataaagaacagt ctgcagccatgtcccaggaggcagccagtccagccactgtgcagagcagacaaggtga catccacgaactgaagcgcacattccaggccctggagattgacctgcagacacagtaca gcacgaaatctgctttggaaaacatgttatccgagacccagtctcggtactcctgcaagctc caggacatgcaagagatcatctcccactatgaggaggaactgacgcagctacgccatga actggagcggcagaacaatgaataccaagtgctgctgggcatcaaaacccacctggaga aggaaatcaccacgtaccgacggctcctggagggagagagtgaagggacacgggaag aatcaaagtcgagcatgaaagtgtctgcaactccaaagatcaaggccataacccaggag accatcaacggaagattagttctttgtcaagtgaatgaaatccaaaagcacgcatgagacc aatgaaagtttccgcctgttgtaaaatctattttcccccaaggaaagtccttgcacagacacc agtgagtgagttctaaaagatacccttggaattatcagactcagaaacttttatttttttttctgt aacagtctcaccagacttctcataatgctcttaatatattgcacttttctaatcaaagtgcgagt ttatgagggtaaagctctactttcctactgcagccttcagattctcatcattttgcatctattttgt agccaataaaactccgcactagctgcaaaaaaaaaaaaaaaaaaa	15
	MAN2B2	NM_001292038.1	ggaagtgggcctggcaccttcccggcctgccgcagggatggggcagctgtgctggctg ccgctgctggcaccgctcctgttgctgcgaccgccaggggtccagtccgccggccccat ccgggccttcgtggtgccccacagccacatggacgtgggctgggtctacactgtgcagg aaagcatgcgggcgtacgccgccaatgtctacacctcagtggtggaagagctggcccgc ggccagcagcgccggttcatcgctgtggagcaggagtttttccggctgtggtgggatggc gtcgcctcggaccagcagaaataccaggtccgccagctcctggaggaaggacgcctgg aatttgtcatcggaggccaggtcatgcatgacgaggctgtgacgcaccttgatgaccagat cctgcagctcacagaaggacacgggtttctctatgaaacatttgggatccggccacagttc tcctggcacgttgacccgtttggcgcctctgccacgacgcccaccctatttgcgctggcgg gcttcaatgcccacctcggctcccggatcgactacgacctgaaggcagccatgcaggag gcccgggggctgcagttcgtgtggcgagggtccccatccctctcagagcggcaggaaat cttcacgcacatcatggaccagtacagctactgcaccccgtcccacatccctttctccaaca ggtcaggattttactggaatggcgtggctgtcttccccaagcctccccaagatggggtgta ccccaacatgagtgagcctgtcaccccagccaacatcaacctctatgccgagctcggtgt ctcggtgcagtatgccacgctgggcgactacttccgtgccctgcacgctctcaatgtcacc	16

[0151]

		tggcgtgtccgcgaccaccacgacttcctgccctattccacagaaccattccaggcctgg acgggcttctacacgtcccgcagctcactgaaggggctggcccggcgagccagcgcctt gttgtatgccggggagtccatgttcacacgctacctgtggccggccccccgtgggcatct ggaccccacctgggccctgcagcagctccagcagcttcgctgggccgtctccgaggtcc agcaccatgatgccatcactgggactgagtcccccaaggtgagagacatgtacgcaacg cacctggcctcggggatgctgggcatgcgcaagctgatggcctccatcgtcctagatgag ctccagccccaggcacccatggcggccagctccgatgcaggacctgcaggacattttgc ctcggtctacaacccgctggcctggacggtcaccaccatcgtcaccctgactgttggtttc cctggagtccgcgtcacagatgaggcgggccacccagtgccctcgcagatccagaact caacagagaccccatctgcgtatgacctgcttattctgaccacaatcccaggcctcagttac cggcactacaacatcagacccactgcaggggcccaagagggcacccaggagccggct gccactgtggcgagcacccttcaatttggccgcaggctgaggagacgcaccagccatgc gggcaggtacttggtgcctgtggcaaacgactgctacattgtgctgctcgaccaggatac caacctgatgcacagcatctgggagagacagagtaaccgaacggtgcgcgtgacccag gaattcctggagtaccacgtcaacggggatgtgaaacagggccccatttccgataactac ctgttcacaccgggcaaggccgcggtgcctgcgtgggaagctgtggaaatggagattgt ggcgggacagcttgtgactgagatccggcagtacttctacaggaacatgacagcacaga attacacgtatgcaatccgctcccggctcacccatgtgccgcagggccatgacggggag ctgctctgccaccggatagagcaggagtaccaagccggccccctggagctgaaccgtg aggctgtcctgaggaccagcaccaacctaaacagccagcaggtcatctactcagacaac aacggctaccagatgcagcggaggccctacgtttcctatgtgaacaacagcatcgcccg gaattactaccccatggttcagtcggccttcatggaggatggcaaaagcaggcttgtgttg ctgtcggagcgggcacatggcatctccagccaagggaatgggcaggtggaggtcatgc tccaccggcggctgtggaacaacttcgactgggacctgggctacaacctcacgctgaac gacacctcagtcgtccacccagtgctctggcttctgctgggatcctggtccctcaccactg ccctgcgccagaggagcgcactggcgctgcagcacaggcccgtggtgctgttcggaga cctcgctgggactgcgccgaagctcccaggaccccagcagcaagaggccgtgacgct gcccccgaatcttcacctgcagatcctgagcatccctggctggcgctacagctccaacca cacggagcactctcagaatctccggaaaggccatcgaggggaagcccaggctgacctc cgccgtgtcctgctgcggctctaccacctgtatgaagtgggcgaggacccagtcctgtctc agccagtgacagtgaatctggaggctgtgctgcaggcgctggggtccgtggtggcagtg gaggagcgctcgctcacagggacctgggatttgagcatgctgcaccgctggagctgga ggacggggcctggccgccacagaggtgacaccacctctccctcgaggccaccaggag gccccatcatcaccgtccacccaaaggaaatccggacgttctttattcactttcaacagcag tgagccctgggcagatgccccggccccagggcttcccccaggaactccatgtaacagaa cagacccaggacagggaaaagcagtgcggagggatgggactggggagtcagctgctc atctgcaggctaatggcaggaaatggtcatatttggggttttccctaatttttttaaacaaaaa ttacattacaagatccaggttcttcccccccacactcaatcaagccagccctctcctcttctgt cacgtaaaggatatttggcacactcatgcgtcattcattcacaaaacacaaacccaggactt tctgcctaaggcagagcacaagactcacagcagcaccgaagcgcatctgccgtccggg ccctgccaggcttgccaggctgccagtggtaactgtggacctactgcgtgccacgtgtttt catagactcatcccatgctggcaacagccctgcaaggggcttggctctgccacagggca ggagaggaagttgtagcgcctagcgagagttccagccccagacgcccacctgtgcctca gggcaccgcctgccgagcagagaaggcacagcagccgtcagagtccatgagaggtga aaccacacagcagggatgtccaatatcagaactattaatatcaataaaagtataaccttccc aggtctatgcccaagagaattgaaaacatccatccacacaatacctgtgctcccgcgttcat agcagcattactcaaaagtcaaacggtagcaacaacccaaatgtccatccacagatgaatt aagacatgaagtgtgttctgtccatacaatggaatattatttggccataaaaaggaaggaaa ttctgacgcatgccacagcctgagtgaatcctacaaatattacgctaagtgaaagaagcca atcacgagtttatgtgaaatgtccagaataggcaaatctgtgtatcagagacaaagcacatt ggtggttgccaggtactggaggaagagagaagaggcatgacagctaacagggacgggg ctttctttggaagatgatgaaattgtggaatgatggttgcacaactttgtgaatatactagaaa ccaatgaattaaaaactttggaagatgaaaaaaaaaaaaaaaaa	
MAX	NM_001320415.1	tgcgtgccgccgttgatccggtgctgcagtgaggaggtggttcttgcccgtgttgtgtgtgt gtgtgagtgagagagcgagtgagtgagtgagtgagtgtgtgtgggggggactcggct	17

[0152]

		tgttgttgtcggtgacttccccctcccctttcacccctttccctccccgccgccgctgcagtg gccgctccctgggccgtaggaaatgagcgataacgatgacatcgaggtggagagcgac gaagagcaaccgaggtttcaatctgcggctgacaaacgggctcatcataatgcactggaa cgaaaacgtagggaccacatcaaagacagctttcacagtttgcgggactcagtcccatca ctccaaggagagaaggcatcccgggcccaaatcctagacaaagccacagaatatatcca gtatatgcgaaggaaaaaccacacacaccagcaagatattgacgacctcaagcggcaga atgctcttctggagcagcaaggggaaagcgagagctgatcaagttctttgttcctggggaa ttcacttctcttcctccctcatggaagatgcaagtaaaaggaaattccgtgcactggagaag gcgaggtcaagtgcccaactgcagaccaactacccctcctcagacaacagcctctacac caacgccaagggcagcaccatctctgccttcgatgggggctcggactccagctcggagt ctgagcctgaagagccccaaagcaggaagaagctccggatggaggccagctaagcca ctcggggcaggccagcaataaaaactgtctgtctccatcgtctcatcctcctttcagttcgtt ggtagagccctcagaaccatttaagagactctttatttttctctttctccctttttttttaaatttttt atttttacgtagaagctcttggacaacagctctcgttctccttccccatttccactgtatatttttt aatgtattcccttcagggattccctgtccccaacaggaatttttaaaccaaaacaccccaact tggcagctttttctgtggaggacagacggccggccggacctctgagcacatagtgtcctg cccaccctaccagctcctccagccctgccgggcacatgcccgggggacgcctgccctg cccaggtggcctcctggcccgccctcacctctgatagactttgtgaatctgaactgctctac tttgagaagatgaccggtttggagtaatcagaatgaaccctcctccttttaagggttttttttt ttccttttctaaaaagctatgtatcgctcctattgaaagaccagatccttagagaagtttgtgg tataaaaaggaagtggggacagattcgcagcacagagtcgctggcatgtttcactcctgct tctctcagccagctgtttaagcctgcggcgccagcctcacggagggccgtgtgacactct cgtggtatgtatgggagatggcagcagtgaagcagcagccaccagggagtggccatttg gggttgggacagggagggtgttttgggtggcatagaggttttgtattgagggccagtgatg atgttttgatatttatttcctgctacttaaatttgaatctgagtgaattgtacctatttctgatgatgt cggtcttgcaaagcgacagattcataaagtaatgatgaaatctttctttcttcccgtgtgtattt ctaagaaatagagccaactgattttgtatgtaaataccaagagcaatttacctggtactaaac ccgcaccccagtgcggacccttcccagccctcatcccacttcctttcctactgtcctggaac ctgtctccattgtgtgatccagccctggttctggctgtggtcagcagatgccagtgaagggt tttgtgtgtttaggcctcatttctttgtctttttcctactccgttcctggcatttgctgatttctagtg tatactctgtagtctcagttcgtgtttgattccattccatggaaataaaaagtatgttgtacatac tgccgaagaattgtcttgcaagttaaggcttcccccctttactataagactataaataaaaactt attttatccttcttaaaaaaaaaaaaaaaa	
MRPS25	NM_022497.4	gaagcgtctcctgtgcgtctgcgcgggaagtggaacctggctctggggagaagccgcgt gagatccgcgcgggtgctagctagtcctttctcgtcgctgctcggctcgcggcccgtggg gtcggccccgccaccgttgccgccatgcccatgaagggccgcttccccatccgccgcac cctgcaatatctgagccaggggaacgtggtgttcaaggactccgtgaaggtcatgacagt gaattacaacacgcatggggagctgggcgagggcgccaggaagtttgtgtttttcaacat acctcagattcaatacaaaaacccttgggtgcagatcatgatgtttaagaacatgacgccgt cacccttcctgcgattctacttagattctggggagcaggtcctggtggatgtggagaccaa gagcaataaggagatcatggagcacatcagaaaaatcttggggaagaatgaggaaacc ctcagggaagaggaggaggagaaaaagcagctttctcacccagccaacttcggccctc gaaagtactgcctgcgggagtgcatctgtgaagtggaagggcaggtgccctgccccagc ctggtgccattacccaaggagatgaggggaagtacaaagccgctctgaaagccgatgc ccaggactaaggcccacggtcactgtgggctggggtgatggtgtctgaccagtggggag attggaatgggattactttggcccagggaagcccctggttctgtccctggagactctggaa atccttttgcattaaaaggactttacacacctgtgtaaaaggatgtgggagaggagggtctg aagctgagctgctaaatgaatatccctgctctgctggtcaataaaacgcttcctaatagcag cttggcgtgtatctggtcctagtgaagaggaaggcctgtgtagcagaaaggctttgggcct gagaggttaaggccacagcctgttgacacctgttttggtcctgcgacccttactggtctcc gctggctttgaatcttcctctgggctctactctggagaacataagggctgctgtggttgagtc tggctagcactgtctgtggttggcagtgtgtacaccctccgttcagttccttgggggtatttt tcagaaatccaaaggcaacccttcgtgcagtgctcacttttttaagtacagttgattaccctg cctgctgggggggcctagccatgggccagagatggaggagccccagtggctgacaggc cagcctcactcaggcacgtacctgctgaccagtcagccactgccaacccatggcccagc	18

[0153]

		cactgtgtgcattagcagggaggtttgtaggccatggaggaaatgaggagacaccaccta gtggagacattggggccctgctgggggatggtgtctatagctggctctgctggctccctc aggccctgcttaccaagctctggaggagggagtgctgcattactgagcaccttccttgttct ttcctcataggacactgatgttactgtcactttagttatgctaaagtggaggtttcagcctcca gaagacagcagagccttctagggtcaccttaagaataggtttagctaggctgggtgtggtg gctcatgcctgtaatcccagcactttgggaggctgatgtgggcggatagttgagcccagg agttcgagaccagcctgggcaacatggcaagaccttgtctctacaaaaagtacaaaaatta gatgggtgtggtgtttcgcgtctgtagtcccagctatttgggaagctgaggtgggaggatct cgagcctgcgagatcaaggctgcagtgaatcatgatcgtgcgctactgcactccagcctg ggccacagagcaagactgtctcaagaaaaaaaatttttaaataagtttaattataaagtgaa ggaccagttggaccacggacccctagaaactcagccaaggagacctgactttatctgag acaggaaggcagtggttaaaagaattaaaaaaggacagtggtgcttgacagagcaggac tgaagttttcattcctctacctgctggggccttggtcaagtcctaaaagctttccaggtctgta actggttttgtctgtaaaatggggaaaaggttacctttctgccacatgaagtagctggctgg tgaaatgatgtcatactacgatgtgtttcattaactgttggagattatcacattaaattgagcag atttggatctttacatttgatgctcaagtttgattctgtaccagatctgggtttggggtgatgg cttgtcgggggtgggaggggaaggtgggcagagactgatgtataatggacaggtgttcc ttgagtgacagacttacaaagggagtgtttaattgaaatctagcatcttgtctctctgctatca gcattttggctgggtggaaaaagctctcctccacagagagccctcccatgtctgctggtttc agttccccacccaactgactgaagtcttgaccttgataccacctgcctgggcgttctacttg gctgcaagggctcttcagaaagcacctagttccttttggctttcatctgcagtgtaggtctcc atagctagtgacacacaaagccttatgagagtattccttccctctagggcccaaagaggct gctaaccagcaggaatgtcctgaaccaaaaggagtggtgaccattctctagacagaataa atgtctggtccctaatgggacagataactagggtttgagttcaggcttgacacaggagcaa tgggcagtgaggtggacagcccagaccctgaaaggacgtgtggagacagcagcagtc ctgtggtgcagttactgcctgtgtggccagcttcacaggcagcagataatttgtggaaataa acattattttctttttttgttccctgtaggctacttgatcctggatagtttctctttaaaccttgtctt tccctattttgtttagtagtgatgaaagatgggtttaaaatatacagaaatgggagaaaattaa ttagagaaaatgtgaggatttttataattgataacatgttcttaattttacttgcacaagcagtgtt cacagccttattctgaagtgaccacttttcttctctttgaggcactacctggcagcaccatcta aacctgtatcatctgctgtggtcccagttactcaggaggctgaggcaggaggatcacttga gcccaggaggttgaggctggagtgagccatgactgtaccactgcattccagcctgggtg acggagtgaggccctatctgcctgccagtgagttctgtcatgcatcagactttggacctca gaattttcacctggaacatgagaggtcagatgacataatgaatatgttctaacttctgaaactt ttggagcttgtttttgcccttgatagcacgtatccttagagaataagcttgccaatttaaggcc tgtctgtaatggcatctgaatgttccagcagcctaactgtgctctgctccagaaacatgtgtg tggcttccctacctccacaccaaggagctgccttgctgggtggatgtaaagactgtcctgc cagggtttcccactaaaggtattaataagtccagtggaccacagagggcccaatccctctt ggccgctaaggctaaggtaggagccagagagctgtagagacaggaccaccaggatgct tcatgtccataacacaagagagcgctgcattgtttgggggccaggcattactactatcatga agaaaaatgaagagcaggatgcatgttagtctttaattcacttttaatagtataaacctcattta ggtagtagtattaagccacaacaataatgccacattgaaacagcatttaataaaatgcataa agctaattcatgcactgcaatactctatatacaaacacaacaatgcaaattcttcttcaagact gaagacattgattagatataaaattcagtttaaaaagaacatgctatttttttaaatgccatcac ataaacaaagtgatttcacagggagaagaaagctgtataaagctgcagctttcaacaggtt ttaaacctggcattaaaatgtaatggcaaaaccaatattttctatattgtgaagggcaaaggtt acagaaacggtcccaagaaaatctaacacccaaatttttccttgatagatagatgccttaaa agggctggtaatgcagttacattctaacagagaagtccaaactacaggtaaaaactacgg cttgtactgtgaaaaatgtgcagcttttcagttataaaactagttgaacactggtttacaagat aatccgtagaacagagagactgtagaaaaatattccagcacttgagttgtgtgtggcagca gcatttgagtccatgaatgctatggtcattaaaataattgattatactttcctaaagaaaagcc atttttttaatgcaaagtctactacttccaaatgttattccaaacattaaattttaacagtctatcaa tcaataaatgttgaacatttttttttctaaaaaaaaa	
NDUFS2	NM_001166159.1	aaaagccagccaggagctgtgggaggaaacgccctcagtaaagatgaccgcggtcact gttatctaaacgcaagtgaagccgagtcacaggacccggatgttgtcagttcgacggtaa	19

[0154]

		acgaccctgccagcttccaagagggcggcttcactgtgcgaataggtgagaagccaaga aggaggcgcgctggagttacttccgcccggttctccttcccgcagtctgcagccggagta agatggcggcgctgagggctttgtgcggcttccggggcgtcgcggcccaggtgctgcg gcctggggctggagtccgattgccgattcagcccagcagaggtgttcggcagtggcagc cagatgtggaatgggcacagcagtttgggggagctgttatgtacccaagcaaagaaaca gcccactggaagcctccaccttggaatgatgtggaccctccaaaggacacaattgtgaag aacattaccctgaactttgggccccaacacccagcagcgcatggtgtcctgcgactagtg atggaattgagtggggagatggtgcggaagtgtgatcctcacatcgggctcctgcaccga ggcactgagaagctcattgaatacaagacctatcttcaggcccttccatactttgaccggct agactatgtgtccatgatgtgtaacgaacaggcctattctctagctgtggagaagttgctaa acatccggcctcctcctcgggcacagtggatccgagtgctgtttggagaaatcacacgttt gttgaaccacatcatggctgtgaccacacatgccctggaccttggggccatgacccctttc ttctggctgtttgaagaaagggagaagatgtttgagttctacgagcgagtgtctggagccc gaatgcatgctgcttatatccggccaggaggagtgcaccaggacctacccctgggcttat ggatgacatttatcagttttctaagaacttctctcttcggcttgatgagttggaggagttgctg accaacaataggatctggcgaaatcggacaattgacattggggttgtaacagcagaagaa gcacttaactatggttttagtggagtgatgcttcggggctcaggcatccagtgggacctgc ggaagacccagccctatgatgtttacgaccaggttgagtttgatgttcctgttggttctcgag gggactgctatgataggtacctgtgccgggtggaggagatgcgccagtccctgagaatta tcgcacagtgtctaaacaagatgcctcctggggagatcaaggttgatgatgccaaagtgtc tccacctaagcgagcagagatgaagacttccatggagtcactgattcatcactttaagttgt atactgagggctaccaagttcctccaggagccacatatactgccattgaggctcccaagg gagagtttggggtgtacctggtgtctgatggcagcagccgcccttatcgatgcaagatcaa ggctcctggttttgcccatctggctggtttggacaagatgtctaagggacacatgttggcag atgtcgttgccatcataggtacgaggcctattgtgtagtagaggtatcctagacaaaggagt tcgggacgcccactggggacagaaggagaacacttcctgttcaccataggccatggcat ggactcgggtcctcaatctttgagcacagtaatgggttctggatcttgggtaacaccacttt ttttgtttgttttgcctcacaacaggaagataagtaacatcacttttttcctccatcctctcacct aggtacccaagatattgtatttggagaagtagatcggtgagcaggggagcagcgtttgatc ccccctgcctatcagcttcttctgtggagcctgttcctcactggaaattggcctctgtgtgtgt gtgtgtgtgtgtgtgtgtgtatgttcatgtacacttggctgtcaggctttctgtgcatgtact aaaaaaggagaaattataataaattagccgtcttgcggcccctaggcctaaaaaaaaaaa aaaaaa	
PPARGC1A	NM_013261.3	tagtaagacaggtgccttcagttcactctcagtaaggggctggttgcctgcatgagtgtgtg ctctgtgtcactgtggattggagttgaaaaagcttgactggcgtcattcaggagctggatgg cgtgggacatgtgcaaccaggactctgagtctgtatggagtgacatcgagtgtgctgctct ggttggtgaagaccagcctctttgcccagatcttcctgaacttgatctttctgaactagatgtg aacgacttggatacagacagctttctgggtggactcaagtggtgcagtgaccaatcagaa ataatatccaatcagtacaacaatgagccttcaaacatatttgagaagatagatgaagagaa tgaggcaaacttgctagcagtcctcacagagacactagacagtctccctgtggatgaaga cggattgccctcatttgatgcgctgacagatggagacgtgaccactgacaatgaggctagt ccttcctccatgcctgacggcacccctccaccccaggaggcagaagagccgtctctactt aagaagctcttactggcaccagccaacactcagctaagttataatgaatgcagtggtctca gtacccagaaccatgcaaatcacaatcacaggatcagaacaaaccctgcaattgttaaga ctgagaattcatggagcaataaagcgaagagtatttgtcaacagcaaaagccacaaagac gtccctgctcggagcttctcaaatatctgaccacaaacgatgaccctcctcacaccaaacc cacagagaacagaaacagcagcagagacaaatgcacctccaaaaagaagtcccacac acagtcgcagtcacaacacttacaagccaaaccaacaactttatctcttcctctgaccccag agtcaccaaatgaccccaagggttccccatttgagaacaagactattgaacgcaccttaag tgtggaactctctggaactgcaggcctaactccacccaccactcctcctcataaagccaac caagataaccctttttagggcttctccaaagctgaagtcctcttgcaagactgtggtgccacc accatcaaagaagcccaggtacagtgagtcttctggtacacaaggcaataactccaccaa gaaagggccggagcaatccgagttgtatgcacaactcagcaagtcctcagtcctcactgg tggacacgaggaaaggaagaccaagcggcccagtctgcggctgtttggtgaccatgact attgccagtcaattaattccaaaacagaaatactcattaatatatcacaggagctccaagact	20

[0155]

		ctagacaactagaaaataaagatgtctcctctgattggcaggggcagatttgttcttccaca gattcagaccagtgctacctgagagagactttggaggcaagcaagcaggtctctccttgc agcacaagaaaacagctccaagaccaggaaatccgagccgagctgaacaagcacttcg gtcatcccagtcaagctgtttttgacgacgaagcagacaagaccggtgaactgagggaca gtgatttcagtaatgaacaattctccaaactacctatgtttataaattcaggactagccatgga tggcctgtttgatgacagcgaagatgaaagtgataaactgagctacccttgggatggcac gcaatcctattcattgttcaatgtgtctccttcttgttcttcttttaactctccatgtagagattctg tgtcaccacccaaatccttattttctcaaagaccccaaaggatgcgctctcgttcaaggtcct tttctcgacacaggtcgtgttcccgatcaccatattccaggtcaagatcaaggtctccaggc agtagatcctcttcaagatcctgctattactatgagtcaagccactacagacaccgcacgca ccgaaattctcccttgtatgtgagatcacgttcaagatcgccctacagccgtcggcccagg tatgacagctacgaggaatatcagcacgagaggctgaagagggaagaatatcgcagag agtatgagaagcgagagtctgagagggccaagcaaagggagaggcagaggcagaag gcaattgaagagcgccgtgtgatttatgtcggtaaaatcagacctgacacaacacggaca gaactgagggaccgttttgaagtttttggtgaaattgaggagtgcacagtaaatctgcggg atgatggagacagctatggtttcattacctaccgttatacctgtgatgcttttgctgctcttgaa aatggatacactttgcgcaggtcaaacgaaactgactttgagctgtacttttgtggacgcaa gcaatttttcaagtctaactatgcagacctagattcaaactcagatgactttgaccctgcttcc accaagagcaagtatgactctctggattttgatagtttactgaaagaagctcagagaagctt gcgcaggtaacatgttccctagctgaggatgacagagggatggcgaatacctcatggga cagcgcgtccttccctaaagactattgcaagtcatacttaggaatttctcctactttacactct ctgtacaaaaacaaaacaaaacaacaacaatacaacaagaacaacaacaacaataacaa caatggtttacatgaacacagctgctgaagaggcaagagacagaatgatatccagtaagc acatgtttattcatgggtgtcagctttgcttttcctggagtctcttggtgatggagtgtgcgtgt gtgcatgtatgtgtgtgtgtatgtatgtgtgtggtgtgtgtgcttggtttaggggaagtatgtgt gggtacatgtgaggactgggggcacctgaccagaatgcgcaagggcaaaccatttcaaa tggcagcagttccatgaagacacgcttaaaacctagaacttcaaaatgttcgtattctattca aaaggaaatatatatatatatatatatatatatatatatatatatataaattaaaaaggaaagaaaa ctaacaaccaaccaaccaaccaaccaaccacaaaccaccctaaaatgacagccgctgat gtctgggcatcagcctttgtactctgtttttttaagaaagtgcagaatcaacttgaagcaagct ttctctcataacgtaatgattatatgacaatcctgaagaaaccacaggttccatagaactaat atcctgtctctctctctctctctctctctctcttttttttttcttttttcctttgccatggaatctgggtg ggagaggatactgcgggcaccagaatgctaaagtttcctaacattttgaagtttctgtagttc atccttaatcctgacacccatgtaaatgtccaaaatgttgatcttccactgcaaatttcaaaag ccttgtcaatggtcaagcgtgcagcttgttcagcggttctttctgaggagcggacaccggg ttacattactaatgagagttgggtagaactctctgagatgtgttcagatagtgtaattgctaca ttctctgatgtagttaagtatttacagatgttaaatggagtatttttattttatgtatatactataca acaatgttcttttttgttacagctatgcactgtaaatgcagccttcttttcaaaactgctaaatttt tcttaatcaagaatattcaaatgtaattatgaggtgaaacaattattgtacactaacatatttag aagctgaacttactgcttatatatatttgattgtaaaaacaaaaagacagtgtgtgtgtctgttg agtgcaacaagagcaaaatgatgctttccgcacatccatcccttaggtgagcttcaatctaa gcatcttgtcaagaaatatcctagtcccctaaaggtattaaccacttctgcgatatttttccac attttcttgtcgcttgtttttctttgaagttttatacactggatttgttaggggaatgaaattttctca tctaaaatttttctagaagatatcatgattttatgtaaagtctctcaatgggtaaccattaagaa atgtttttattttctctatcaacagtagttttgaaactagaagtcaaaaatctttttaaaatgctgtt ttgttttaatttttgtgattttaatttgatacaaaatgctgaggtaataattatagtatgatttttaca ataattaatgtgtgtctgaagactatctttgaagccagtatttctttcccttggcagagtatgac gatggtatttatctgtattttttacagttatgcatcctgtataaatactgatatttcattcctttgttta ctaaagagacatatttatcagttgcagatagcctatttattataaattatgagatgatgaaaata ataaagccagtggaaattttctacctaggatgcatgacaattgtcaggttggagtgtaagtg cttcatttgggaaattcagcttttgcagaagcagtgtttctacttgcactagcatggcctctga cgtgaccatggtgttgttcttgatgacattgcttctgctaaatttaataaaaacttcagaaaaa cctccattttgatcatcaggatttcatctgagtgtggagtccctggaatggaattcagtaacat ttggagtgtgtattcaagtttctaaattgagattcgattactgtttggctgacatgacttttctgg aagacatgatacacctactactcaattgttcttttcctttctctcgcccaacacgatcttgtaag	

[0156]

		atggatttcacccccaggccaatgcagctaattttgatagctgcattcatttatcaccagcat attgtgttctgagtgaatccactgtttgtcctgtcggatgcttgcttgatttttggcttcttatttc taagtagatagaaagcaataaaaatactatgaaatgaaagaacttgttcacaggttctgcgt tacaacagtaacacatctttaatccgcctaattcttgttgttctgtaggttaaatgcaggtatttt aactgtgtgaacgccaaactaaagtttacagtctttctttctgaattttgagtatcttctgttgta gaataataataaaaagactattaagagcaataaattatttttaagaaatcgagatttagtaaat cctattatgtgttcaaggaccacatgtgttctctattttgccttaaatttttgtgaaccaattttaa atacattctccttttttgccctggattgttgacatgagtggaatacttggtttcttttcttacttatca aaagacagcactacagatatcatattgaggattaatttatccccctacccccagcctgaca aatattgttaccatgaagatagttttcctcaatggacttcaaattgcatctagaattagtggag cttttgtatcttctgcagacactgtgggtagcccatcaaaatgtaagctgtgctcctctcatttt tatttttatttttttgggagagaatatttcaaatgaacacgtgcaccccatcatcactggaggc aaatttcagcatagatctgtaggatttttagaagaccgtgggccattgccttcatgccgtggt aagtaccacatctacaattttggtaaccgaactggtgctttagtaatgtggatttttttctttttta aaagagatgtagcagaataattcttccagtgcaacaaaatcaatttttttgctaaacgactccg agaacaacagttgggctgtcaacattcaaagcagcagagagggaactttgcactattggg gtatgatgtttgggtcagttgataaaaggaaaccttttcatgcctttagatgtgagcttccagt aggtaatgattatgtgtcctttcttgatggctgtaatgagaacttcaatcactgtagtctaaga cctgatctatagatgacctagaatagccatgtactataatgtgatgattctaaatttgtacctat gtgacagacattttcaataatgtgaactgctgatttgatggagctactttaagatttgtaggtg aaagtgtaatactgttggttgaactatgctgaagagggaaagtgagcgattagttgagccct tgccgggccttttttccacctgccaattctacatgtattgttgtggttttattcattgtatgaaaat tcctgtgatttttttttaaatgtgcagtacacatcagcctcactgagctaataaagggaaacga atgtttcaaatcta	
	PPRC1	NM_001288727.1	gtagttcctttcccacaatcggctgggcgaggcggcgccagcgatcagagcagcgctgg gtgttcaggggccaagatggcggcgcgccggggacggagagacggagtcgcgccgc ccccgagtgggggccccggtccggaccctggcgggggagcccgcggcagtggttgg ggaagtcgaagccaagcgccgtatgggactttgggcgctgtgagcggcggcgagcag gtgctgctgcatgaggaggcgggtgattctggctttgtcagtctctctcggctgggcccatc tctgagggacaaggacctggaaatggaggagctaatgctgcaggatgagacactgctgg ggaccatgcagagctacatggatgcctcccttatctccctcattgaggattttgggagcctt ggagagagcaggttatctctggaggaccagaatgaagtgtcgctgctcacggctctgac ggagatcttggacaatgcagattctgagaacctttctccatttgacagcattcctgattcgga gctgcttgtgtcaccccgggagggctcctctctgcacaagctgcttactctctctcggacac ccccagaacgtgacctcatcaccccagttgacccactggggcccagtacaggcagcagt agagggagtggggttgaaatgtctcttccagatccctcttgggacttctccccaccctctttc ttagagacctcttcccccaagcttcctagctggagacccccaagatcaagaccacgctgg ggccaatccccacctccccagcagcgcagtgatggagaagaagaggaggaggtggcc agcttcagtggccagattcttgccggggagcttgacaactgtgtgagcagtatcccggact tccccatgcatttggcctgccctgaggaggaagataaagcaacagcagcagagatggca gtgccagcagctggtgatgagagcatctcctccctgagtgagctggtgcgggccatgca cccatactgcctgcccaacctcacccacctggcatcacttgaggatgagcttcaggagca gccagatgatttgacactgcctgagggctgcgtagtgctggagattgtggggcaggcag ccacagctggcgatgacctggagatcccagttgtggtgcgacaggtctctcctggacccc ggcctgtgctcctggatgactcgctagagactagttctgccttgcagctgcttatgcctaca ctggagtcagagacagaggctgctgtgcccaaggtaaccctctgctctgagaaagaggg gttgtcattgaactcagaggagaagctggactcagcctgcttattgaagcccagggaggt cgtggagccggtggtgcccaaggagcctcagaacccacctgccaatgcagcaccaggt tcccagagagctcgaaagggcaggaagaagaagagcaaggagcagccagcagcctgt gtggaaggctatgccaggaggctgaggtcatcttctcgcgggcagtctactgtaggtaca gaagtgacctctcaggtagacaacttgcagaaacagcctcaggaagaacttcaaaaaga gtctgggcctctccagggtaaggggaagccccgggcttgggctcgggcctgggcagct gccttggagaattctagccctaagaacttggagagaagtgctggacaaagtagtcctgcta aagaaggccctctagacctctacccaaagctggctgacactatccaaaccaatcctatacc aacccatctctcattggtcgactctgcccaagccagccccatgccagttgactctgttgaag	21

[0157]

		ctgatcccactgcagttggccctgttctagctggccctgtacctgttgaccctgggttggttg accttgcttcaaccagctcagaactggttgagcctctcccggctgagccagtgctgatcaa cccagtcctggctgactcagcagcagttgaccctgcagtggttcccatctcagataacttg ccaccagttgatgctgtcccgtctggcccagcaccagttgatctagcactggttgaccctgt tcctaatgacctgactccagttgacccagtgctagttaagtccagaccaactgatcccaga cgtggtgcagtgtcatcagccctgggggggttcagcaccccagctcctcgtggagtcaga gtccttggacccaccaaagaccatcatccctgaagtcaaagaggttgtggattctctgaaa attgaaagtggtaccagtgctacaacccatgaagccagacctcggcctctcagcttatctg agtaccggcgacgaaggcagcaacgccaagcagaaacagaagagagaagtccacag cccccaactgggaagtggcctagccttccagagactcccacagggctggcagacatccc ttgtcttgtcatcccaccagccccagccaagaagacagctctgcagagaagccctgaaac acccccttgagatttgccttgtgcctgtaggtcccagccctgcttctcctagtcctgagccacc tgtaagcaaacctgtggcctcatctcccactgagcaggtgccatcccaggagatgccact gttggcgagaccttcccctcctgtgcagtctgtgtcccctgctgtgcccacacctccctcga tgtctgctgccctgcctttccctgcaggtgggcttggcatgccccccagtctgccccccacct cccttgcagcctcctagtcttccattgtctatggggccagtactacctgatccgtttactcact atgccccctgccatcctggccttgttatcctcatgtgtcccctctggctatccttgcctgcc ccccccaccaacggtgcccctagtgtctggtactcctggtgcctatgccgtgcctcccactt gcagtgtgccttgggcaccccctcctgccccagtctcaccttacagttccacatgtacctat gggcccttgggatggggcccagggcctcaacatgctccattctggtctactgttcccccac ctcctttgcctccagcctccattgggagagctgttccccaacctaaaatggagtctagggg cactccagctggccctcctgaaaatgtacttcccttgtcgatggctcctccctcagtcttgg gctacctggccatggagctcctcagacagagcctaccaaggtggaggtcaagccagtgc ctgcatctccccatccgaaacacaaggtgtctgccctggtgcaaagtccccagatgaagg ctctagcatgtgtgtctgctgaaggtgtgactgttgaggagcctgcatcagagaggctaaa gcctgagacccaagagaccaggcccagggagaagccccccttgcctgctaccaaggct gttcccacaccaaggcagagcactgtccccaagctgcctgctgtccacccagcccgtcta aggaagctgtccttcctgcctaccccacgtactcagggttctgaagatgtggtacaggcttt catcagtgagattggaattgaggcatcggacctgtccagtctgctggagcagtttgagaaa tcagaagccaaaaaggagtgtcctcctccggctcctgctgacagcttggctgtaggaaac tcagggtccagctgtagttcctctggacgttctcgaagatgctcttcctcttcttcgtcatcatc ttcctcttcgtcttcctcatcctcatcatccagttctcgaagccgctcacgatccccatccccc cgccggagaagtgacaggaggcggcggtacagctcttatcgttcacatgaccattaccaa aggcaaagagtgctacaaaaggagcgtgcaatagaagaaagaagggtggtcttcattgg aaagatacctggccgcatgactcgatcagagctgaaacagaggttctccgtttttggagag attgaggagtgcaccatccacttccgtgtccaaggggacaactacggcttcgtcacttatc gctatgctgaggaggcatttgcagccattgagagtggccacaagctgcggcaggcagat gagcagccctttgatctctgctttgggggccgaaggcagttctgcaagaggagctattctg atcttgactccaaccgggaagactttgacccagcacctgtaaagagcaaatttgattctctt gactttgacacattgttgaaacaggcccagaagaacctcaggaggtaaccttgggcccttc cctgctatccttttctccttggaggtgcccaacctcctccaccccctttccctactctaggg gagagagctgctagtgagatgactgttttataaagaaatggaaaaaagtgaaataaaaaat atgttgaatcagatttttaaaaggggtatttgttttttataacaggtattgaaacaagttaactt gcattcctatgtaagataggaggggctgaggggatccccagtgtttggaacataagtcact atgcagactaataaacatcaactagagagaactcccaaaaaaaaaaaaaaaaaa	
RAD23A	NM_001270362.1	ggtggtcagcgcgcgcattgcctgccccggaagtggtcggcgcgcggcgcggcgcgc ctgggcgctaagatggcggcggcgtgagttgcatgttgtgtgaggatcccggggccgcc gcgtcgctcgggccccgccatggccgtcaccatcacgctcaaaacgctgcagcagcag accttcaagatccgcatggagcctgacgagacggtgaaggtgctaaaggagaagatagaa agctgagaagggtcgtgatgccttccccgtggctggacagaaactcatctatgccggcaa gatcttgagtgacgatgtccctatcagggactatcgcatcgatgagaagaactttgtggtcg tcatggtgaccaagaccaaagccggccagggtacctcagcacccccagaggcctcacc cacagctgccccagagtcctctacatccttcccgcctgcccccacctcaggcatgtcccat cccccacctgccgccagagaggacaagagcccatcagaggaatccgcccccacgacg tccccagagtctgtgtcaggctctgttccctcttcaggtagcagcgggcgagaggaagac	22

[0158]

		gcggcctccacgctagtgacgggctctgagtatgagacgatgctgacggagatcatgtcc atgggctatgagcgagagcgggtcgtggccgccctgagagccagctacaacaaccccc accgagccgtggagtatctgctcacgggaattcctgggagccccgagccggaacacgg ttctgtccaggagagccaggtatcggagcagccggccacggaagcaggagagaaccc cctggagttcctgcgggaccagccccagttccagaacatgcggcaggtgattcagcaga accctgcgctgctgcccgccctgctccagcagctgggccaggagaaccctcagcttttac agcaaatcagccggcaccaggagcagttcatccagatgctgaacgagcccccctgggga gctggcggacatctcagatgtggaggggggaggtgggcgccataggagaggaggcccc gcagatgaactacatccaggtgacgccgcaggagaaagaagctatagagaggttgaag gccctgggcttcccagagagcctggtcatccaggcctatttcgcgtgtgaaaaaaatgag aacttggctgccaacttcctcctgagtcagaactttgatgacgagtgatgccaggaagcca ggccaccgaagccccccaccctacccttattccatgaaagttttataaaagaaaaaatatata tatattcatgtttatttaagaaatggaaaaaaaaatcaaaaatcttaaaaaaaacaagcaaaca gtccagcttcctgtcctcctaaagtggcccctgttcccatctcccgggccagacagctgtcc ccccgtcctcctccccagcccagcctgctcagagaagctggcaggactgggaggcgac agatgggcccctcttggcctctgtcccagctctctgcagccagacggaaaggcggctgct tgcctctccatcctccgaaaaacccctgaggaccccccccccatcctcttctaggatgaggg gaagctggagccccaactttgatcctccattggagtggcccaaatctttccatctagggca agtcctgaaaggcccaaggcccccctccccagtctggccttggcctccagcctggagaag ggctaacatcagctcattgtcaaggccacccccacccccagaacagaaccgtgtctctgat aaaggttttgaagtgaataaagttttaaaaactag	
[0158]	*REPIN 1*	NM_013400.3	cccggcgggggggaggttggggacgggcctggcagttgtgaactcgaacctgccgctgt cgccgcggcggggcggggagcgagagtgggccgcggaggccggccttcgggctcc atggacgggcgccgcgtccctgcacagcccgccgcagaggtaaggctggcctctctgc agtcagaggtctgagctctgccatggggataggggtgtctttattactgcagttttctctaac acctgggggctaccggagtgtgggccgaagcaggcgctgcagccgcggaagtatccc caggaacatccccaagaggagctggaaaaagcctcatccccagctctgcagtctccagg ggagctcagtgtctgtttgtccagcttctcagagttgctgtgcagctcggatgtggcatagg aaacagcagacacagggagagggcagcataaggcactgtagggagcagtggccacat tttctgcagaggaagaaccgatgctggaacgtcgttgcaggggccccctggccatgggc ctggcccagccccgactcctttctgggccctcccaggagtcaccccagaccctggggaa ggagtcccgcgggctgaggcaacaaggcacgtcagtggcccagtctggtgcccaagcc ccaggcagggcccatcgctgtgcccactgtcgaaggcacttccctggctgggtggctctg tggcttcacacccgccggtgccaggcccggctgcccttgccctgccctgagtgtggccgt cgctttcgccatgcccccttcttagcactgcaccgccaggtccatgctgctgccaccccag acctgggctttgcctgccacctctgtgggcagagcttccgaggctgggtggccctggttct gcatctgcgggcccattcagctgcaaagcggcccatcgcttgtcccaaatgcgagagac gcttctggcgacgaaagcagcttcgagctcatctgcggcggtgccaccctcccgccccg gaggcccggcccttcatatgcggcaactgtggccggagctttgcccagtgggaccagct agttgcccacaagcgggtgcacgtagctgaggccctggaggaggccgcagccaaggc tctggggccccggcccaggggccgccccgcggtgaccgccccccggcccggtggag atgccgtcgaccgccccttccagtgtgcctgttgtggcaagcgcttccggcacaagccca acttgatcgctcaccgccgcgtgcacacgggcgagcggccccaccagtgccccgagtg cgggaagcgctttaccaataagccctatctgacttcgcaccggcgcatccacaccggcga gaagccctacccgtgcaaagagtgcggccgccgcttccggcacaaacccaacctgctgt ctcacagcaagattcacaagcgatccgaggggtcggcccaggccgccccccggcccgg ggagcccccagctgccagccggcccccaggagtccgcggccgagcccaccccggcg gtacctctgaaaccggcccaggagccgccgccaggggccccgccagagcacccgca ggacccgatcgaagccccccctccctctacagctgcgacgactgcggcaggagcttcc ggctggagcgcttcctgcgggcccaccagcggcagcacaccggggagcggcccttca cctgcgccgagtgcgggaagaacttcggcaagaagacgcacctggtggcgcactcgcg cgtgcactccggcgagcggcccttcgcctgcgaggagtgcggccgccgcttctcccag ggcagccatctggcggcgcatcggcgcgaccacgccccgatcggcccttcgtgtgtcc cgactgcggcaaggccttccgccacaaaccctacctggcggcgcaccggcgcatccac accggcgagaagccctacgtctgccccgactgcggcaaagccttcagccagaagtcca	23

[0159]

		acctggtgtcgcaccggcgcatccacacgggcgagcggccctacgcctgtcccgactg cgaccgcagcttcagccagaagtccaacctcatcacccaccgcaagagccacatccgg gacggcgccttctgctgtgccatctgtggccagaccttcgacgacgaggagagactcctg gcccaccagaagaagcacgatgtctgagacggtgggcggggccgtgttggctgagaga gggctggggtccttcgtggtgggagtcgcagtgggctgggggtgcctgcctagtgctgg agtaggggacaatgggaatcctagaggggatggaagacgcggggagtgagctgggtg ggccctgctagcgagagaggtcaaccccggtggccagggaacccacttccaagcgca gggacgccggcctccagctggtgtgtgctaaggctccgtcctgactgccctgtgccctgg aaaagcagcaatagcatccgccccttagagccctctggctagaggagccaccagtggaa aggaagaccctccatcctctggtattaacgccttaatgccctgtctttttactgtaagttactta agatcatttttggaagcaggcgtggtagagtcctgtaaatgaatgctctgggctagatacag cttggagaacctgctggccttgttagacagcacttgggcctttgccagcagcaagaggtg aagcgaagccactcttacctctcccttccctcccacctgcccccctgcgtaggcacccaga cttggagagacccgtctgctgttaatacttccatcctcttccttcccaaagagcagatcccaa ggcatttactccttggtctgtctcgctttatctgtcgcccctcccagcgctgagagcctcccc tggctgtcagcagcactgtgtccaggctcttgtctgaacaccgcagcccctccttcgctcct tccagagctcagcatgtcacggcaaggactgccgcattggtgatggagggccagctgag gggaagttgctggtgagtttccttttctccatttctagcatatggacacctggcctctgcttga gcacttaggtgacaggaacttccgcacctcctgaggccctggatgattctaattgttagaaa ttctaattgttagaaatccttccttataatgaatgaattctgctttcctataatttctacctattggg ccttgttctgttctctggaactaaacagaacaaccatttaccctcctttcaaactagagaat aaagatttggttttagaactggtaaaaaaaaaaaaaaaaaa	
SDR39U1	NM_020195.2	actttacgcaggcgcgttaggtcctagtcgctatgcgtgtgcttgtgggtggcgggacagg cttcattgggacagccctaacccagctgctgaatgccagaggccacgaagtgacgttggt ctcccgaaagcccgggcccggccggatcacgtgggatgagctcgctgcatcggggctg ccgagctgcgatgccgccgtcaacctggccggagagaacatcctcaaccctctccgaag atggaatgaaaccttccaaaaagaggtaatcggcagccgcctagagaccacccaattgct ggctaaagccatcaccaaagccccacaaccccccaaggcctgggtcttagtcacaggtg tagcttactaccagcccagtctgactgcggagtatgatgaagacagcccaggaggggac tttgacttttttctccaacctcgtaaccaaatgggaagctgcagccaggcttcctggagattct acacgccaggtggtggtgcgctcaggggttgtgctgggccgtgggggtggtgccatgg gccacatgctgctgccctttcgcctgggcctgggggggccccatcggctcaggccaccaa ttcttcccctggatacacatcggggacctggcaggaatcctgacccatgcccttgaagcaa accacgtgcacggggtcctgaatggagtggctccatcctccgccactaatgctgagtttgc ccagaccttgggtgctgccctgggccgccgagccttcatccctctccccagcgctgtggt gcaagctgtctttgggcgacagcgtgccatcatgctgctggagggccagaaggtgatcc cacagcgaacactggccactggctaccagtattccttcccagagctaggggctgccttaa aggaaattgtagcctaagtaggtcgtggcaagggcctgaggcctgttcctcacaggcttc caggttaggcactgtgaataggctcagctcctctagagagctgaagccatctggttcttag attcctctcccagtcctctttcccattgttctgttgctccaccttattgtctcaaggccgtaatct catcaggttgggacattaatcttttcaactccttgtaagatttcccagtttggtttctctacatgt cctgcagctgccccacttctcctttacgctgtgtagagaatgctctgcagtttaggcaataaa aataaattgtctcactaaaaaaaaaaaaaaaaaa	24
SETBP1	NM_001130110.1	aagcgcggggccggccggggcgcccgccgctcgccgccgcctccgcgcgcccggg ggccccggcgccccccgagctagggcggccagctcgcggctcgccgtttgacagatgc tcatcgccatggagttgccgcagcagcacctttgggggctcgggcgagcgacgggagc cgggatctgagcgagcgccggggccagcggagccggagccgccgggacatggttgc agatctgatctcttctgaacacctcatcgtgtctccatccctgggaatctgaccctagcaact ggaccactttgttcttggaattttgggtgtcctcttttctcacctttccctttteccttttccccttc ccctcctgagaactccggaagactgtagagattgtcatggagtccagggaaaccttaag cagctcccggcaaagaggggggcgagtcagacttcctgccggtctcctcagccaagccc ccagctgctcctggctgtgcaggagaaccttgctctccactccaggacctgggaaggggg atcccggtgggcggagagcgcatggagccagaggaggaggatgaactaggctcaggg cgggatgtggattccaactccaacgcggacagtgagaaatgggtggcaggagatggttt ggaagagcaggaattttctatcaaggaggcaaacttcacagagggaagtctgaagctaaa	25

[0160]

		gattcagaccacaaagcgggctaagaaaccccccaaagaatttggagaactatatatgtcc acctgagatcaagatcaccatcaagcagtctggggaccagaaggtgtcccgtgctggaa aaaatagcaaagccacgaaggaggaagaaagaagccactccaaaaagaagctcctcac agccagtgaccttgcagccagtgacctcaaaggatttcagccacagattaaagactccag taaggaggaagtctggaagagaagaggaggccaaggcatcccattcaaaaagcaattc ctgtcccaggaacgtgccatgtgcttctcatgcccccggaacccattccccgcaaaaccc ggttctctcactcttccttttcacagtgaacctgcagtctgggcacaagaagtataacttcgc atggattctgcaaagcccacacctgtggtcattccctgttctttccattcaacaatggagactt gcccaagattgtaaactagtgagtgacagcatttgggcttatgatcttctctgcctgctagct agacattctctctgggtctaaaagataatccaaaaagatccagcttcacaatgctgccctga agagataatgcattaggcggccctgatgcagcattcactgtcttccagggcaggcttgatc ccatgagtttgcttgctcagacgatcacttaggaaacacatgcctttactctctaggccttttt ctagcttgccttgtatcagctatgccatggatctttgctctcttaccccatgctatacagagtat gggctccaagccacagctggcctgtcaagtgtgtgtcgctggtccaccatgggatacattt agaaacttttatagcaatttgacatttttgtgatatccaagcatgtgattgttttcctacggatttg tcttatagtattttaccaaagtttccacacaaaaagtatggattaaggacaaagtatctggtcc ttcatcaaagatcgtttgataagctctgttctagttaaccaacactgagctttcctagttttaata aaagagtaggatttggaaaaaaaaaaaaaaaaaaaa	
SLC14A1	NM_001128588.3	acacagagcagagtggggctctgagtatataactgttaggtgcctccctccagcaccatct cctgagaagcactctcccttgtcgtggaggtgggcaaatctttatcagccactgccttctgc tgccaggaagccagctagagtggtctttaaagaaaactgggcatctcctgctacttaaaat caaaaactacctaaaataaagattataaaaaagtaaggatgaatggacggtctttgattggc ggcgctggtgacgcccgtcatggtcctgtttggaaggaccctttggaactaaagctggtg acgcagcgcgcagaggcatcgcccggctaagcttggccctggcagatgggtcgcagg aacaggagccagaggaagagatagccatggaggacagccccactatggttagagtgga cagccccactatggttaggggtgaaaaccaggtttcgccatgtcaagggagaaggtgctt ccccaaagctcttggctatgtcaccggtgacatgaaagaacttgccaaccagcttaaagac aaacccgtggtgctccagttcattgactggattctccggggcatatcccaagtggtgttcgt caacaaccccgtcagtggaatcctgattctggtaggacttcttgttcagaaccctggtggg ctctcactggctggctgggaacagtggtctccactctgatggccctcttgctcagccagga caggtcattaatagcatctgggctctatggctacaatgccaccctggtgggagtactcatg gctgtcttttcggacaagggagactatttctggtggctgttactccctgtatgtgctatgtcca tgacttgcccaattttctcaagtgcattgaattccatgctcagcaaatgggacctccccgtctt caccctccctttcaacatggcgttgtcaatgtacctttcagccacaggacattacaatccatt ctttccagccaaactggtcatacctataactacagctccaaatatctcctggtctgacctcag tgccctggagttgttgaaatctataccagtgggagttggtcagatctatggctgtgataatcc atggacaggggggcattttcctgggagccatcctactctcctccccactcatgtgcctgcatg ctgccataggatcattgctgggcatagcagcgggactcagtctttcagccccatttgagga catctactttggactctggggtttcaacagctctctggcctgcattgcaatgggaggaatgtt catggcgctcacctggcaaacccacctcctggctcttggctgtgccctgttcacggcctat cttggagtcggcatggcaaactttatggctgaggttggattgccagcttgtacctggccctt ctgtttggccacgctattgttcctcatcatgaccacaaaaaattccaacatctacaagatgcc cctcagtaaagttacttatcctgaagaaaaccgcatcttctacctgcaagccaagaaaaga atggtggaaagccctttgtgagaacaagccccatttgcagccatggtcacgagtcatttctg cctgactgctccagctaacttccagggtctcagcaaactgctgtttttcacgagtatcaacttt catactgacgcgtctgtaatctgttcttatgctcattttgtatttttcctttcaactccaggaatatc cttgagcatatgagagtcacatccaggtgatgtgctctggtatggaatttgaaaccccaatg ggggccttggcactaagactggaatgtatataaagtcaaagtgctccaacagaaggaggaa gtgaaaacaaactattagtatttattgatattcttggtgtttagctggctcgatgatgttaacagt attaaaaattaaaccccataaaccaactaagccttatggaattcacagtcacaaaatcgaag ttaatccagaattctgtgataagcagcttggctttttttttaaatcaatgcaagttacacattata gccagaatctgtatcacagaggtgcaagctgacagcagagctcagtccccacttcctgca aacaatggcctgcaccctatcccttgtgtgtgtgacattctctcatgggacaatgttggggtt tttcagactgacaggactgcaagagggagaaaggaattttgtcaatcaaaattattctgtatt gcaacttttctcagagattgcaaaggatttttaggtagagattatttttccttatgaaaaatgat	26

[0161]

		ctgttttaaatgagataaaataggagaagttcctggcttaacctgttcttacatattaaagaaa agttacttactgtatttatgaaatactcagcttaggcatttttactttaacccctaaattgattttgt aaatgccacaaatgcatagaattgttaccaacctccaaagggctctttaaaatcatatttttttat tcatttgaggatgtcttataaagactgaaggcaaaggtcagattgcttacgggtgttatttttat aagttgttgaattccttaatttaaaaaagctcattatttttgcacactcacaatattctctctcag aaatcaatggcatttgaaccaccaaaaagaaataaagggctgagtgcggtggctcacgc ctgtaatcccagcactttggggagcccaggcgggcagattgcttgaacccaggagttcaa gaccagcctgggcagcatggtgaaaccctgtatctacaaaaaatacaaaaattagccagg catggtggtgggtgcctgtagttccagctacttgggaggctgaggtgggaaaatgacttga gcccaggaggaggaggctgcagtgagctaagattgcaccactgcactccaacctgggc gacaagagtgaaactgtgtctctcaaaaaaaaaaaaaaacaaacaaaaacaaaaacaaa acaaaacaaaacaaaacaaaacaggtaaggattcccctgttttcctctctttaattttaaagtt atcagttccgtaaagtctctgtaaccaaacatactgaagacagcaacagaagtcacgttca gggactggctcacacctgtaatcccagcactttgggagatggaggtaaaaggatctcttga gcccaggagttcaagaccagcttgggcaacatagcaagactccatctcttaaaaaataaa aatagtaacattagccaggtgtagcagcacacatctgcagcagctactcaggaggctgag gtggaaagatcgcttgtgcacagaagttcgaggctgcagtgagctatatgatcatgtcact gcactccagcctgtgtgaccgagcaagaccctatctcaaaaaaattaattaattaattaatta attaatttaaaaaggaagtcatgttcatttactttccacttcagtgtgtatcgtgtagtattttgga ggttggaaagtgaaacgtaggaatcctgaagatttttttccacttctagtttgcagtgctcagt gcacaatatacattttgctgaatgaataaacagaaatagggaagtaaacctacaaatatttta gggagaagctcacttcttccttttctcaggaaaccaagcaagcaaacatatcgttccaatttt aaaacccagtgaccaaagcctttggaactatgaatttgcaactgtcataggtttatggatatt gctgtggagaagctcaattttcagtgtttgaactgaacccttttcttgttagggaacgtgtgaa agaagaattgtggggaaaaaaaagcaagcataaccaaagatcatcagcagtgaagaatc taggctgtggctgagagaaccagaggcctctaaaatggacccgagtcgatcttcagaaca gggatctaccatgcaggagcttcttgtgctcacacaaatctgtaaatgggaacattgtacatt gtcgaatttaaatgatattaattttctcaagctatttttgttactattttcctaaaattgaatatttgc agggagcacttatacttttttcctaatgtctgtataacaaatttctatgcaagtacatgaataaat tatgctcacagctca	
SLC18 A2	NM_003054.4	agagccggacggggtaaactgagcggcggcggcggggcgctggggcggagactgc gacccggagccgcccggactgacggagcccactgcggtgcgggcgttggcgcgggc acggaggacccgggcaggcatcgcaagcgaccccgagcggagccccggagccatgg ccctgagcgagctggcgctggtccgctggctgcaggagagccgccgctcgcggaagct catcctgttcatcgtgttcctggcgctgctgctggacaacatgctgctcactgtcgtggtccc catcatcccaagttatctgtacagcattaagcatgagaagaatgctacagaaatccagacg gccaggccagtgcacactgcctccatctcagacagcttccagagcatcttctcctattatga taactcgactatggtcaccgggaatgctaccagagacctgacacttcatcagaccgccac acagcacatggtgaccaacgcgtccgctgttccttccgactgtcccagtgaagacaaaga cctcctgaatgaaaacgtgcaagttggtctgttgtttgcctcgaaagccaccgtccagctca tcaccaaccctttcataggactactgaccaacagaattggctatccaattcccatatttgcgg gattctgcatcatgtttgtctcaacaattatgtttgccttctccagcagctatgccttcctgctga ttgccaggtcgctgcagggcatcggctcgtcctgctcctctgtggctgggatgggcatgct tgccagtgtctacacagatgatgaagagagaggcaacgtcatgggaatcgccttgggag gcctggccatgggggtcttagtgggccccccctcgggagtgtgctctatgagtttgtggg gaagacggctccgttcctggtgctggccgccctggtactcttggatggagctattcagctct ttgtgctccagccgtcccgggtgcagccagagagtcagaaggggacacccctaaccac gctgctgaaggacccgtacatcctcattgctgcaggctccatctgctttgcaaacatgggc atcgccatgctggagccagccctgcccatctggatgatggagaccatgtgttcccgaaag tggcagctgggcgttgccttcttgccagctagtatctcttatctcattggaaccaatatttttgg gatacttgcacacaaaatggggaggtggctttgtgctcttctgggaatgataattgttggagt cagcattttatgtattccatttgcaaaaaacatttatggactcatagctccgaactttggagttg gttttgcaattggaatggtggattcgtcaatgatgcctatcatgggctacctcgtagacctgc ggcacgtgtccgtctatgggagtgtgtacgccattgcggatgtggcattttgtatggggtat gctataggtccttctgctggtggtgctattgcaaaggcaattggatttccatggctcatgaca	27

[0162]

		attattgggataattgatattctttttgcccctctctgctttttttcttcgaagtccacctgccaaag aagaaaaaatggctattctcatggatcacaactgccctattaaaacaaaaatgtacactcag aataatatccagtcatatccgataggtgaagatgaagaatctgaaagtgactgagatgaga tcctcaaaaatcatcaaagtgtttaattgtataaaacagtgtttccagtgacacaactcatcca gaactgtcttagtcataccatccatccctggtgaaagagtaaaaccaaaggttattatttcctt tccatggttatggtcgattgccaacagccttataaagaaaaagaagcttttctaggggtttgt ataaatagtgttgaaacttttattttatgtatttaatttttattaaatatcatacaatatattttgatgaa ataggtattgtgtaaatctataaatatttgaatccaaaccaaatataatttttttaacttacattaac aaacatttgggcaaaaatcatattggtaatgagtgtttaaaattaaagcacacattatctctga gactcttccaacaaagagaaactagaatgaagtctgaaaaacagaatcaagtaagacagc atgttatatagtgacactgaatgttatttaacttgtagttactatcaatatatttatgcgttaaaca gctagttctctcaagtgtagaggacaagaacttgtgtcagttatcttttgaatccataaatctta gctggcattagttttctatgtaatcacctacctagagagagttgtaaattatatgttaacatgtt atctggttggcagcaaacactaaagccaataaaggaaaaacagtaaatgttccgaaagca gagaaaagcaaccaaacatattgttatgaactaaaagctttccctttaagatgcatacttgtct tactggatgaagaaaattgagggtacatgtaccttatactgtcaaggttgtttaaacatgata aggttaatcgccatctacttcaagttttagaaaaggaaacaagaagctgaaaacagctgct ctgactttaatatctgactatatctttgatctgtttgcaggtcatccaagtgttttctaggaatata tttatttttaggttgtctgaaactactatttttttagactcctgaaagttgttcacatcaatgtgaaga caaattttaaatgaaaatgaagaatgaaattatgtcttgaatcatatattaagaagtaaaaata atagtgatcaggcagaaaagaaaaatggaacatctaaaaatgtatgtgctaactatatcatc cagtgtgcagtgttgtgtatttttctaagcatgacaacattgatgtgccttttcagtgtaacagc aaatactgttagtgaacattgtcaatttatgtcattttgttaagagatatgactggagtgtgcag tgtggaatgtctctaatactacttgtgaatcctgcagttctataatcataaacaaaaattactta gtttcgttaagctaagattgtgtttgtgttaacttcgacatcaaggagcaaagaactttagaac agactcctcaatcttgtgactttcttattctctaggaaagtaacacttcgtttcatgaagcttttct gtggggcttcgattatttcaagtctggtttctaagtgcagtgtgtttgaagcaaacgaacttcc aactcacttatttggcattgggcaacttggccaagtctgccacttggaagatggctctgga ggaaactctcatatggctaaaaaggcaggctagtttcttacttctacaggggtagagcctta aaaaagaacgtgctacaaattggttctctttgagggtttctggttctccctgccccccaatacc atatactttattgcaattttattttgccttacggctctgtgtctttctgcaagaaggcctggcaa aggtatgcctgctgttggtccctcgggataagataaaatataaataaaaccttcagaactgtt ttggagcaaaagatagcttgtacttggggaaaaaaattctaagttcttttatatgactaatattc ttggttagcaagactggaaagaggtgttttttaaaatgtacataccagaacaaagaacata cagctctctgaacatttatttttgaacagaggtggtttttatgtttggacctggtaatacagata caaaaactttaatgaggtagcaatgaatattcaactgtttgactgctaagtgtatctgtccata ttttagcaagtttacttaataaatcttctgaaccatgaaaaaaaaaaaaa	
SMC4	NM_001002800.2	gccctcttctgaagaggcgtttctggaccactgagccccgcctcccactgtgagcggaac cctaccgtttttaaaaaaatctttttcaaaacttgccaggttgtctttccaaatatttttaataata gtgctgctgctgtagaccacagagaaaagaatccctcgctcttcctttcacttagtagaaa cttctaccgcgtaggtcccgccaggagttcgcgcatgcgcaggagcgacaataagatgg cggtgataatcgccgcacttttttttcaaattagtggatcccagaaatcattgcgcgcatttgta acgaatttccgttcgagtttgtattttaggcgccattttcgagtgaaggacccggagccgaa acaccggtaggagcggggaggtgggtactacacaaccgtctccagccttggtctgagtg gactgtcctgcagcgaccatgccccgtaaaggcacccagccctccactgcccggcgca gagaggaagggccgccgccgccgtcccctgacggcgccagcagcgacgcggagcct gagccgccgtccggccgcacggagagcccagccaccgccgcagagactgcaagtga ggaacttgataatagaagtttagaagagattttgaacagcattcctcctcccccgcctccag caatgaccaatgaagctggagctcctcggcttatgataactcatattgtaaaccagaacttc aaatcctatgctggggagaaaattctgggacctttccataagcgcttttcctgtattatcggg ccaaatggcagtggcaaatccaatgttattgattctatgctttttgtgtttggctatcgagcac aaaaaataagatctaaaaaactctcagtattaatacataattctgatgaacacaaggacattc agagttgtacagtagaagttcattttcaaaagataattgataaggaaggggatgattatgaa gtcattcctaacagtaatttctatgtatccagaacggcctgcagagataatacttctgtctatc acataagtggaaagaaaaagacatttaaggatgttggaaatcttcttcgaagccatggaatt	28

[0163]

gacttggaccataatagattttaattttacagggtgaagttgaacaaattgctatgatgaaac
caaaaggccagactgaacacgatgagggtatgcttgaatatttagaagatataattggttgt
ggacggctaaatgaacctattaaagtcttgtgtcggagagttgaaatattaaatgaacacag
aggagagaagttaaacagggtaaagatggtggaaaaggaaaaggatgccttagaaggga
gagaaaaacatagctatcgaatttcttaccttggaaaatgaaatatttagaaaaaagaatcat
gtttgtcaatattatatttatgagttgcagaaacgaattgctgaaatggaaactcaaaaggaa
aaaattcatgaagataccaaagaaattaatgagaagagcaatatactatcaaatgaaatga
aagctaagaataaagatgtaaaagatacagaaaagaaactgaataaaattacaaaatttatt
gaggagaataaagaaaaatttacacagctagatttggaagatgttcaagttagagaaaagt
taaaacatgccacgagtaaagccaaaaaactggagaaacaacttcaaaaagataaagaa
aaggttgaagaatttaaaagtatacctgccaagagtaacaatatcattaatgaaacaacaac
cagaaacaatgccctcgagaaggaaaaagagaaagaagaaaaaaaattaaaggaagtt
atggatagccttaaacaggaaacacaagggcttcagaaagaaaaagaaagtcgagaga
aagaacttatgggtttcagcaaatcggtaaatgaagcacgttcaaagatggatgtagccca
gtcagaacttgatatctatctcagtcgtcataatactgcagtgtctcaattaactaaggctaag
gaagctctaattgcagcttctgagactctcaaagaaaggaaagctgcaatcagagatatag
aaggaaaactccctcaaactgaacaagaattaaaggagaaagaaaaagaacttcaaaaa
cttacacaagaagaaacaaactttaaaagtttggttcatgatctctttcaaaaagttgaagaa
gcaaagagctcattagcaatgaatcgaagtaggggggaaagtccttgatgcaataattcaa
gaaaaaaaatctggcaggattccaggaatatatggaagattgggggacttaggagccatt
gatgaaaaatacgacgtggctatatcatcctgttgtcatgcactggactacattgttgttgatt
ctattgatatagcccaagaatgtgtaaacttccttaaaagacaaaatattggagttgcaacct
ttataggtttagataagatggctgtatgggcgaaaaagatgaccgaaattcaaactcctgaa
aatactcctcgtttatttgatttagtaaaagtaaaagatgagaaaattcgccaagcttttatttt
gctttacgagataccttagtagctgacaacttggatcaagccacaagagtagcatatcaaa
aagatagaagatggagagtggtaactttacagggacaaatcatagaacagtcaggtacaa
tgactggtggtggaagcaaagtaatgaaaggaagaatgggttcctcacttgttattgaaatc
tctgaagaagaggtaaacaaaatggaatcacagttgcaaaacgactctaaaaaagcaatg
caaatccaagaacagaaagtacaacttgaagaaagagtagttaagttacggcatagtgaa
cgagaaatgaggaacacactagaaaaatttactgcaagcatccagcgtttaatagagcaa
gaagaatatttgaatgtccaagttaaggaacttgaagctaatgtacttgctacagcccctga
caaaaaaaagcagaaattgctagaagaaaacgttagtgctttcaaaacagaatatgatgct
gtggctgagaaagctggtaaagtagaagctgaggttaaacgcttacacaataccatcgta
gaaatcaataatcataaactcaaggcccaacaagacaaacttgataaaataaataagcaat
tagatgaatgtgcttctgctattactaaagcccaagtagcaatcaagactgctgacagaaac
cttcaaaaggcacaagactctgtcttgcgtacagagaaagaaataaagatactgagaaa
gaggtggatgacctaacagcagagctgaaaagtcttgaggacaaagcagcagaggtcg
taaagaatacaaatgctgcagaggaatccttaccagagatccagaaagaacatcgcaatc
tgcttcaagaattaaaagttattcaagaaaatgaacatgctcttcaaaaagatgcacttagtat
taagttgaaacttgaacaaatagatggtcacattgctgaacataattctaaaataaaatattg
gcacaaagagatttcaaaaatatcactgcatcctatagaagataatcctattgaagagatttc
ggttctaagcccagaggatcttgaagcgatcaagaatccagattctataacaaatcaaattg
cacttttggaagcccggtgtcatgaaatgaaaccaaacctcggtgccatcgcagagtataa
aaagaaggaagaattgtatttgcaacgggtagcagaattggacaaaattacttatgaaaga
gacagttttagacaggcatatgaagatcttcggaaacaaaggcttaatgaatttatggcagg
tttttatataataacaaataaattaaaggaaaattaccaaatgcttactttgggaggggacgc
cgaactcgagcttgtagacagcttggatcctttctctgaaggaatcatgttcagtgttcgacc
acctaagaaaagttggaaaaagatcttcaacctttcgggaggagagaaaacacttagttca
ttggctttagtatttgctcttcaccactacaagcccactccccttacttcatggatgagattga
tgcagcccttgattttaaaaatgtgtccattgttgcattttatatatatgaacaaacaaaaaatg
cacagttcataataatttctcttcgaaataatatgtttgagatttcggatagacttattggaattt
acaagacatacaacataacaaaaagtgttgctgtaaatccaaaagaaattgcatctaaggg
actttgttgaacttttatgctgaagattcttcaagttgattcagtgtattactgatttttttctatttgt
aaaggattatgagttgtataaaatacatactccctaaactagatcatgaaactggtttctgtttt
atgcagttgtcatttgtaaagtctaataaaatattctctataattgcttctagattacaaaaatat

[0164]

		gacaatcttgtaagtagcagactatggagaaaaatgagttacctggagggtcaggtaactt gccaaactaaaaagtatgttagttgaggcaaagtcctaagcaaggttgtgctatcaaggct cagcataccttcgtgggcctttgatttaccaacactggaaatgcctgccaactaatcttggat agattctttaaggcattccacttagcttgccagttgagacaatcaccacagttattacccaaat actatgaacatatttttgtaaaccagtcattctgaattatagtgatgagaatttaaatatatgctt tctagaatttgatgtttgaccatttatgacttaattaccagagagccagtaaattaggacagtg tttcaacaagcctaggctatctcgtaagttgaaaaatatcccactatagttgcttcatgagtat gaagtaagatggcctctgatttacactggttcaatttacaaattttcaacttttatgataggtttat ccgggtactaaatgcatttcaacttgatagtttcaacttatgataggtttaccaggatgtagtc ccactgttgaggagcatctatttaggggttaattactttagtaataagtggaaagtaagatac cttgagtaatgtttgcctataaaattgtcagcgtatttttacactattggctcaagaatgttataa tgctaagggacataagttggcaaccacttggtttttggaaggactttcggtattgtattagaa gtctgccctagctgttaaatttctgggtatttatcctaaggaattaattaaagagttaattgttcc tttcttcagtgggccattgttttagatatttaaaaaatccaacagtttctatcataatgtaactgta aaaatgtaaacacattattagcatggacttttaaataaagatttaaagaaagcaagatcgga aaaaaaaaaaaaaaaa	
[0164]	*SPARC*	NM_001309443.1	gggagaaggaggaggccgggggaaggaggagacaggaggaggagggaccacggg gtggaggggagatagacccagcccagagctctgagtggtttcctgttgcctgtctctaaac ccctccacattcccgcggtccttcagactgcccggagagcgcgctctgcctgccgcctgc ctgcctgccactgagggttcccagcaccatgagggcctggatcttctttctcctttgcctgg ccgggagggccttggcagcccctcaagaagccctgcctgatgagacagaggtggtgga agaaactgtggcagaggtgactgaggtatctgtgggagctaatcctgtccaggtggaagt aggagaatttgatgatggtgcagaggaaaccgaagaggaggtggtggcggaaaatccc tgccagaaccaccactgcaaacacggcaaggtgtgcgagctggatgagaacaacaccc ccatgtgcgtgtgccaggaccccaccagctgcccagcccccattggcgagtttgagaag gtgtgcagcaatgacaacaagaccttcgactcttcctgccacttctttgccacaaagtgcac cctggagggcaccaagaagggccacaagctccacctggactacatcgggccttgcaaat acatccccccttgcctggactctgagctgaccgaattccccctgcgcatgcgggactggct caagaacgtcctggtcaccctgtatgagagggatgaggacaacaaccttctgactgagaa gcagaagctgcgggtgaagaagatccatgagaatgagaagcgcctggaggcaggaga ccaccccgtggagctgctggcccgggacttcgagaagaactataacatgtacatcttcct gtacactggcagttcggccagctggaccagcaccccattgacgggtacctctcccacacc gagctggctccactgcgtgctcccctcatccccatggagcattgcaccacccgctttttcga gacctgtgacctggacaatgacaagtacatcgccctggatgagtgggccggctgcttcgg catcaagcagaaggatatcgacaaggatcttgtgatctaaatccactccttccacagtacc ggattctctctttaaccctcccccttcgtgtttcccccaatgtttaaaatgtttggatggtttgttgt tctgcctggagacaaggtgctaacatagatttaagtgaatacattaacggtgctaaaaatga aaattctaacccaagacatgacattcttagctgtaacttaactattaaggccttttccacacgc attaatagtcccatttttctcttgccatttgtagctttgcccattgtcttattggcacatgggtgg acacggatctgctgggctctgccttaaacacacattgcagcttcaacttttctctttagtgttct gtttgaaactaatacttaccgagtcagactttgtgttcatttcatttcagggtcttggctgcctgt gggcttccccaggtggcctggaggtgggcaaagggaagtaacagacacacgatgttgtc aaggatggttttgggactagaggctcagtggtgggagagatccctgcagaacccaccaa ccagaacgtggtttgcctgaggctgtaactgagagaaagattctggggctgtgttatgaaa atatagacattctcacataagcccagttcatcaccatttcctcctttaccttcagtgcagtttct tttcacattaggctgttggttcaaacttttgggagcacggactgtcagttctctgggaagtgg tcagcgcatcctgcagggcttctcctcctctgtctttggagaaccagggctcttctcaggg gctctagggactgccaggctgtttcagccaggaaggccaaaatcaagagtgagatgtag aaagttgtaaaatagaaaaagtggagttggtgaatcggttgttctttcctcacatttggatgat tgtcataaggtttttagcatgttcctcctttttcttcaccctccccttttttcttctattaatcaagag aaacttcaaagttaatgggatggtcggatctcacaggctgagaactcgttcacctccaagc atttcatgaaaaagctgcttcttattaatcatacaaactctcaccatgatgtgaagagtttcac aaatccttcaaaataaaaagtaatgacttagaaactgccttcctgggtgatttgcatgtgtctt agtcttagtcaccttattatcctgacacaaaaacacatgagcatacatgtctacacatgacta cacaaatgcaaacctttgcaaacacattatgcttttgcacacacacacctgtacacacacac	29

			cggcatgtttatacacagggagtgtatggttcctgtaagcactaagttagctgttttcatttaat gacctgtggtttaaccctttgatcactaccaccattatcagcaccagactgagcagctatat ccttttattaatcatggtcattcattcattcattcacaaaatatttatgatgtatttactctgca ccaggtcccatgccaagcactggggacacagttatggcaaagtagacaaagcatttgttc atttggagcttagagtccaggaggaatacattagataatgacacaatcaaatataaattgca agatgtcacaggtgtgatgaagggagagtaggagagaccatgagtatgtgtaacaggag gacacagcattattctagtgctgtactgttccgtacggcagccactacccacatgtaacttttt aagatttaaatttaaattagttaacattcaaaacgcagctccccaatcacactagcaacatttc aagtgcttgagagccatgcatgattagtggttaccctattgaataggtcagaagtagaatctt ttcatcatcacagaaagttctattggacagtgctcttctagatcatcataagactacagagca cttttcaaagctcatgcatgttcatcatgttagtgtcgtattttgagctggggttttgagactcc ccttagagatagagaaacagacccaagaaatgtgctcaattgcaatgggccacataccta gatctccagatgtcatttcccctctcttattttaagttatgttaagattactaaaacaataaaagc tcctaaaaaatcaaactgtattctggtgttctcttctacacagtgggagggcgagcagtagg agagattggcccatttggtgctggccatttgaggaatgcaagcccagcactagtctcataat ctctaggaatctgtagagagaggaattgaagtaaatttcagcattggctcattcagtcattcg gcgacattcatcaggtacctgcaatgtgttaggggatcttatgagtaggcagcgtgcgtga tccttgctcccctggagctttctaacattctagcaggcagaccacacataaatttgcaatact gtttctgataaaaacgtgctgtaaaggaaataaagcagagaactatcatggaaaaaaaaaa aaaaaaaa	
[0165]	*SQLE*	NM_003129.3	gtctgggccgagcccgcccagctggctgagacgcgtggagcctggcggcgagtgggg gcgtgcgacggttactctggttactggggccgcgccgcgctggcgagagccgccgccc gcgagggatgctggtgaggaagccgtcgggagccgccgccgccatctgagggaggta ccctggaaaccacctttttatcggtggggaagtgcagtcgcggtgggcggctctgggggc cagcgaaacgggaggcctctaaatctttaggttggggctgcattgccctggagccgcact cttgagtccgaggccatctttgttggagaaggcgtcggcgttggcgttttcccgaggttgg gctgtacagtgtctccgtccgcggaaaaagaagcctctgaacccgcgccggcccgcag cccccgtgccttccggccgctgctcgccgtcgccagaggctaggccacgtttcccccagt gccgaggtgtttctgtgaccctccctccactcccattcccttctgaaagggcacctgctcttg gtgagaaaagaaattatagcacgaagagccagtatcagaagagtatccatcacccgcag caaccgctcagggaacaccatcaaaaaagaaaaaaagggaatatctggatttcctgggc gaggaggagcgagtctgctcgggagctgttccagcaggcgatttttaaatactgctttctac gccctatacaacttggcttcacatacttttacactaacttttatatgatttttaaaaactggtctga tcggacttctcgtcctgggacactgtttactggagtctggccggctctccgtgctcctcttgg tacctcattttggggagaaccttaaacccactcgagcagataatctccgccttgaccggtgc caccaaagaagccttggaaccatgtggacttttctgggcattgccactttcacctatttttata agaagttcggggacttcatcactttggccaacagggaggtcctgttgtgcgtgctggtgttc ctctcgctgggcctggtgctctcctaccgctgtcgccaccgaaacgggggtctcctcggg cgccagcagagcggctcccagttcgccctcttctcggatattctctcaggcctgcctttcatt ggcttcttctgggccaaatccccccctgaatcagaaaataaggagcagctcgaggccag gaggcgcagaaaaggaaccaatatttcagaaacaagcttaataggaacagctgcctgtac atcaacatcttctcagaatgacccagaagttatcatcgtgggagctggcgtgcttggctctg ctttggcagctgtgctttccagagatggaagaaaggtgacagtcattgagagagacttaaa agagcctgacagaatagttggagaattcctgcagccgggtggttatcatgttctcaaagac cttggtcttggagatacagtggaaggtcttgatgcccaggttgtaaatggttacatgattcat gatcaggaaagcaaatcagaggttcagattccttaccctctgtcagaaaacaatcaagtgc agagtggaagagctttccatcacggaagattcatcatgagtctccggaaagcagctatgg cagagcccaatgcaaagtttattgaaggtgttgtgttacagttattagaggaagatgatgttg tgatgggagttcagtacaaggataaagagactggagatatcaaggaactccatgctccac tgactgttgttgcagatgggcttttctccaagttcaggaaaagcctggtctccaataaagtttc tgtatcatctcattttgttggctttcttatgaagaatgcaccacagtttaaagcaaatcatgctg aacttattttagctaacccgagtccagttctcatctaccagatttcatccagtgaaactcgagt acttgttgacattagaggagaaatgccaaggaatttaagagaatacatggttgaaaaaattt acccacaaatacctgatcacctgaaagaaccattcttagaagccactgacaattctcatctg aggtccatgccagcaagcttccttcctccttcatcagtgaagaaacgaggtgttcttcttttg	30

[0166]

		ggagacgcatataatatgaggcatccacttactggtggaggaatgactgttgcttttaaaga tataaaactatggagaaaactgctaaagggtatccctgacctttatgatgatgcagctattttc gaggccaaaaaatcattttactgggcaagaaaaacatctcattcctttgtcgtgaatatcctt gctcaggctctttatgaattattttctgccacagatgattccctgcatcaactaagaaaagcct gttttctttatttcaaacttggtggcgaatgtgttgcgggtcctgttgggctgctttctgtattgt ctcctaaccctctagttttaattggacacttctttgctgttgcaatctatgccgtgtatttttgcttt aagtcagaaccttggattacaaaacctcgagcccttctcagtagtggtgctgtattgtacaa agcgtgttctgtaatatttcctctaatttactcagaaatgaagtatatggttcattaagcttaaag gggaaccatttgtgaatgaatatttggaacttaccaagtcctaagagactttggaagagga tatatatagcatagtaccataccacttataaagtggaaactcttggaccaagatttggattaat ttgtttttgaagtttttgtatataaatatgtaaatacatgctttaatttgcaatttaaaatgaaggg gttaaataagttagacatttaaaagaaatgattgttaccataaattagtgctaatgctgagga gaactacagtttttctttgaatttagtatttgagatgagttgttgggacatgcaaataaaatga agaatgaa	
STRIP1	NM_001270768.1	attttacccagcccctgttcaagatggagttgctgtggttcacacatctctgacaaaaatacа gggctattcggagtcaccagacctggagtttgagtatgctgacacagacaagtgggctgc agagctctcggagctttacagctacacggaagggccagaattcctgatgaatcgaaaatg ctttgaggaggacttccggatccatgtgacagacaagaagtggactgagctggataccaa ccagcaccggacccatgccatgaggctcctggatggcttggaagtcactgccagggaga agagactcaaggtggctcgagcaattctctatgttgctcaaggcacgtttggggagtgcag ctcggaggcagaggtgcagtcctggatgcgctacaacatctttctcctcctggaggtggg cacgttcaatgctttggtggagcttctgaacatggaaatagacaacagtgccgcctgcagc agtgctgtgaggaagcctgccatctccctggctgacagcacagacctcagggtcctgctc aacatcatgtacctgatagtggagaccgttcatcaggagtgtgagggtgacaaggctgag tggaggaccatgcggcagaccttcagagccgagctgggctccccgctgtacaacaatga gccatttgccatcatgctgtttgggatggtgaccaaattttgcagtggtcacgcccctcacttt cccatgaagaaagttctcttgctgctctggaagacagtattgtgcacgctaggcggctttga ggagctgcagagcatgaaggctgagaagcgcagcatcctgggcctcccccgcttcctg aggacagcatcaaagtgattcgcaacatgagagcagcctctccaccagcatctgcttcag acttgattgagcagcagcagaaacggggccgccgagagcacaaggctctgataaagca ggacaacctagatgccttcaacgagcgggatccctacaaggctgatgactctcgagaag aggaagaggagaatgatgatgacaacagtctggagggggagacgtttccccctggaacg ggatgaagtgatgcctcccccgctacagcacccacagactgacaggctgacttgcccca aagggctcccgtgggctcccaaggtcagagagaaagacattgagatgttccttgagtcca gccgcagcaaatttataggttacactctaggcagtgacacgaacacagtggtggggctgc ccaggccaatccacgaaagcatcaagactctgaaacagcacaagtacacgtcgattgca gaggtccaggcacagatggaggaggaatacctccgctcccctctctcaggggagaag aagaagttgagcaagtccctgcagaaaccctctaccaaggcttgctccccagcctgcctc agtatatgattgccctcctgaagatcctgttggctgcagcacccacctcaaaagccaaaac agactcaatcaacatcctagcggacgtcttgcctgaggagatgcccaccacagtgttgca gagcatgaagctgggggtggatgtaaaccgccacaaagaggtcattgttaaggccatttc tgctgtcctgctgctgctgctcaagcactttaagttgaaccatgtctaccagtttgaatacatg gcccagcacctggtgtttgccaactgcattcctttgatcctaaagttcttcaatcaaaacatca tgtcctacatcactgccaagaacagcatttctgtcctggattaccctcactgcgtggtgcatg agctgccagagctgacggcggagagtttggaagcaggtgacagtaaccaattttgctgg aggaacctcttttcttgtatcaatctgcttcggatcttgaacaagctgacaaagtggaagcat tcaaggacaatgatgctggtggtgttcaagtcagcccccatcttgaagcgggccctaaag gtgaaacaagccatgatgcagctctatgtgctgaagctgctcaaggtacagaccaaatact tggggcggcagtggcgaaagagcaacatgaagaccatgtctgccatctaccagaaggt gcggcatcggctgaacgacgactgggcatacggcaatgatcttgatgcccggccttggg acttccaggcagaggagtgtgcccttcgtgccaacattgaacgcttcaacgcccggcgct atgaccgggcccacagcaaccctgacttcctgccagtggacaactgcctgcagagtgtc ctgggccaacgggtggacctccctgaggactttcagatgaactatgacctctggttagaaa gggaggtcttctccaagcccatttcctgggaagagctgctgcagtgaggctgttggttagg ggactgaaatggagagaaaagatgatctgaaggtacctgtgggactgtcctagttcattgc	31

[0167]

		tgcagtgctcccatcccccaccaggtggcagcacagccccactgtgtcttccgcagtctgt cctgggcttgggtgagcccagcttgacctccccttggttcccagggtcctgctccgaagca gtcatctctgcctgagatccattcttcctttacttcccccaccctcctctcttggatatggttggt tttggctcatttcacaatcagcccaaggctgggaaagctggaatgggatgggaaccctc cgccgtgcatctgaatttcaggggtcatgctgatgcctctcgagacatacaaatccttgcttt gtcagcttgcaaaggaggagagtttaggattagggccagggccagaaagtcggtatcttg gttgtgctctggggtgggggtggggtgtttctgatgttattccagcctcctgctacattatatc cagaagtaattgcggaggctccttcagctgcctcagcactttgattttggacagggacaag gtaggaagagaagcttcccttaaccagaggggccatttttccttttggctttcgagggcctg taaatatctatatataattctgtgtgtattctgtgtcatgttggggtttttaatgtgattgtgtattct gtttacattaaaaagaagcaaaaataaaaaaaaaaaaa	
STX12	NM_177424.2	gcacgcagccttagctccttccccgcccttgctcttcccagtttctccgtcagcctgcgggt cccggctggcggctgcttccggtaggagagcggtgtagagcgagcaggtctcagctcct cgtcatgtcatacggtcccttagacatgtaccggaacccggggccctcggggccccagct ccgggacttcagcagcatcatccagacgtgcagcggcaacatccagcggatcagccaa gccactgctcagataaagaatttgatgagccagctaggaactaagcaggactcaagcaa gctacaggaaaatctgcaacagttacaacactccacaaatcagctcgccaaggaaacaa atgaattgctgaaagaattagggtccttgccccttcccttatctacttcagaacagcgccag cagagacttcagaaggaacgcctcatgaatgacttctctgcagccttaaacaatttccagg ctgtgcagagaagggtatctgaaaaggaaaaggagagtattgccagagcaagagctgg atctcgtctttctgcagaagagaggcaaagagaggagcagctggtctcatttgacagccat gaggagtggaaccagatgcagagccaggaggatgaggtggccatcactgagcaggatt tggaacttattaaagaaagagaaacggcaattcggcagctggaggctgacattttggatgt caatcagatatttaaagatttggccatgatgatccatgaccagggtgatctgattgatagcat agaagccaatgtggaaagctcagaggtgcacgtcgaaagagccactgaacagttacag cgagctgcttactatcagaaaaaatctcgcaagaagatgtgtatcctggtgcttgtcctgtca gtgattattctaatcttgggacttattatctggctagtttataaaacgaagtgattgcctccgat cgttctcccgctgagctgttttcaagggcaagtgcttgttgaagtcttgccagaacaaactg atcacaagaagacagcatatatcagaacgtcctgtaatcatttagttagaaactaactactaa ctagtctttggaattcgtgacctatggagacagtaattatcaatttattgattctattgatttctca aattaggaattaacttatgtggattttgcttcctcttgtattctgattgcccttcatcccaagtgtt tactgaaaattccattctagatattcttgttttgacaaatgacactacagtctcgtaatattgtctt ttatgtatatacaaaatttacctttttactagcatctgagatagagttactttctggtacccagtat attggagtctgtcagaaactctataataggccaccagtttttattatttaacatttttatttgaattt ctaagaagcctattctctatctatttttgaaagattttggcactatatttaattggaaggtaaaata ttgtacatgtgatccagagtaaatgagaagtctctatctgagctggtcagttactggagtaca tgttactaatctgggtttaaagtttacttcattatctgctagtgtcatccacagcagttcatcctc atccacactaagccatcctgttagcttttaaaggaagttaatttaattaacattaatatactctat gggctccctctcccacctgtctgcatagaaaggcagaattagacatagcatgctttggaaa agcaaataggaattgttgggaatgatttaatcttgttgttgttgttgttgttcacttgtggttc tacattcctggtgaatgatgaatgttgctgtcaaagggctgccccctaccttataagggttgc tgggcatttgaaggcaggaagatttttaaagatagattgaggttggtttaaaattattcctgta aaccaacaataaagcaaagaagaggttcatttttgtaaataacactggtttcaaatagtgatg ttagacttaacctaatttataaacaagagattaatatctccatgcatagttttagacaaaaaaa gatgtttcaataaaattactgtcttgtaatataaatgttgtccacttccctttccacaggcctag aacagttaaagggaacataatttgtttaggctcccacataaatgtgaatctggccaacaactt tggttcatcctttagtgaattagaggatttggctaccctgagtatatttatattcatttcttctgttc tccttctgttattatacttaatcttctaaactaaactaatgtgaacagtagggaagcaagggcc caaatgcataagtttctttgcactgttgcacttacttaatacaaataaatgttttttaaagcttttg tagtatgtttttatgagttaacatcctaatgtggtaggtattaggtaatgtgctgtcatgagaaa aattgagacttccaagaaaactggacaccaggtgagggttggtttggagacggaataggt gtagctgccttttccttgaaaaacagtgtgtagagatggctgagtgcaatggctcacacttgt aatcccaacactttggaaggctgaggcgggaggatcagtatatcggtacgtctgagccca agagttcaagatcagcctgggcagtatagcaagaccccatctccatttttttttttaatgatttttt aattaaaaaaaagaacaacaggatagagctgttggggtggcacagtggcccaaagagc	32

[0168]

		agcttcagagataattccttggttctatgatccctgtttaactccaaattacagtcggacttgg atacatcatttgtaacattgtaggaaagaaaaaagtcttggttgtgaaaaacgatttgcatttg ggtaaaataaagtgaccatgcttttgttctgtaatactgtgtgacctgtggttgttgtaatggtg atcatggagagcaaatatgaacttggcctggattttaaatggcctagaatttgtggtagttgc caaagaggttctcctaggtggtcttaataaacctattcacagaattctccttaaaaaaaaaaa aaaaaaaa	
TMPRSS2_1	DQ204772.1	taggcgcgagctaagcaggaggcggaggcggaggcggagggcgaggggcggggа gcgccgcctggagcgcggcaggaagccttatcagttgtgagtgaggaccagtcgttgttt gagtgtgcctacggaacgccacacctggctaagacagagatgaccgcgtcctcctccag cgactatggacagacttccaagatgagcccacgcgtccctcagcaggattggctgtctca acccccagccagggtcaccatcaaaatggaatgtaaccctagccaggtgaatggctcaa g	33
TMPRSS2_2	OM_TMPRSS2-ERG_T2E4_COSF28.0	gggaacaaaagctggagctccaccgcggtggcggccgctctagccctcaaggaactct cctgatgaatgcagtgtggccaaaggcgggaagatggtgggcagcccagacaccgttg ggatgaactacggcagctacatggaggagaagcacatgccacccccaaacatgaccac gaacgagcgcagagttatcgtgccagcagatcctacgctatggagtacagaccatgtgc ggcagtggctggagtgggcggtgaaagaatatggccttccagacgtcaacatcttgttatt ccagaacatcgatgggaaggaactgtgcaagatgaccaaggacgacttccagaggctc acccccagctacaacgccgacatccttctctcacatctccactacctcagagagactcctct tccacatttgacttcagatgatgttgataaagccttacaaaactctccacggttaatgcatgct agaaacacaggggtgcagcttttatttttcccaaatacttcagtatatcctgaagctacgca aagaattacaactaggccagatttaccatatgagccccccaggagatcagcctggaccgg tcacggccacccccacgccccagtcgaaagctgctcaaccatctccttccacagtgcccaa aactgaagaccagcgtcctcagttagaaccttatcagattcttggaccaacaagtagccgc cttgcaaatccaggcagtggccagatccagctttggcagttcctcctggagctcctgtcgg acagctccaactccagctgcatcacctgggaaggcaccaacggggagttcaagatgacg gatcccgacgaggtggcccggcgctggggagagcggaagagcaaacccaacatgaa ctacgataagctcagccgcgccctccgttactactatgacaagaacatcatgaccaaggtc catgggaagcgctacgcctacaagttcgacttccacgggatcgcccaggccctccagcc ccacccccggagtcatctctgtacaagtaccctcagacctcccgtacatgggctcctat cacgcccacccacagaagatgaactttgtggcgccccaccctccagccctccccgtgac atcttccagttttttgctgccccaaacccatactggaattcaccaactgggggtatataccc caacactaggctccccaccagccatatgccttctcatctgggcacttactactaaagacctg gcggaggcttttcccatcagcgtgcattcaccagcccatcgccacaaactctatcggaga acatgaatcaaaagtgcctcaagaggaatgaaaaaagctttactggggctggggaagga agccggggaagagatccaaagactcttgggagggagttactgaagtcttactgaagtctt actacagaaatgaggaggatgctaaaaatgtcacgaatatggacatatcatctgtggactg accttgtaaaagacagtgtatgtagaagcatgaagtcttaaggacaaagtgccaaagaaa gtggtcttaagaaatgtataaactttagagtagagtttgaatcccactaatgcaaactgggat gaaactaaagcaatagaaacaacacagttttgacctaacataccgtttataatgccattttaa ggaaaactacctgtatttaaaaatagaaacatatcaaaaacaagagaaaagacacgagag agactgtggcccatcaacagacgttgatatgcaactgcatggcatgtgctgttttggttgaa atcaaatacattccgtttgatggacagctgtcagctttctcaaactgtgaagatgacccaaa gtttccaactcctttacagtattaccgggactatgaactaaaaggtgggactgaggatgtgt atagagtgagcgtgtgattgtagacagaggggtgaagaaggaggaggaagaggcaga gaaggaggagaccagggctgggaaagaaacttctcaagcaatgaagactggactcagg acatttggggactgtgtacaatgagttatggagactcgagggttcatgcagtcagtgttata ccaaacccagtgttaggagaaaggacacagcgtaatggagaaaggggaagtagtagaa ttcagaaacaaaaatgcgcatctctttctttgtttgtcaaatgaaaattttaactggaattgtctg atatttaagagaaacattcaggacctcatcattatgtgggggctttgttctccacagggtcag gtaagagatggccttcttggctgccacaatcagaaatcacgcaggcattttgggtaggcg gcctccagttttccttgagtcgcgaacgctgtgcgtttgtcagaatgaagtatacaagtcaa tgtttttccccctttttatataataattatataacttatgcatttatacactacgagttgatctcggc cagccaaagacacacgacaaaagagacaatcgatataatgtggccttgaattttaactctg tatgcttaatgtttacaatatgaagttattagttcttagaatgcagaatgtatgtaataaaataag	

[0169]

		cttggcctagcatggcaaatcagatttatacaggagtctgcatttgcacttttttagtgactaa agttgcttaatgaaaacatgtgctgaatgttgtggattttgtgttataatttactttgtccaggaa cttgtgcaagggagagccaaggaaataggatgtttggcacccaaatggcgtcagcctctc caggtccttcttgcctcccctcctgtcttttatttctagccccttttggaacagaaggaccccg ggtttcacattggagcctccatatttatgcctggaatggaaagaggcctatgaagctggggt tgtcattgagaaattctagttcagcacctggtcacaaatcacccttaattcctgctatgattaa aatacatttgttgaacagtgaacaagctaccactcgtaaggcaaactgtattattactggcg ggcggatccccgggctgcaggaattcgatatcaagcttatcgataccgtcga	
TRIM29	NM_012101.3	ctcctcacaggtgtgtctctagtcctcgtggttgcctgccccactccctgccgagacgcctg ccagaaaggtcacctatcctgaaccccagcaagcctgaaacagctcagccaagcaccct gcgatggaagctgcagatgcctccaggagcaacgggtcgagcccagaagccagggat gcccggagcccgtcgggccccagtggcagcctggagaatggcaccaaggctgacggc aaggatgccaagaccaccaacgggcacggcggggaggcagctgagggcaagagcct gggcagcgccctgaagccaggggaaggtaggagcgccctgttcgcgggcaatgagtg gcggcgacccatcatccagtttgtcgagtccggggacgacaagaactccaactacttcag catggactctatggaaggcaagaggtcgccgtacgcagggctccagctgggggctgcc aagaagccacccgttacctttgccgaaaagggcgagctgcgcaagtccatttttctcggag tcccggaagcccacggtgtccatcatggagcccggggagacccggcggaacagctac ccccgggccgacacgggccttttttcacggtccaagtccggctccgaggaggtgctgtgc gactcctgcatcggcaacaagcagaaggcggtcaagtcctgcctggtgtgccaggcctc cttctgcgagctgcatctcaagccccacctggagggcgccgccttccgagaccaccagc tgctcgagcccatccgggactttgaggcccgcaagtgtcccgtgcatggcaagacgatg gagctcttctgccagaccgaccagacctgcatctgctacctttgcatgttccaggagcaca agaatcatagcaccgtgacagtggaggaggccaaggccgagaaggagacggagctgt cattgcaaaaggagcagctgcagctcaagatcattgagattgaggatgaagctgagaagt ggcagaaggagaaggaccgcatcaagagcttcaccaccaatgagaaggccatcctgga gcagaacttccgggacctggtgcgggacctggagaagcaaaaggaggaagtgagggc tgcgctggagcagcgggagcaggatgctgtggaccaagtgaaggtgatcatggatgctc tggatgagagagccaaggtgctgcatgaggacaagcagacccgggagcagctgcata gcatcagcgactctgtgttgtttctgcaggaatttggtgcattgatgagcaattactctctccc cccacccctgcccacctatcatgtcctgctggagggggagggcctgggacagtcactag gcaacttcaaggacgacctgctcaatgtatgcatgcgccacgttgagaagatgtgcaagg cggacctgagccgtaacttcattgagaggaaccacatggagaacggtggtgaccatcgc tatgtgaacaactacacgaacagcttcgggggtgagtggagtgcaccggacaccatgaa gagatactccatgtacctgacacccaaaggtggggtccggacatcataccagccctcgtc tcctggccgcttcaccaaggagaccacccagaagaatttcaacaatctctatggcaccaa aggtaactacacctcccgggtctgggagtactcctccagcattcagaactctgacaatgac ctgcccgtcgtccaaggcagctcctccttctccctgaaaggctatccctccctcatgcgga gccaaagccccaaggcccagccccagacttggaaatctggcaagcagactatgctgtct cactaccggccattctacgtcaacaaaggcaacgggattgggtccaacgaagccccatg agctcctggcggaaggaacgaggcgccacacccctgctcttcctcctgaccctgctgctc ttgccttctaagctactgtgcttgtctgggtgggagggagcctggtcctgcacctgccctct gcagccctctgccagcctcttgggggcagttccggcctctccgacttccccactggccac actccattcagactcctttcctgccttgtgacctcagatggtcaccatcattcctgtgctcaga ggccaacccatcacaggggtgagataggttggggcctgccctaacccgccagcctcctc ctctcgggctggatctgggggctagcagtgagtacccgcatggtatcagcctgcctctcc cgcccacgccctgctgtctccaggcctatagacgtttctctccaaggccctatccccccaat gttgtcagcagatgcctggacagcacagccacccatctcccattcacatggcccacctcct gcttcccagaggactggccctacgtgctctctctcgtcctacctatcaatgcccagcatggc agaacctgcagcccttggccactgcagatggaaacctctcagtgtcttgacatcaccctac ccaggcggtgggtctccaccacagccactttgagtctgtggtccctggagggtggcttctc ctgactggcaggatgaccttagccaagatattcctctgttccctctgctgagataaagaattc ccttaacatgatataatccacccatgcaaatagctactggcccagctaccatttaccatttgc ctacagaatttcattcagtctacactttggcattctctctggcgatggagtgtggctgggctg accgcaaaaggtgccttacacactgcccccacctcagccgttgccccatcagaggctg	35

[0170]

		cctcctccttctgattacccccccatgttgcatatcagggtgctcaaggattggagaggagac aaaaccaggagcagcacagtggggacatctcccgtctcaacagccccaggcctatggg ggctctggaaggatgggccagcttgcaggggttggggagggagacatccagcttgggc tttccccttggaataaaccattggtctgtcaaaaaaaaaaaaaaaaaaa	
UNC45A	NM_001039675.1	acttaacaaccgaagtaacccgcaatgcggaagggcgaggggattgcgagtcaccgag tttcccgcgcggcttgagtcacggcctagaaagagagatgttggggttcccaggaccag gacagaggtggtagtgaactctcatgggcatccagagaaggtcaggccccttgctgaca ggcctatctgtggggctactgctgctcttcagctgggtgacccttgtccagccaacctctct ctcagctctggtccaccaccctcacttgtgccagaccacccgggatgtccatggccgtca ctaccctggtttcttttgccctcgtctgtctgattctccagaggaagcctactgctgccacctg caggctgcaggggctcctgctgcacccgggctgaatttgaggccctgtaccaagtcaat ctgtccgctcttccgccccgcccatcctcaggggcccaggcccgctcctagtgctgggc ctctacaacctactggttgtgaccctgatgaccgtagacctcgtgcacttctgctgcggtcg gggccggagtctgggctggagccaccgcaggcctccctctgggtcctccgccgcgagc tccctgcaggtctctgcggggacagcttaggtgcgcccggagcttgcctgcacctgcgat ccagagccaagcgccccgccctgcccgggcgcgctccctccttagccctgcccctctc tgaccccacctccgacgcaagagtggggcggggcagctgccggtggcgtcccgaacc cagactcgccccgccccagagactgcgcctgcgcgggcacgagacaacctctccgcg atgactgccagctcagtggagcagctgcggaaggagggcaatgagctgttcaaatgtgg agactacgggggcgccctggcggcctacactcaggccctgggtctggacgcgacgccc caggaccaggccgttctgcaccggaaccgggccgcctgccacctcaagctggaagatt acgacaaagcagaaacagaggcatccaaagccattgaaaaggatggtggggatgtcaa agcactctaccggcggagccaagccctagagaagctgggccgcctggaccaggctgtc cttgacctgcagagatgtgtgagcttggagcccaagaacaaagttttccaggaggccttgc ggaacatcgggggccagattcaggagaaggtgcgatacatgtcctcgacggatgccaa agtggaacagatgtttcagatactgttggacccagaagagaagggcactgagaaaaagc aaaaggcttctcagaacctggtggtgctggccagggaggatgctggagcggagaagat cttccggagtaatggggttcagctcttgcaacgtttactggacatgggagagactgacctc atgctggcggctctgcgtacgctggttggcatttgctctgagcatcagtcacggacagtgg caaccctgagcatactgggaactcggcgagtagtctccatcctgggcgtggaaagccag gctgtgtccctggctgcctgccacctgctgcaggttatgtttgatgccctcaaggaaggtgt caaaaaaggcttccgaggcaaagaaggtgccatcattgtggatcctgcccgggagctga aggtcctcatcagtaacctcttagatctgctgacagaggtgggggtctctggccaaggcc gagacaatgccctgaccctcctgattaaagcggtgccccggaagtctctcaaggacccca acaacagcctcaccctctgggtcatcgaccaaggtctgaaaaagattttggaagtggggg gctctctacaggaccctcctggggagctcgcagtgaccgcaaacagccgcatgagcgc ctctattctcctcagcaagctctttgatgacctcaagtgtgatgcggagagggagaatttcc acagactttgtgaaaactacatcaagagctggtttgagggccaagggctggccgggaag ctacgggccatccagacggtgtcctgcctcctgcagggcccatgtgacgctggcaaccg ggccttggagctgagcggtgtcatggagagtgtgattgctctgtgtgcctctgagcagga ggaggagcagctggtggccgtggaggctctgatccatgcagccggcaaggctaagcg ggcctcattcatcactgccaatggtgtctcgctgctgaaggacctatataagtgcagcgag aaggacagcatccgcatccgggcgctagtgggactctgtaagctcggttcggctggagg gactgacttcagcatgaagcagtttgctgaaggctccactctcaaactggctaagcagtgt cgaaagtggctgtgcaatgaccagatcgacgcaggcactcggcgctgggcagtggagg gcctggcttacctgacctttgatgccgacgtgaaggaagagtttgtggaggatgcggctg ctctgaaagctctgttccagctcagcaggttggaggagaggtcagtgctctttgcggtggc ctcagcgctggtgaactgcaccaacagctatgactacgaggagcccgaccccaagatgg tggagctggccaagtatgccaagcagcatgtgcccgagcagcaccccaaggacaagcc aagcttcgtgcgggctcgggtgaagaagctgctggcagcgggtgtggtgtcggccatgg tgtgcatggtgaagacggagagccctgtgctgaccagttcctgcagagagctgctctcca gggtcttcttggctttagtggaagaggtagaggaccgaggcactgtggttgcccagggag gcggcagggcgctgatcccgctggccctggaaggcacggacgtggggcagacaaag gcagcccaggcccttgccaagctcaccatcacctccaacccggagatgaccttccctgg cgagcggatctatgaggtggtccggcccctcgtctccctgttgcacctcaactgctcaggc	36

[0171]

		ctgcagaacttcgaggcgctcatggccctaacaaacctggctgggatcagcgagaggct ccggcagaagatcctgaaggagaaggctgtgcccatgatagaaggctacatgtttgagg agcatgagatgatccgccgggcagccacggagtgcatgtgtaacttggccatgagcaag gaggtgcaggacctcttcgaagcccagggcaatgaccgactgaagctgctggtgctgta cagtggagaggatgatgagctgctacagcgggcagctgccgggggcttggccatgctta cctccatgcggcccacgctctgcagccgcattccccaagtgaccacacactggctggag atcctgcaggccctgcttctgagctccaaccaggagctgcagcaccggggtgctgtggtg gtgctgaacatggtggaggcctcgagggagattgccagcaccctgatggagagtgagat gatggagatcttgtcagtgctagctaagggtgaccacagccctgtcacaagggctgctgc agcctgcctggacaaagcagtggaatatgggcttatccaacccaaccaagatggagagt gaggggttgtccctgggcccaaggctcatgcacacgctacctattgtggcacggagag taaggacggaagcagctttggctggtggtggctggcatgcccaatactcttgcccatcctc gcttgctgccctaggatgtcctctgttctgagtcagcggccacgttcagtcacacagccctg cttggccagcactgcctgcagcctcactcagaggggccctttttctgtactactgtagtcag ctgggaatggggaaggtgcatcccaacacagcctgtggatcctggggcatctggaagg gcgcacacatcagcagcctcaccagctgtgagcctgctatcaggcctgcccctccaataa aagtgtgtagaactccaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	
XPC	NM_004628.4	cgaaggggcgtggccaagcgcaccgcctcggggcggggccggcgttctagcgcatcg cggccgggtgcgtcactcgcgaagtggaatttgcccagacaagcaacatggctcggaaa cgcgcggccggcggggagccgcggggacgcgaactgcgcagccagaaatccaagg ccaagagcaaggcccggcgtgaggaggaggaggaggatgcctttgaagatgagaaac ccccaaagaagagccttctctccaaagtttcacaaggaaagaggaaaagaggctgcagt catcctgggggttcagcagatggtccagcaaaaaagaaagtggccaaggtgactgttaa atctgaaaacctcaaggttataaaggatgaagccctcagcgatggggatgacctcaggga ctttccaagtgacctcaagaaggcacaccatctgaagagaggggctaccatgaatgaag acagcaatgaagaagaggaagaaagtgaaaatgattgggaagaggttgaagaacttagt gagcctgtgctgggtgacgtgagagaaagtacagccttctctcgatctcttctgcctgtgaa gccagtggagatagagattgaaacgccagagcaggcgaagacaagagaaagaagtga aaagataaaactggagtttgagacatatcttcggagggcgatgaaacgtttcaataaaggg gtccatgaggacacacacaaggttcaccttctctgcctgctagcaaatggcttctatcgaaa taacatctgcagccagccagatctgcatgctattggcctgtccatcatcccagcccgcttta ccagagtgctgcctcgagatgtggacacctactacctctcaaacctggtgaagtggttcatt ggaacatttacagttaatgcagaactttcagccagtgaacaagataacctgcagactacatt ggaaaggagatttgctatttactctgctcgagatgatgaggaattggtccatatattcttactg attctccgggctctgcagctcttgacccggctggtattgtctctacagccaattcctctgaag tcagcaacagcaaagggaaagaaaccttccaaggaaagattgactgcggatccaggag gctcctcagaaacttccagccaagttctagaaaaccacaccaaaccaaagaccagcaaa ggaaccaaacaagaggaaaccttttgctaagggcacctgcaggccaagtgccaaagggga agaggaacaagggaggcagaaagaaacggagcaagccctcctccagcgaggaagat gagggcccaggagacaagcaggagaaggcaacccagcgacgtccgcatggccgggga gcggcgggtggcctccagggtgtcttataaagaggagagtgggagtgatgaggctggc agcggctctgattttgagctctccagtggagaagcctctgatccctctgatgaggattccga acctggccctccaaagcagaggaaagccccgctcctcagaggacaaaggctgggtcc aagagtgcctccaggacccatcgtgggagccatcgtaaggacccaagcttgccagcgg catcctcaagctcttcaagcagtaaaagaggcaagaaaatgtgcagcgatggtgagaag gcagaaaaaagaagcatagctggtatagaccagtggctagaggtgttctgtgagcagga ggaaaagtgggtatgtgtagactgtgtgcacggtgtggtgggccagcctctgacctgttac aagtacgccaccaagcccatgacctatgtggtgggcattgacagtgacggctgggtccg agatgtcacacagaggtacgacccagtctggatgacagtgacccgcaagtgccgggttg atgctgagtggtgggccgagaccttgagaccataccagagcccatttatggacagggag aagaaagaagacttggagtttcaggcaaaacacatggaccagcctttgcccactgccatt ggcttatataagaaccaccctctgtatgccctgaagcggcatctcctgaaatatgaggccat ctatcccgagacagctgccatccttgggtattgtcgtggagaagcggtctactccagggat tgtgtgcacactctgcattccagggacacgtggctgaagaaagcaagagtggtgaggctt ggagaagtaccctacaagatggtgaaaggcttttctaaccgtgctcggaaagcccgactt	37

		gctgagccccagctgcgggaagaaaatgacctgggcctgtttggctactggcagacaga ggagtatcagcccccagtggccgtggacgggaaggtgccccggaacgagtttgggaat gtgtacctcttcctgcccagcatgatgcctattggctgtgtccagctgaacctgcccaatcta caccgcgtggcccgcaagctggacatcgactgtgtccaggccatcactggctttgatttcc atggcggctactcccatcccgtgactgatggatacatcgtctgcgaggaattcaaagacgt gctcctgactgcctgggaaaatgagcaggcagtcattgaaaggaaggagaaggagaaa aaggagaagcgggctctagggaactggaagttgctggccaaaggtctgctcatcaggga gaggctgaagcgtcgctacgggcccaagagtgaggcagcagctccccacacagatgc aggaggtggactctcttctgatgaagaggaggggaccagctctcaagcagaagcggcc aggatactggctgcctcctggcctcaaaaccgagaagatgaagaaaagcagaagctgaa gggtgggcccaagaagaccaaaagggaaaagaaagcagcagcttcccacctgttccca tttgagcagctgtgagctgagcgcccactagaggggcacccaccagttgctgctgcccc actacaggccccacacctgccctgggcatgcccagcccctggtggtgggggcttctctg ctgagaaggcaaactgaggcagcatgcacggaggcggggtcaggggagacgaggcc aagctgaggaggtgctgcaggtcccgtctggctccagcccttgtcagattcacccagggt gaagccttcaaagctttttgctaccaaagcccactcaccctttgagctacagaacactttgct aggagatactcttctgcctcctagacctgttctttccatctttagaaacatcagttttgtatgga agccaccgggagatttctggatggtggtgcatccgtgaatgcgctgatcgtttcttccagtt agagtcttcatctgtccgacaagttcactcgcctcggttgcggacctaggaccatttctctgc aggccacttaccttcccctgagtcaggcttactaatgctgccctcactgcctctttgcagtag gggagagagcagagaagtacaggtcatctgctgggatctagttttccaagtaacattttgtg gtgacagaagcctaaaaaaaagctaaaatcaggaaagaaaaggaaaaatacgaattgaaa attaaggaaatgttagtaaaatagatgagtgttaaactagattgtattcattactagataaaat gtataaagctctctgtactaaggagaaatgacttttataacattttgagaaaataataaagcat ttatctaaaaaaaaaaa	
[0172]	*ALG9*	NM_001077690.1	gtcttttgtccctcggcggacaccgtttgccagccaaagctatgtctgcgcgctcaccgact tcatagggtgccgaattcttttttccccaggcttgccatggctagtcgaggggctcggcagc gcctgaagggcagcggggccagcagtggggatacggccccggctgcggacaagctg cgggagctgctgggcagccgagaggcgggcggcgcggagcaccggaccgagttatct gggaacaaagcaggacaagtctgggcacctgaaggatctactgctttcaagtgtctgcttt cagcaaggttatgtgctgctctcctgagcaacatctctgactgtgatgaaacattcaactact gggagccaacacactacctcatctatggggaagggtttcagacttgggaatattccccag catatgccattcgctcctatgcttacctgttgcttcatgcctggccagctgcatttcatgcaag aattctacaaactaataagattcttgtgttttacttttgcgatgtcttctggcttttgtgagctgta tttgtgaactttacttttacaaggctgtgtgcaagaagtttgggttgcacgtgagtcgaatgat gctagccttcttggttctcagcactggcatgttttgctcatcatcagcattccttcctagtagct tctgtatgtacactacgttgatagccatgactggatggtatatggacaagacttccattgctgt gctgggagtagcagctggggctatcttaggctggccattcagtgcagctcttggtttaccc attgcctttgatttgctggtcatgaaacacaggtggaagagtttctttcattggtcgctgatgg ccctcatactatttctggtgcctgtggtggtcattgacagctactattatgggaagttggtgat tgcaccactcaacattgttttgtataatgtctttactcctcatggacctgatctttatggtacaga accctggtatttctatttaattaatggatttctgaatttcaatgtagcctttgctttggctctccta gtcctaccactgacttctcttatggaatacctgctgcagagatttcatgttcagaatttaggcc acccgtattggcttaccttggctccaatgtatatttggtttataattttcttcatccagcctcaca aagaggagagatttcttttccctgtgtatccacttatatgtctctgtggcgctgtggctctctct gcacttcagaaatgttaccactttgtgtttcaacgatatcgcctggagcactatactgtgacat cgaattggctggcattaggaactgtcttcctgtttgggctcttgtcattttctcgctctgtggca ctgttcagaggatatcacgggccccttgatttgtatccagaattttaccgaattgctacagac ccaaccatccacactgtcccagaaggcagacctgtgaatgtctgtgtgggaaaagagtgg tatcgatttcccagcagcttccttcttcctgacaattggcagcttcagttcattccatcagagtt cagaggtcagttaccaaaaccttttgcagaaggacctctggccacccggattgttcctact gacatgaatgaccagaatctagaagagccatccagatatattgatatcagtaaatgccatta tttagtggatttggacaccatgagagaaacaccccgggagccaaaatattcatccaataaa gaagaatggatcagcttggcctatagaccattccttgatgcttctagatcttcaaagctgctg cgggcattctatgtcccttcctgtcagatcagtatacagtgtacgtaaactacaccatcctc	38

[0173]

		aaaccccggaaagcaaagcaaatcaggaagaaaagtggaggttagcaacacacctgtg gccccaaaggacaaccatcttgttaactattgattccagtgacctgactccctgcaagtcat cgcctgtaacatttgtaataaaggtcttctgacatgaatactggaatctgggtgctctgggct agtcaaagtctatttcaaagtctaatcaaagtcacatttgctccctgtgtgtgtctctgttctgc atgtaaacttttttgcagctaggcagagaaaggccctaaagcacagatagatatattgctcca catctcattgtttttcctctgttcaattatttactagaccggagaagagcagaaccaacttaca ggaagaattgaaaatcctggtactggatggctgtgataagctgttctccacactctggcctg gcatctgagaactagcaagcctctcttaggccatatgggcttctccaccaaagctgtttggc agctcctagcagaccttcttattgaaatcctcatgctgaaaatgaacacagcctagttgcca acccacatgtccttttcacctccagcaagactaagcttctttaaagcacttcacaggactag gaccctgtcctggagctatctcaggaaaaaggtgaccatttgaggaactgtgacctaatttt attataatgatgcctctaattttcatttccttcacaaccaactgtaactataaggttgtattgctttt ttgttcagttttagcatgctatttttttgaattctagactcctccatgtgaagatatcaacagacaa aactacaactgtataggacatatttggagaaaattctatcaattgatacatttggatgacatca cattttaagtaatgtaatctgaggccattgctgaggaaattaagaattttccttttttttaacca cccccagtgaaaaggatcagtgtatatttatagcacctatttttttagttctgtctgttgtgaggc acatcctgcatggggcacttctagtcaaataggcaatgataaggacctaattaaaatgtgat aagtgtatactattactttaaaagcctttacagtcagtacttcagtttacaaggcactttcacag catctcgtttgatcctcacagtcacaacatgtggtagacaaggcaggtgatttttatccccatt ttacagataaggaaacaggctgcgggtggggagtgaggggaggtaaagatagttagttg cctaaggtcacacagccagtaagtaatagagctgggactggaacccaggtttccttactct catctattgctcctccatattcctcactcaaccatgaaaacattacttgaaaggactgatgag gttaaccagagacctaactgatattgtaactttctattttaaggaagaattgtgtctgtatttga gttctttggagcctccagtctgcctgtgtgttagaccagcacagcagtgctgtgtgatgcag cctgacctgtggcaggaaagtagtgcttctgtttggaagtcatgttcttttgcagccacacag gatccaaatatcagtactattcctgtagtcaatctggggtcacattataggtgccttatttccct aagggtaactgatctgaatatctgcaaataggatgaatctatttttcagaagttccatctttcat ttttctttttttttttgagacagagtctcattctgtcgcccatgctggagtgcagtggcgcgatct cggctcgctgcaacctctgcctcccaggttgaagcaattctcatgcctcagccacccgagt agctgggattacaggcatgcgccatcatgcccagctaatttatgtatttttagtagagttgga gtttcaccatgttggccaggctggtcttggactcctgacctcaggtcatccacccgcctcag cctcccaaagtgctggtattacaggcgtgagccaccgcacccagccccatctttcattttca aagagaagggcattctaataggaactggtgccaagagagaagaaaagaagtgataaca gaagaaatggctagttacaatattaaaaagctcctctttgagatctcctctgcaggaatatca gagacggagttgaagcgctggagaggtaataggtctagacagtacagaacaataactgg ggagtgtgtgaggatagactgggctccccccttgcttgaaagatctctggcatttaattctcaa ttcttgattactattttccagtgtaaaactagcacatatgatctgactacaggacagagaatttt aagtgaaacatttgccttacttgcagtaataatgtgctgttcttcacagtagctaaggccctct atgtttcccagaggtaaataagaatccaggaatggaggtccatctgtgatgaatggctttttt ctaatcaaagtagtataatgctgttttatctgttttgtcatcttgtttttttttttttttaaaaaaacaa aaccttaattataatatagcgcaaagaaaggccaggactgatgcagggattccttggaaat atcagttcctatcacttttaaaacctgattttggatctctctgttctatgtatgtctttagtgagag cacaatacatggcagaacgctgtgccaaatgttataggtaaggaatatagaaatgaatgttt tttgttgtgaaggtgttttcatgtgatattttataaacacattttaaaaaatctccatcacttttag tataggaaggatagctttgcctgggaaaaacagtttcaacacacctgctcagagtagcagt tctccctcaaaaaagcagtgttcagcctgcactgactgttctgcttgccaaaaggaggaag catgcaagatacttatttctccatagattgtggagtatagagggatgtgggactacagattat tatttttttttccccgagacagagtcttgctctgtcgcccaggttggaacacaatggcacgacc tcagctcactgcaacctctgtctcccgggttcaagcaattctcctgcttcagcctcctgagta gctgggattacaggcacacaccaccaccgcactcagctaatttttgtatttttagtagaggtg gggttttaccatgttggccaggctggtcttaaactcctgaccttgtaatcatcccgcctcggc ctcctaaagtgctaggattacaggcatgagccaccgcacccggcccagataatttttaata gcctttgatcatggggtgagtgagggagtaggtatacttggcaaatgcatggttctctgattt ctagctctaaagcagccttatctgaatccccaaatcttgtgatgctgagtaccattactgaac cagtctgcacggtaggcatctgctaccaaaatttacctcctacctggtaggtgtcatctgata	

[0174]

		agaaagaagacaggttattttaatttttgagataatcacagaaaattgcagcccatactcttt attaccgaattcaagtttggaaatagacccttgttttaaatcatgatgggtctttatcccaatc atttatctgggtcatttttccaactttggagttctaggaaagaaccttgaaaacctgatatgatt ctgcagcatgaggtctacggtgaccatttgggcaaagctccagtggcaatcatttattgtgtt ttgcatttcctgggatttattgaaataagaattcactgtgattatgtagtcttctggctagtatca ggcagctctgcttttaatttggttaattttattttctctgaagagggagaagaggtacaatttaa tcttggcctccacaagcatattaaagctcacgtgttaatcagtgcattcttatgctcctacatta aatgccttgggtaaatggataaatggacatgtgcccagctttaatttttttttgcaacagaaag atcagacttccgtatggcatcgttggatttcagaggctttctggtgtatctgtaaatctgaatgt tgccttctgccagtctgtataaccaggtgattcatgctgcaaatgaaatcaggaagcagtaa agtgttaaagcaagagtattgtccaattcacttgtcttcctgatccttgtactttatttcacgtgt cggtgtttacattacatacttatatttcctgtgaaagaaagagttaaataaattgtagcagtttg a	
SEPN	NM_031475.2	agcggagcgccaggcagcgcggagcggaggccaggcccacagccgctccgcctccc ggcccgcagatccccgacggccgcaccgcgggctcctctggcccgcaagaacacgtg catggcgtcctggggaaggcgctgagtgcggagtcgcggcgccgcacgcggcaccat ggccctggagcaggcgctgcaggcggcgcggcagggcgagctggacgtgctgaggt cgctgcacgccgcaggcctcctggggccctcgctgcgcgacccgctggacgcgctgcc cgtgcaccacgcggcccgcgctgggaagctgcactgtctgcgcttcctggtggaggaag ccgccctccccgccgcggcccgcgcccgcaacggcgccacaccggcccacgacgcc tccgccaccggccacctcgcctgcctgcagtggctgctgtcgcagggcggctgcagagt gcaggacaaagacaattctggtgccacagtcttgcatctggctgcccgcttcggccaccc cgaggtggtgaactggctcttgcatcatggcggtggggaccccaccgcggccacagac atgggcgccctgcctatccactacgctgccgccaaaggagacttcccctccctgaggctt ctcgtcgagcactaccctgagggagtgaatgcccaaaccaagaacggtgccacgccct gtacctggcgtgccaggagggccacctggaggtgacccagtacctggtgcaggaatgc ggcgcagacccgcacgcgcgcgcccacgacggcatgaccccgctgcacgccgcggc gcagatgggccacagcccagtcatcgtgtggttggtgagctgcaccgacgtgagcctgt ccgagcaggacaaagacggcgccaccgccatgcacttcgcggcgagccgcggccac accaaggtgctcagctggctgctgctgcacggcggggagatctcggctgacctgtgggg cgggaccccgctgcacgacgccgccgagaacggggagctagagtgctgccagatcct ggtagtgaacggcgcggagctggacgtccgcgaccgcgacgggtacacggccgccg acctgtcggacttcaacggccacagccactgcacccgctacctgcgcacggtggagaac ctgagcgtggagcaccgcgtgctttcccgggatccatccgcagagctggaggctaagca gccggattcaggcatgtcctcacccaataccacggtgtcggtccagccgctgaactttgac ctcagctcgcctaccagcaccctctccaactacgactcctgctcctccagccactccagca tcaagggccagcaccctccatgtgggctttccagcgctagagctgcagacatacagagct acatggacatgctgaacccggagctgggcctgcctcggggcacgattgggaagcccac acccccaccaccccccacccagcttcccccccgccaccccccgcccccaggcacccaactg cccccaccccccacctggctacccagctcccaagcctcctgtaggaccacaggcagctga catctacatgcagaccaagaacaaactccgccacgtggagacagaggccctcaagaag gagctgagctcctgtgacggccacgacgggctgcggaggcaggactccagccgcaag ccccgcgccttcagcaagcagcccagcacgggggactactaccggcagctgggccgct gccccggcgagacgctggccgcacgcccgggcatggcgcacagcgaggaggtgcgt gcccgccagcccgcgcgcgccggctgcccgcgcctcggccctgccgcccgcggctca ctcgaaggcccctccgctcccccgcaggcggcgctgcttcctgggaaccatgttcctaac ggctgcgccgcggacccccaaggcgtccagggagctgccaccgccgcccccaccgcc gccgccgcccctgccggaggccgcgagttcgccaccgccggccccgcctctgccccctc gagagcgctggccctggctgcgggcagcgccgctcctcctcgtccaccggcagcacca agtctttcaacatgatgtccccgacgggcgacaactcggagctactggctgagattaagg caggcaagagcctgaagccgacgccccagagcaaggggctgaccacagtgttctcag gcatcgggcagccggccttccagcccgattcgccgctgccttctgtgtcacctgcactgtc accagtccggagccccacaccgccagctgcggggtttcagccgctgctcaatggaagct tggttcccgtgccgcccactactcctgcgccgggagtgcagctggacgtggaggctctca tccccacgcacgatgagcagggccggcccatccccgagtggaagcgccaggtgatggt	39

[0175]

		gcgcaagatgcagctgaagatgcaggaggaggaggagcagaggcggaaggaggag gaggaggaggcccggctggccagcatgcccgcctggaggcgggacctcctgcggaa gaagctggaagaagagagggagcagaagcggaaagaggaggagcgacagaagcag gaggagctgcggcgggagaaggaacagtcagagaagctgcggacgctgggctacgat gagagcaagctggcgccctggcagcgacaggtcatcctgaagaaggggacatcgcta agtactagaggccgcagactcctgtccgcagcctcgcagctccgtggggccctccgccc cagccccagccagccaggccctggtggaaaggctgggagccgcacagccctccctc ctgcgctggaaaccctccctgaccccacccctggcccccgtatccccagcccttggcaa cactggagtgcacacgccgccacggttgcccagaaaaagtgcccaagctgctgacgca aacaacaacaaatgctgcttatttgcatgccgacttacatatatttgcatgttcgttgactatca aagagtgcagagctctccccagccccgtgggtggtgactttgttttcctgcggggctcagc ccctccaggatgcagcccctcccccgcaccccggaaccggcgtcgctggcgcatcc tgggtggaggcaggccccgagctcggggaaggggttttcccttcctctctgacccagatc tgcgcgcggcctagcccgggcctcatttcttatccccgccaagggtttcctctcagtcattt gtttaccagaaacatgaaaactgcctgtctggccgggccgcacttgtggcccccgggacc ccacctctggccccacctccctcaagtctgcgccccgtccccagccagacccactcgctg ccgggacccttcactgccccggtggagtgaatagaggatgaggggccctgaccctgtg tctccaactgctgcaccccatcccgaccctgtctccgccacctcgcagccccattaaagcg ctctcatctgggctccggttcactca	
YWHAQ	NM_006826.3	ttgggcggtggaccgcccctcggccccggggtaggctgacacgggagggtcctcagct aaagccaaaagcagatcaaagtggtgggactcgcgtcgcggccgcggagacgtgaag ctctcgaggctcctcccgctgcgggtcggcgctcgccctcgctctcctcgccctccgccc cggccccggccccgcgcccgccatggagaagactgagctgatccagaaggccaagct ggccgagcaggccgagcgctacgacgacatggccacctgcatgaaggcagtgaccga gcagggcgccgagctgtccaacgaggagcgcaacctgctctccgtggcctacaagaac gtggtcgggggccgcaggtccgcctggagggtcatctctagcatcgagcagaagaccg acacctccgacaagaagttgcagctgattaaggactatcgggagaaagtggagtccgag ctgagatccatctgcaccacggtgctggaattgttggataaatatttaatagccaatgcaact aatccagagagtaaggtcttctatctgaaaatgaagggtgattacttccggtaccttgctga agttgcgtgtggtgatgatcgaaaacaaacgatagataattcccaaggagcttaccaaga ggcatttgatataagcaagaaagagatgcaacccacacacccaatccgcctggggcttgc tcttaacttttctgtattttactatgagattcttaataacccagagcttgcctgcacgctggctaa aacggcttttgatgaggccattgctgaacttgatacactgaatgaagactcatacaaagaca gcaccctcatcatgcagttgcttagagacaacctaacactttggacatcagacagtgcagg agaagaatgtgatgcggcagaaggggctgaaaactaaatccatacagggtgtcatccttc tttccttcaagaaaccttttacacatctccattccttattccacttggatttcctatagcaaaga aacccattcatgtgtatggaatcaactgtttatagtcttttcacactgcagctttgggaaaactt cattccttgatttgtgtttgtcttggccttcctggtgtgcagtactgctgtagaaaagtattaata gcttcatttcatataaacataagtaactcccaaacacttatgtagaggactaaaaatgtatctg gtatttaagtaatctgaaccagttctgcaagtgactgtgttttgtattactgtgaaaataagaaa atgtagttaattacaatttaaagagtattccacataacttcttaatttctacattccctcccttact cttcgggggtttccttcagtaagcaacttttccatgctcttaatgtattccttttagtaggaatc cggaagtattagattgaatggaaaagcacttgccatctctgtctaggggtcacaaattgaaa tggctcctgtatcacatacggaggtcttgtgtatctgtggcaacagggagtttccttattcact ctttatttgctgctgtttaagttgccaacctcccctcccaataaaaattcacttacacctcctgc ctttgtagttctggtattcactttactatgtgatagaagtagcatgttgctgccagaatacaag cattgcttttggcaaattaaagtgcatgtcatttcttaatacactagaaaggggaaataaatta aagtacacaagtccaagtctaaaactttagtacttttccatgcagatttgtgcacatgtgaga gggtgtccagtttgtctagtgattgttatttagagagttggaccactattgtgtgttgctaatca ttgactgtagtcccaaaaaagccttgtgaaaatgttatgccctatgtaacagcagagtaaca taaaataaaagtacattttataaaccatttactatggctttgtaacaattgcatacccatatttta agggacaggtgaatttactacttttctaaagtttattgatacttccctttttatgtaaaatgtagtag tgatacctatatttccacattgtgcattgtgacacacttgtctagggatgcctggaagtgtata aaattggactgcatttcttagagtgttttactatagatcagtctcatgggccatctcttcctcag atgtaaatgatatctggttaagtgttatatggaataaagtggacattttaaaactagcaaagtt	40

			aaaaaaaaaaaaaaaaaaaa	
[0176]	*VPS37A*	NM_001145152.1	gcagagggggcggagagcgcccccgggggcggggcacgcaagtgacggcggcgc gggtggtggagcgctgggcggccaggctccctggctggccggtttgggcgtctgggcc gtgaaggtgggacctcctgttccgggccgcaagtttccctctccagccgcccgccgttcgt agcatgtcccccagaactcggggagcgcaggcaggacaggcttagagaagacgcggt ccccagcgcttgggccacggacgtcccaccccgctcctctgtcgctggagaaccgccg ggccgagccactgggagaagcaggccagagccttccagggcctccggcccgtggacc cgaggaggatgagctggctttttcccctgaccaagagcgcctcctcctccgcggctgggt cccccggtggcctcaccagcctccagcagcagaagcagcgcctgatcgagtccctccg gaactcacactccagattgcttcctccacagtttcctcaggaaaaaccagtgatcagtgttta tccaccaatacgacatcacttaatggataaacaaggagtgtatgttacctctccattagtaaa caattttacaatgcactcagatcttggaaaaattattcagagtctgttggatgagttttggaag aatcctccagttttagctcctacttcaacagcatttccttatctatacagtaacccaagtggga tgtctccttatgcttctcagggttttccatttcttcctccatatcctccacaagaagcaaacagg agtatcacttctttatctgttgctgacactgtttcttcttcaacaacaagtcataccacagccaa gcctgccgctccttcatttggtgtcctttcaaatctgccattacccattcccacagtggatgct tcaataccgacaagccaaaatggttttgggtacaagatgccagatgtccctgatgcatttcc agaactctcagaactaagtgtgtcacaactcacagatatgaatgaacaagaggaggtatta ctagaacagtttctgactttgcctcaactaaaacaaattattaccgacaaagatgacttagta aaaagtattgaggaactagcaagaaaaaatctccttttggagcccagcttggaagccaaa agacaaactgttttagataagtatgaattacttacacagatgaagtccactttcgaaaagaag atgcaaaggcagcatgaacttagtgagagctgtagtgcaagtgcccttcaggcaagattg aaagtagctgcacatgaagctgaggaagaatctgataatattgcagaagacttcttggagg gaaagatggaaatagatgattttctcagtagcttcatggaaaagagaacaatttgccactgt agaagagccaaggaagagaaacttcagcaggcgatagcaatgcacagccaatttcatgc tccactatagattttcctggaaacatgaactgccaagagaggaatgggacacaaaaccaa acactgttttatatttatggtttgcaaactggcatttcatcagtggctaaattcacagatatcctа tatagattgtatacagaactgagactgattttgtaccgattagaatgattgctatgatctttgag aaatttttctgcactatttgcactgaaatgtttatttattgttgataaattgtatcatatttaagttcc actgctgttcctcttaccttgattaaatgcctatgcatgtacttttagctagttttaatattttataa aacttcatttaaatttgtatttttaacttgaagttccatttctttatcaaggatggtatttagatttttt tcctcttaacctttttttcaaaaactattttcaactgtgaggaaaccccttatttttctttctttgtggat aaaactttcaaaagcaatttaagatattcatagtgttaggaaacaccaaacctgcctatgtgc catctcacaaaagaaacttttaatacctacaataaatcaaaagaataaaccagctgttcttat atattgtttcatttttaaaactaaagatgcatttaagaagcaatacaagtaaatattttacctaat aggaaaaaaaaaagttgcctttcatttaaaccattccaacagaaattcttatgctaatttaaaa catatatatatctggtaggtttgtggttggataggttttctaaattcctaatgttaaaaacaatctt tatgttaatatacactaaatctatacacaaaaaaagtcagtgaacttttctgacctttactgtga gttacctttttcctaagaggaaagctatagtaataagtaaaatttaatttttaggcaatcctgattt ttaatgaatttaattgagtgttcttgtatactacattgagcagtttgcttctataccgtgtcacaa aattcatgtatttcttgagaagccctaaaagctcataaaggaaaatgccgtgaactatgtag ctcaggcttggtaaggtgccatctaaattacaaaacaaactaatgcataatttttgcttaaattt catcccagtatgattgtcttcccaacaccagcatatagtatagattgtctgtctttttatatttttt agttcttcctgtacatgtttttggcaataaagttataggaagaacaaaattattttgttagaatta aaacatgcttaatatttagtctgtttgtggagggcaggtattcacgtggactgagatacaatg ttggatacagaaaataactttcattgtcttcctgacactgtgctaaggacatgctgttaaagct tcaaagtgaccagatgaggaaggaataattaattattactcctgatttgtagataactgaggt aagagtgtttcaaatttatgatagtcttttgggtattcagaaaccttttccttatactgcactggc caccagagcttaattttcccagcagttacagcaatgggagatagaacagtctcaatcttttg ccaaccatcaggttcctagaaaccaggtaggtgtatcccataacaagggaggagcatacc acagcccctcatttgattaattcatttgatctatctatgttattaagtacctactaggaataagg cattgtggaaatactatacaaagataaacattgtttagatgcttatctactttccttttcaccaga aaaacagaaaaaaaagaaacattttcttacagagtaaaaatgttctacataatcacatgagt agttcatctcagtgtttttattctttaaagttgaactatcccagtttcattctataccattcattgg ataaccttgttacaacccagtcatgaaacagagcagtgtgatcagttatctgcatttaacaaa	41

[0177]

		tagacaaatcagtttacataaaggttatgtatgtcacccacgatgaaaagaatctgcatttga atatgcccgtatgaatgtgggttctgtttttgcaacagagattaagtgaccatttttttctaatttt atggctatatattttcttcataaaaattggtcacatcggagaagcagtgccacaggaaaaat gaaatgcatgtgaaagtttgtattctgattttacaagatgagatagaaatcagaattaaagag gaatacttaggagttactaggctaatcagtgtacgaatttgtcataggtagagatttaaaggt taatatcttaaaatagaagaaaattctaaatcaatcaatcagtgagatataaactaaacagac ccacttcaaagttgaaagaaatttctaggcataaattgagactaggaaatttatatcagaata gagggtgcttgacacatatatatgcttaaattgaaggacagctcagattcatttttaggagaa gaaagtaaactaatgtgctcttaaagaataaaaatttattctatggtttctgtctctgatcatca ccttccattctataaaaagctcagttactgatttgctgggtcatggtcaaaattcttacctattta tttcatatcaactttaaaaaataaattacttgcattctatatattactaattgggaagtaatatgcc tcaaatcagttttatactggattattccctatgctttaaaccactgctctcaataaaacacttcct gattaatgtttgattattagatattttagtcttgttggggatattttagtcttgttgggttagccatg ctctgaagaatctgtgaaagtacagtaaagttttaataagcaataaatgtaacctttatataa atctcagtgctaggttaacttctaataagcagacgaacatgttacataaattataatgtctgtct tgtaaaaaagttgaggggactaaaagtttatgactctgatatggaagttgtcatattaaaaaa ctacattttaaaacatcaaatatttatactatttgcttttcaaataaaagcatagtgctgtttggc ata	
PRRC2B	NM_013318.3	gcagatcgggagcggtgccgagaaaaatttccttactagatgacatttcatcgcaatgtcc gatcgtttggggcaaattaccaagggcaaggatgggaaaagcaagtactcgactctcag cctgtttgataagtataaaggaaaatcagtagacgcgattagatcctcagttattcctagaca tggcttacagagtcttgggaaagttgctgcagcccggcgcatgccaccgcctgcaaacct gccaagcttgaagtctgaaaacaaaggaaacgaccccaacatcgtgatagtacccaagg acgggacgggatgggcaaacaagcaggatcagcaagacccaaagagttccagtgcga cggcctctcagccgccggagtcgctgccgcagccgggtttgcagaaatctgtctccaattt gcagaaaccgacacagtcaatcagtcaggagaatacaaattcagtgccaggtggaccaa agtcatgggcacagctgaatggaaagccagtaggacacgaaggtggtttaaggggctca agccgactgttatccttctctcccgaggaatttccgacgctgaaagcagctggagggcag gacaaggctggcaaagaaaagggcgtcttagatctgtcgtatgggccaggaccaagcct ccgccctcagaatgtgacaagctggagggagggcggtgggcgacacataatttctgcca cgtctctgagcacctccccaactgagctgggcagcaggaactcgagtacgggagatgga gccccctcctcggcatgtaccagcgattctaaggacccctctctccgcccggctcagcct gtccgaaaaggggcttcacagttcatgggaaatgtataccacccacctacataccatgaca tgcttcctgcttttatgtgttcgccgaagtcatcagaaaaccagggtacagtggaacgagg ctcttttccccttcctcagctccgccttgaacctcgagttccttttagacagttccagatgaatg accaagacggaaaagaaaacaggctgggattgtctcgcccactccgcccactaaggca gctggtggagcgggcaccacggcccaccattatcaatgcggaaaacctgaagggccttg acgatctggacgccgatgccgatgatggctgggcaggcctccatgaagaagtggactatt ctgagaaactgaagttcagtgatgatgaagaggaggaagaagttgtgaaggacggcag gccaaagtggaacagttgggaccctaggaggcagcggcagttgtcaatgagctctgcag acagtgcggacgctaagcggactcgagaggaagggaaggactgggctgaagcagtgg gtgcgtcccgtgtggtccgaaaggcgccagaccctcagccaccgcccaggaagcttcat ggctgggcaccaggccctgactaccagaagtcatcaatgggcagcatgttccggcaaca gtccatcgaggacaaggaggacaagcccccaccaaggcagaagttcattcagtcagag atgtccgaggcggtggagcgagcccgaaagcgccgggaagaagaggagcgccgagc ccgggaggagaggctggccgcctgtgctgccaaactcaagcagctggaccagaagtgt aagcaggcacgaaaggcaggtgaggcccggaagcaggcagagaaggaagtgccctg gtctccaagtgctgagaaggcatctccccaggaaaacggccctgctgtccacaaaggct ccccagaattccctgcccaagagacccccaccacattcccagaagaggcacccacagtg tccccagcagtggcacagagcaacagcagtgaggaagaggccagagaggctgggtcc cctgcacaggagttcaagtatcagaagtcccttcctccccgattccagcgccagcagcag caacaacagcaggagcagctgtacaagatgcagcactggcagccggtgtacccccccgc cgtcccacccccagcgcaccttttacccacaccacccccagatgttgggcttcgatccca ggtggatgatgatgccttcctacatggacccacgtatcacgcccactcggaccccggtgg acttctacccctccgccctgcatccctcaggactgatgaagcccatgatgccccaggagtc	42

[0178]

		cctcaatgggacaggctgtcgctctgaggatcagaactgtgtgcccccactccaagaaag aaaagtgacccccatcgactcacccccctgtgtggagcccagagggctacatggcactgc agagcaagggctacccgctcccgcacccgaagtcgagtgacaccttggctatggacatg cgtgtcaggaatgaaagctctttctctgcctcactcggaagggcaggggggcgtaagtgct cagcgcgatctctttgaggagagaggggaggagtacttgagtgcttttgacaagaaggcc caagcagactttgacagctgtatctcttctcaaagaataggccaggagcttttgtttccaccc caagaaaatgttcaggatgcaggtgctcctgggggtcacacccaaaacctcaggtgttcc ccattggagcctgactttgtcccagatgagaaaaagccagagtgtggcagttgggatgtta gccaccagccagagaccgctgacacagcccatggtgttgagcgggagacaccccggg aggggacggcctttaacatctcctcctgggacaagaacgggagccccaacaaacagcc atcctcggagcctgaatggactcccgagccccggagctccagcagccagcacccggag cagacgggcaggacccggaggtcgggacccatcaagaaaccagtcctgaaagccctc aaggtggaagacaaggagaaggagcttgagaagattaagcaggagctaggggaggag agtacccggctggccaaggagaaggagcagagccccacggcagaaaaggatgagga cgaagagaacgatgcctctctggccaactcctccaccaccactttggaggacaaaggcc ctggccatgccacttttggccgcgaggccaccaaatttgaagaggaggagaaacctgac aaggcctgggaagccagacccccacgagagtccagcgatgttcccccccatgaagagaa ataactggatctttattgatgaggagcaagcctttggggtcagaggacaggcccggggcc ggggccgtggtttcagagagttcacttttcgtggtcggcctgctggcggaaatgggagcg gcctctgtggtgggggggtcctgggggcccgcagcatctactgcagcagtcagcgcag cggccgtggccggggcctgcgagagtttgcgcggccagaggactgccccagagccaa gccccgacggagagttgccagtgagacccatagcgagggctcagagtatgaagaacttc ccaagcgccgccggcagaggggctccgagaacgggaatgaaggctcgctcctggaga gggaggagagcaccttgaagaagggcgactgcagagattcttggcggtccaacaaggg gtgctctgaggaccacagcggtctagatgccaagagccgaggccctcgggcctttgggc gagccctccctccccggctgagcaattgcgggtatggacggagaaccttcgtctccaaag agtcaccccactggcagagcaaaagtccaggcagctcttggcaggaatatggcccttcc gacacatgcggatcccggcgacctacagacagagactatgtcccagattcctacagaca ccctgacgcatttggtggccggggctttgaggacagccgcgcggaggacaagagatcct tcttccaagatgaacacgtggcagattctgaaaatgcagagaaccggcccttcaggagaa ggcgcccccccacgccaagataagccccctcgattccggcgcctccggcaagagcggg agtccctgggcctgtggggacccgaggaggagccccacctgctggcaggtcagtggcc aggcaggcccaaactgtgttctggggacaagagtggcactgtgggccgcaggtcccctg agctctcctaccagaactcctccgatcacgccaatgaggagtgggagacggcctccgaa agcagcgacttcagcgagcggcgggagcggcgggaaggccctgggtccgagcccga ctcccaggtggatggtggcctgtcgggggctagtttgggtgagaagaaggagctggcca agaggagcttctccagtcagagacccgtggttgacagacagagccgaaagctggagcc gggagggtttggggagaagcccgttaggccaggtggtggtgacacctcccctcgctatg agagccaacagaatgggacgcctttgaaagtgaaaagatccccagacgaggccttgcct ggaggtcttagtggctgcagcagtgggagtggccactccccctatgccctggagcgggc agcccatgccagtgctgaccttcccgaagcctccagtaaaaaggcagagaaggaggcc aagttggctgctccgagggcaggtgaacagggagaggccatgaaacagtttgacctgaa ctatggaagtgccatcattgaaaattgcgggtccagccccggggaggagagtgaggtgg gttctatggtgggcgaaggcttcatcgaagtcctgaccaagaagcagcgccgcctgctgg aggaagagagaagaaagaaggagcaggccgtgcaggtgcctgtcaaaggtcgaggcc tttcctcccgtattcctcctcgatttgcaaaaaagcagaacaacttatgtctggagcaaggtg acgtgaccgtgcctggcagcagcctgggcactgagatctgggagagcagcagccagg ctctccctgtgcaggccccagccaacgactcctggaggaaagctgtcactgccttcagca gcaccgagactggctctgcggagcagggttttaagagcagccagggagatagtggcgtt gacttgagtgccgagtctcgggagtcgtctgcgacctcctcgcagcgcagctccccatat gggactctgaagccagaggagatgagcgggcccggcctggcggaacccaaggccga cagccacaaggagcaggctccaaagccatctgagcagaaggattcagaacaaggctct ggacagagcaaggagcacagaccaggacccatcggcaacgagcgttctctgaaaaac agaaagggctcggaggggccgagcggctgcaaggggctgtcgtcccgcctgttaac ggggtggagattcacgtggactccgtgctgcctgtgccacccattgaatttggagtcagtc	

[0179]

		caaaagactccgatttcagcttgccacctggttctgcctctggtcctactgggagtccagtt gttaaacttcaggatgccttggccagtaatgcagggttaacacagagtatccccatcctgc ggcgggaccatcacatccagagggccatcggtctctccccaatgtccttccccaccgccg accttactctgaagatggagtctgcgcgcaaggcttgggaaaactcccccagtttgccgg agcagagctctccaggcggcgctggctcaggcatccagcctccatcctctgtgggtgcct ccagcggggtcaactacagctccttcggtggagtgtccatgccacccatgcctgtggcct ctgtagcaccttctgcttctatgccaggcagccacctcccgcccctgtacctggatggccat gtgtttgcaagtcagccccggctggttcctcaaacgatacctcagcagcagagttaccaac aggccgccgctgcccagcagatcccgatctcccttcacacatctctgcaggcacaagctc agcttggactgaggggtgggcttcctgtgtcccagtcccaggagatcttcagctccttgca gcccttcagatctcaggtgtacatgcaccccagcctgtcaccgcccagcaccatgatcctc tctgggggcacagccttgaagcctccatactcggcgttcccaggcatgcagcccttggag atggtgaagccgcagtctggctcaccctaccagcccatgagcgggaaccaagccctggt ctacgagggccagctcagccaggctgctggcctgggtgcctcccagatgttggactccc agctcccacagctgaccatgccactgcctcggtacggctccgggcagcagccactgatc ctgccccagtctattcagctgccacctgggcagagcctctccgttggggccccccgaagg attcctccgcccgggtcccagccgccagtcctgaacaccagcagagagccctctcagat ggagatgaaaggcttccactttgccgacagtaaacagaatgtcccttcaggaggccccgt gccatcgccacagacctacaggcctagctctgctagccccagtgggaagccctctggat cagcagttaacatgggctctgtgcagggacactacgtgcaacaggcaaaacaacgagtg gatgagaaacccagcctgggagccgtgaagctgcaggaggccccctcggctgcctccc agatgaagcgaaccggagcgatcaagcctcgggctgtcaaagtggaggagagtaagg cctgacagtgcctggctgccacctcgcctctccctactgaggacggtgccgccatgcggc ctcgacacagccgacactcgggagcctcaccagatccaccgtccaaatgcgtggccca gactgagagacctccctcctctccactcccgaaagctccgttgtcaaccagcttgcacccg tggatatatggcattgacccgcttgctttgatacgaaacaaaaaagcagacgactccttcat cccatctgctcctaccgtgactgtggagtgacgcctcctgtgcagtgcagatttgccctccc tgcctcctccctgtcctgccgcgcagccagggcgccttctcagcagtgcttccggcccag ccgcccatccctaggcacagtgatttggcagcagggtcattttactttgaggctttttgtttta aaatgtagccaaggtttttacaaaggggaaaggaaaagaaaacaaaaacgcaagctcca tgtgtatagctgaacttttatatgtttcttgccagcccctccgctcccttccatctctagcctctg tcctgtttagtttgatacgtcactgcagtaccttaagaggtgactcttaagaatgcatccccctc ctgattcctcagctggttcacccttgaggttatttgcaaaaagaaaaggaggttcttgaggg caccgattgcgagcattctggtgcctggctccccgcctgggaagcgatggggtgctcag agcagcaggcaggttgggggaggggggggtcatagttgggttccagctcctggcttga tgagcccagggcgcttacaggcagcccatgaagttgatgacagttttagcatgagaatca cacagggtccctgtcctgggctcctctaaagccagtggatgtgctgggcaccagagaca aatcatggagatggctgctggtggctcccaggttggcccagatggggtgagctgacatac cacaggcccatcccaggccccgtgggctctgcttctggggctccataccctgccctgcag gggtgctgtgtttttcacacatttctttccctgaagccttctgtaacctgtcattttccttccttcct cttccggagcctgctgctttctctggacctgtctccacctcccacacagctcatcgtgaaca ccacttggtgatggagggagtggacccgtgtgtggtccccaagtgaggccactgggagt ttgtccttttcctccttttgcttcactcccagcagcagacccaggttgtcaggacaggagggc ctgagctaagcagtaggcatcagtctcgtttgtcttcagacggcgggggcaggtccaggg tgaggctgggtggagggctgaccaaggtccaaagggcctgcgcagcctccgggaggg cagcttctccagccagaggcttgtgtgagccatcgtgtgctgggcttgtttttaagtaagaa acaaggaaatcactccagattctgtcattccaaggaaagggaaggggacagttcaggttt ctcagctgttcttaggggtcactgagcgtctacctcctcctccagaggaggctggctcaga acacctagaggaggggggccggggatgcacccccccaccagaggctgccttcagcgtctc acgggtgcaggacagcgctcaggcttgggctctaagctctgtgtctagtgtagaacatgg ggaaggagcatcttaggaactgctgaagtaacttcttactgctctcacaattctaaggaagc gggagaacggcctcctaccaacagcgcccacccccagagctgcctgggaaagggcagtt ttactgaaaggtgctttactgttcacctgcatctttcagcagctcccctcctgccctcacctgg tcttttccctctttatcccaagcctttatgcttgagtcccttccccaggggctgcccacccgac agttccaggcattccctacctgagcttcttgtctgcttttccttctcccactgcaagcggctgc	

[0180]

		ttgtggggcctgggatgagccctctctgtccccaccggccctccttgccaagccattcctg ggtgagttcaggcctgcgggagccacacattcatctccacctggacacttgagccgcatg gccagacccctcccacctgatgcggtggtgcgtgtgatttgtcaaaagaaagccttctgga tgctgttaagatgtacccttcaggtgaacctggtatcagacccacagtacttgctgtttgaga aaaaataaaaacaaaaaggtcacctgttctccagccctttttctcttacctggtatttccttcctt tctcctcccccaccccaaataaaaaaacaaaaaacactagaatttatttatatgtattgatgtt gtaggtctaggtgaaaaaaaaagaagtaaatgtttcactgctctatttatatataatgtctgaa ttaattctgtgcaggaaaggccaggaaattgcatgtgaagttcggtgcagtcaccacctgt gtgtgacctgagctgcagtctcttcgctgagatgcaggttttaaatgagacttgggggggctg agggcaggcctcaggcctcccagcgccccaacccctccttggtctaatgaaatgcagttc ttagtgcagagatgttttaaggtgcaatatatctcttcctttcccgtggttttagagccaagctc aaggtagtaggacgtagggtcttattttgttttcaaaccccccatcctcagagcgcagatacat gcagaggcttctgccaggataccacggggccttagtgggaacaggtggagaccagcac ttcccttcctgctgctgaggtagggattgggggtcagaacccactcacttttgcctgttaa agttgccctcctgacgctggcagctctgccttggtcactggggatgcggctcgttgctcag ccaccagtggccttgcggtattgtccaccatccactagagtgggatgaagtccagagtgtg ggtatacatctcagatgcccatctacccactggggacttcaatgccagctgcatttggtttg gttttcttaactgttggcttctccccacagcgttttttgttttttttaaacattcatattgttttcaaa cttggaattcatagacactctggctctaggttccttaaggggggaaaacaaaagatgactttat ttcacattcaagaaaatcagttcagttccaaagctgtggtccttccagccacttctagggaca ctggggaaccttgttaaacgttgacatcagtgctctccagccgtgctgtcaccctcctatctt ctggatctgccttcgcgatggtcagtgacagcttctggaagctgagcacacacaggtgca cagccatgctgtggtctggcctgctacggcagcatggcagctctggtggagccttctccct tgccatttggttcccctgtgccaagtagctgcaggctgcccctcaaatcttcatttgtccctttt cacttcctgcagaacaagcctgggttagagggtctgctggaaatggcctttgaagaccaa ggataccaggatgtgtgcactctgtcgtgttctgtgatgaatgggaaacgtaggcttccag aaagccagctctcttctgaaatgtgacggacctaagcaggaagtcatccaggacaggagt ggctcagtgttggggatggacgctgtcgcccagccatgctccaccagggccaccaatgt gtagttggctggtggtcttcgggcatgtgagacctgctcttcactgtttccaccccacttggt ggcctccaggatggtagtggcaccctcagagccccatcttcagcatgttctgaagcctca gagtggaaattcctgctaaggctctgtgtggacgcctttctcccgtgatctaaaggggaca ctgtactcaagcttttgacctcatgccttgtgtagtaaaaaaggatttgggggttttgtttggtt cctgagagggttgtgttttgtttttgtttcctttttgtttatgttttggccttttcctctttgtctttccatg tagaccagatatttgaaagggcagacgatggctagaggtgtaatgtgcagcttgtttatacg gtattttgggaaacttaccttggatgggaaatcgaatcgtggattcaccaggccggtgctg gcacactcaccctcgccctttccctccggttcagtacctattgtttctccttttcaaatatgtgatt gtactagctctttccatatgaaagaattctccttatttaaataaaaaaagtttaaaaa	
DOPEY 2	NM_005128.3	tcccacagtgcctggcccagaagccttgctaaatatttgaacaggattgcccaatacttttct gctgtgagaatgtaagatggatccagaagagcaggagctcttaaatgattacagatacag aagctactcttcagtgattgaaaaggctttgagaaattttgagtcctcgagtgaatgggcgg atctcatatcttcacttggcaaactcaacaaggctcttcagagtaacctgaggtactccttgtt gccaagacggctcctcatcagcaaaagattagctcagtgtttgcaccctgccctgcccagt ggtgtccacttaaaagctctggaaacctacgagattatctttaaaatcgtggggaccaaatg gctggccaaggacttgtttctgtacagctgcgggttatttcctctcctggcacacgcggcgg tgtcggtgaggccggtgctgctcaccctgtacgagaagtacttcctcccactgcagaagct gctcctgcccagtctgcaggccttcatcgtgggcctgctgcccggccttgaagagggctc cgagatctccgacagaacggatgctctgctcctgagactgtcgctggtggttggcaaaga ggtgttttacaccgccctctgggggagcgtcctggccagcccgtccatccgcctccctgc ctcagtcttcgtggtgggccacatcaacagggatgcccccggccgggagcagaagtaca tgctggggaccaatcaccaactcacggtgaagtctttgcgtgcctccctgttggactcaaat gttcttgtgcaaagaaataatctggaaatcgttctgtttttcttcccattttatacctgtctggatt ccaatgagagagccatccccctcctcagatctgacatcgtgcgcattctctcagccgccac ccagaccctactgagaagggacatgtccctgaacagaagactgtatgcatggttactagg ctcagacataaaaggaaataccgttgtgccagaatctgaaatctcaaattcttatgaagacc agtcgtcttatttttttgaaaaatactccaaggatcttttagttgagggtttggctgagatattgc	43

[0181]

		atcagaagttcatagatgctgacgtggaggaacgccatcatgcatacctgaagccttttcg cgtcctcatcagtctgcttgacaagccagaaatagggcctcaagtggttgggaatttgtttct cgaagtcatcagggccttttattcttactgcagagatgcccttggctctgatcttaaacttagc tacacccagagtggaaattcgctgataagtgcaatcaaggaaaacagaaatgcctctgag attgtcaaaacggtaaatttgctgataacttctctaagcacagactttctctgggattatatga caaggtgttttgaggaatgctttagaccagtgaagcagcgttacagcgtgaggaacagcg tcagccctccccccacggtctcggagctctgcgccctcctggtcttcctgctggatgtcatt cctttggaactttactctgaggtgcaaacccagtatctccctcaggtgctcggctgcctggt gcagcctcttgctgaggacatggaggccttaagtttacctgaactcacgcatgccttgaag acgtgtttcaaggtgctcagcaaagtccagatgcctccttcctacctcgacacggagtcca ccagcggaacctcgagtccagtaaaaggtgaaaacggcaaaataatttttggaaacaaag gcagtgattcccggtgacgaagatgcttcgtttccccctctgaagtctgaggacagtggga tcgggctcagtgcctcgtcaccggagctctctgagcacttgagggttcctcgagtttctctg gaaagggacgacgtttggaagaagggcgggagcatgcagaggacgtttctttgcatcca agagctaatcgccaactttgccagcaagaacatttttggagtacagctgacagcgtcagga gaagaaagcaagtccgaggagcctgcagggaagagggacagggatgggacgcagag cctggcagccaatgattccagcaggaagaactcttgggagcccaagcccatcactgtgc ctcagttcaagcagatgctgtcagacttgttcacagcacgagggtctccattcaagacaaa aagttcagagtcaccatcgtcttcgcccagcagccctgccaggaaaaacgggggagaat gggatgttgagaaggtggtcattgacctgggggttccagggaggaacgcagggaggc ctttgccgccgcctgccacctgctgctggattgtgccactttccctgtctacctgtccgagg aagagaccgagcagctctgtgcaacgctcttccagctgccaggagccggtgattccagtt ttccatcttggctgaagtccctcatgactatttgctgctgtgtgactgactgctacctccagaa cgtggccatttccactctgctggaagtgataaaccattcccagtccctggcgcttgtcattga agacaagatgaaacgctataagagctctggacacaaccctttttttggcaagctgcagatg gtgacggttcctcccattgctccagggatattgaaagtcattgcagagaaaacagatttctat cagagggtggctcgtgtgctttggaatcagctgaacaaagagacccgggagcatcacgt cacctgcgtagaattgttctaccggctgcactgcctggcccctacggccaacatctgcgag gacatcatctgccatgccctcctggaccctgacaagggaacaaggctggaagctctgtttta gattttccgtgatctggcatctgacaagagagatccaaggcagtcgagtaacatctcacaa tcgctcctttgataggtccttgtttgtcgtgctggacagcctggcctgcacggatggtgccat cggtgcggcagcccagggctggctggtgcgtgcgctctccctcggggacgtggctcgc atcctcgaacccgtgctcctgctgctgctgcagccaaaaacccagagaacctccatccac tgcctcaagcaggagaactcggccgatgacttgcaccgttggtttaacaggaagaaaacc tctttcagagaggcatgcgcagtgcccgagcctcaggagagcggctctgaagagcacct gcctctgagccagttcaccacagtggaccgtgaagccatttgggccgaagtggagaagg agcccgagaagtacccgctgcgaggcgagctgagcgaggaagagctgccctactacgt ggagcttccagacaggacggcccacggcgccccggacagcagcgagcacaccgagt ctgcagatacaagctcctgccacacggacagcgagaacacgtcctccttctcctcccctc ccacgacctgcaggagctgagcaacgaagagaactgctgtgcacccatccccatgggg ggcagggcgtaccccaagcgctcggccctgctggcggccttccagtcagaaagcttcaa ggctggggccaagttaagcctggtgcgggtggactcggacaagacgcaggcttctgagt cgttctccagcgacgaggaggcggacttggagctccaggccctcaccacatccaggctg ctaaagcagcagcgggaaaggcaggaggccgtcgaggccttgttcaagcacatcctgct ctacctgcagccctacgactctcggcgggtcctctatgccttctcggtgctggaggctgtg ctcaaaaccaaccctaaggaattcatcgaggctgtgtccaggactagcatggataccagc tccaccgcgcacctcaacctcatctccaacctcctcgctcgccaccaggaggccctcattg gccagagtttctacggaaagctccagacccaggtccccaacgtgtgccccccactctctgc tcctggagctgctcacctacctctgcctgagcttcctgcgctcctactacccttgctatttgaa ggtctcgcaccgagacattctcggcaaccgggacgtgcaggtcaaaagtgtcgaggtttt gatcaggataatgatgcagctggtctcagtggccaagtcttcggaagggaagaacgtgg agttcatccacagcttgctgcagaggtgcaaagttcaggagtttgtcctgctctccctgtcg gcgtccatgtacacgagccagaagcgctacgggctggccaccgcccaccacggcagg gccctgccagaggacagcctctttgaggagagtctcattaacttgggtcaggaccagatct ggagtgagcacccgctgcagattgagctgctgaagctgctgcaggtgctgattgtcttgg	

[0182]

		aacaccacctgggtcgggcccatgaggaggcggaaaaccagcccgacctgtcccggg agtggcagagagccctgaacttccagcaggccatcagcgccctgcagtacgtgcagcc ccacccccctcacctcccagggtcttctggtctctgcggtggtgaggggtctgcagcccgc ctacggttacggcatgcatccggcctgggtgagcttggtcacgcattccttgccctacttcg gaaagtccctgggctggacggtgacacccttttgttgtccagatttgcaaaaacttggatga cttggtcaagcagtatgaaagcgaatctgtgaagctctctgtcagcacaacctccaagagg gaaaacatttctccagattatccactcacccttctagaaggtctaacgaccattagtcatttttt gtcttttggaacaagccaaccaaaacaaaaagaccatggctgcaggtgatcctgccaactt gaggaatgccagaaatgccattttggaagagctgcctcgaactgttaacaccatggccctt ctctggaatgttctcagaaaggaggagactcaaaagagacctgtcgatctcctaggggcc acgaagggatcctcttccgtttactttaaaaccaccaaaaccataagacaaaaaattttaga cttcttaaaccccttgacggcccatcttggggttcagttgacagcggctgttgcggcagtgt ggagcagaaagaaagcccagcgtcacagtaagatgaagattatcccaacggcaagtgc atcccagctaacccttgtcgacttggtgtgtgcactcagcaccctgcagactgacacgctg ctgcacctggtgaaggaggtggtgaagaggccaccccaagtcaaaggggtgatgaga aatcgcccctagtggacattcctgtgttgcagttttgctatgcttttctccaaaggctcccagt accagccttgcaagagaactttttcttcactgttgggagtattgaaagagtctgtacagttgaa tctagccccacctgggtattttctgcttctcagcatgctgaatgactttgtaacaagaactccc aacctggaaaacaagaaggaccaaaaagacctgcaggaaatcactcagaaaatcctag aagctgtggggaacattgccggctcttccttggagcaaaccagctggctaagcagaaacc tggaagtgaaggcccaacctcaggcctctctagaagaatctgatgctgaggaggacctgt atgatgctgctgcagcttcagcaatggtgtcttcatccgccccgtcggtgtacagcgtgca agccctctctctcctggcagaggtactggcttccctcctggacatggtttatcgaagtgatg agaaggagaaagctgtgccgttaatctcccgtctgctttactatgtttttccatacttacgcaa ccacagtgcctacaatgctcccagcttccgggctggcgctcagctgctgagctccctgag tggctatgcctacacaaagcgagcctggaggaaggaggtcctggagctgtttctcgaccc cgctttctttcagatggatacttcctgtgttcattggaagtccattattgaccatcttttgactcat gagaaaacaatgtttaaggatttaatgaacatgcagagcagttctttgaaactattctcaagtt ttgaacagaaagccatgctgttaaagcgccaggcttttgctgtcttcagtggagaacttgat caataccacctttaccttccactgatacaagaacgcctgacagacaatctcagagttggac agacatccatagttgctgctcagatgtttctttttttcagagttttgctgctaagaatatctcctc aacatttgacttcattgtggccaataatggtctctgaattgattcagacattcacacagcttga agaagatctaaaagatgaagatgagtcattgagaagcaccaacaaagtaaacagaacga aagtttcagtcccggatgcaaatggaccctcagtgggggagataccccagagtgaactca tcttgtatttatcagcttgcaaattcttggacacagcgctttcttttccacctgacaagatgcca ttatttcaaatttataggtgggcatttattccagaagtggacacagagggccctgccttcctgt cggatgtagaggagaatcaccaagaatgcaaaccccacactgtcaggattctagaacttc taaaattaaagtttggggaaatcagtagctctgatgagatcaccatgaagagtgaattcccg cttctgcgccaacattctgtttccagcatcaggcagttgatgccattcttcatgactctaaatg gtgcatttaagacccagagacagctgcctgctgatagcccaggaactccattcttggacttt cctgtcacagatagcccaaggatcttaaaacaactggaagaatgcatcgaatatgattttct ggaacatccagaatgttaaccatgtgagagagaatatgtttaatccatgtattggtactttact gaaaaccaggttatattctaaagaagaaagaaggcaggatagtgcttttgaacaagcctat ttccattttgaaagtagatttcaggctaggtgcggtggctcacacctgtaatctcagcactttg ggaggccaaggcaggcagatcacttgaggtcaggagttcgagaccagcctgaccaaca tggtgagaccctgtctctactaaaaatacaaaaattagctgggtgtggtggcggcgcctgt aatcccagctacttgggaggctaaggcatgagaattgcttgaacccaggaggtggaggct gcagtgagccgagatcacgacactgcactccagctgtgtgacagaatgagaccatctcc aaaaaaaaaaaaaagtagatttcagataatttactgttcagcaacaggacacacctccctaa atgccttgtaatatatttgaatctgattctgcatttcttcctcaatttatgtaatgaaaataaaatta atatatcatctaacagtagcacaaaatttgtaatatgaagtaaagtatgaagataatgaagaa gttgttttctttgttgaagcagttatatgggtctttctcagtatatttctcttttctctaaaagtttaa acttattaaaagaatgttatttttaacctttcaaaaaaaaaaa	
NDUFB11	NM_019056.6	gctctggccggccccggcgattggtcaccgcccgctaggggacagccctggcctcctct gattggcaagcgctggccacctccccacacccctttgcgaacgctcccctagtggagaaa	44

[0183]

		aggagtagctattagccaattcggcagggcccgctttttagaagcttgatttcctttgaagat gaaagactagcggaagctctgcctctttccccagtgggcgagggaactcggggcgattg gctgggaactgtatccacccaaatgtcaccgatttcttcctatgcaggaaatgagcagacc catcaataagaaatttctcagcctggccgaaaatggttggccccacgaagccacgacaac tggaggcaaagagggttgctcaacgccccgcctcattggaaaaccaaatcagatctggg acctatatagcgtggcggaggcggggcgatgattgtcgcgctcgcacccactgcagctg cgcacagtcgcatttctttccccgcccctgagaccctgcagcaccatctgtcatggcggct gggctgtttggtttgagcgctcgccgtcttttggcggcagcggcgacgcgagggctcccg gccgcccgcgtccgctgggaatctagcttctccaggactgtggtcgccccgtccgctgtg gcgggaaagcggccccagaaccgaccacaccgtggcaagaggacccagaacccga ggacgaaaacttgtatgagaagaacccagactcccatggttatgacaaggaccccgttttg gacgtctggaacatgcgacttgtcttcttctttggcgtctccatcatcctggtccttggcagca cctttgtggcctatctgcctgactacaggtgcacagggtgtccaagagcgtgggatgggat gaaagagtggtcccgccgcgaagctgagaggcttgtgaaataccgagaggccaatggc cttcccatcatggaatccaactgcttcgacccccagcaagatccagctgccagaggatgag tgaccagttgctaagtggggctcaagaagcaccgccttccccacccccctgcctgccattct gacctcttctcagagcacctaattaaaggggctgaaagtctgaaaaaaaaaaaaaaa	
[0183]	*ND4*	NC_012920.1	atgctaaaactaatcgtcccaacaattatattactaccactgacatgactttccaaaaaacac ataatttgaatcaacacaaccacccacagcctaattattagcatcatccctctactatttttttaa ccaaatcaacaacaacctatttagctgttccccaacctttcctccgaccccctaacaaccc ccctcctaatactaactacctgactcctaccccctcacaatcatggcaagccaacgccactta tccagtgaaccactatcacgaaaaaaactctacctctctatactaatctccctacaaatctcct taattataacattcacagccacagaactaatcatattttatatcttcttcgaaaccacacttatc cccaccttggctatcatcacccgatgaggcaaccagccagaacgcctgaacgcaggcac atacttcctattctacaccctagtaggctcccttccctactcatcgcactaatttacactcaca acaccctaggctcactaaacattctactactcactctcactgcccaagaactatcaaactcct gagccaacaacttaatatgactagcttacacaatagcttttatagtaaagatacctctttacgg actccacttatgactccctaaagcccatgtcgaagcccccatcgctgggtcaatagtacttg ccgcagtactcttaaaactaggcggctatggtataatacgcctcacactcattctcaacccc ctgacaaaacacatagcctacccctttccttgtactatccctatgaggcataattataacaagc tccatctgcctacgacaaacagacctaaaatcgctcattgcatactcttcaatcagccacat agccctcgtagtaacagccattctcatccaaaccccctgaagcttcaccggcgcagtcatt ctcataatcgcccacgggcttacatcctcattactattctgcctagcaaactcaaactacgaa cgcactcacagtcgcatcataatcctctctcaaggacttcaaacttactcccactaatagcttt ttgatgacttctagcaagcctcgctaacctcgccttacccccccactattaacctactgggag aactctctgtgctagtaaccacgttctcctgatcaaatatcactctcctacttacaggactcaa catactagtcacagccctatactccctctacatatttaccacaacacaatggggctcactca cccaccacattaacaacataaaaccctcattcacacgagaaaacaccctcatgttcataca cctatccccccattctcctcctatccctcaaccccgacatcattaccgggttttcctctt	45
	MORF4L1	NM_001265603.1	cggcgtgccctggggcggcgcgggcgcaggggcgcgtgcgcggcgggctgtcgttg gctggagcagcggctgcgcgggtcgcggtgctgtgaggtctgcgggcgctggcaaatc cggcccaggatgtagagctggcagtgcctgacggcgcgtctgacgcggagttgggtgg ggtagagagtaggggcggtagtcgggggtggtgggagaaggaggaggcggcgaat cacttataaatggcgccgaagcaggacccgaagcctaaattccaggaggttgggatgaat gggttccggagagcagagtactcaaatacgtggacaccaatttgcagaaacagcgagaa cttcaaaaagccaatcaggagcagtatgcagaggggaagatgagaggggctgccccag gaaagaagacatctggtctgcaacagaaaaatgttgaagtgaaaacgaaaaagaacaaa cagaaaacacctggaaatggagatggtggcagtaccagtgagacccctcagcctcctcg gaagaaaagggcccgggtagatcctactgttgaaaatgaggaaacattcatgaacagagt tgaagttaaagtaaagattcctgaagagctaaaaccgtggcttgttgatgactgggacttaa ttaccaggcaaaaacagctcttttatcttcctgccaagaagaatgtggattccattcttgagg attatgcaaattacaagaaatctcgtggaaacacagataataaggagtatgcggttaatgaa gttgtggcagggataaaagaatacttcaacgtaatgttgggtacccagctactctataaattt gagagaccacagtatgctgaaattcttgcagatcatcccgatgcacccatgtccaggtgt atggagcgccacatctcctgagattatttgtacgaattggagcaatgttggcttatacacctc	46

[0184]

		tggatgagaagagccttgctttattactcaattatcttcacgatttcctaaagtacctggcaaa gaattctgcaactttgttcagtgccagcgattatgaagtggctcctcctgagtaccatcgga aagctgtgtgagaggcactctcactcacttatgtttggatctccgtaaacacatttttgttctta gtctatctcttgtacaaacgatgtgctttgaagatgttagtgtataacaattgatgtttgttttctg tttgattttaaacagagaaaaaataaaaggggggtaatagctccttttttcttctttctttttttttttc atttcaaaattgctgccagtgttttcaatgatggacaacagagggatatgctgtagagtgtttt attgcctagttgacaaagctgcttttgaatgctggtggttctattcctttgacactacgcacttttt ataatacatgttaatgctatatgacaaaatgctctgattcctagtgccaaaggttcaattcagt gtatataactgaacacactcatccatttgtgctttgtttttttttatggtgcttaaagtaaagagc ccatcctttgcaagtcatccatgttgttacttaggcattttatcttggctcaaattgttgaagaat ggtggcttgtttcatggttttgtatttgtgtctaatgcacgttttaacatgatagacgcaatgca ttgtgtagctagttttctggaaaagtcaatcttttaggaattgtttttcagatcttcaataaattttttt ctttaaatttcaaagaacaaaaaaaaaaaaaaa	
MRPL19	NM_014763.3	gtagtcttgacgtgagctagctggcatggcggcctgcattgcagcggggcactgggctg caatgggcctaggccggagtttccaagccgccaggactctgctccccccgccggcctct atcgcctgcagggtccacgcggggcctgtccggcagcagagcactgggccttccgagc ccggtgcgttccaaccgccgccgaaaccggtcatcgtggacaagcaccgccccgtgga accggaacgcaggttcttgagtcctgaattcattcctcgaaggggaagaacagatcctctg aaatttcaaatagaaagaaaagatatgttagaaaggagaaaagtactccacattccagagt tctatgttggaagtattcttcgtgttactacagctgacccatatgccagtggaaaaatcagcc agtttctggggatttgcattcagagatcaggaagaggacttggagctactttcatccttagg aatgttatcgaaggacaaggtgtcgagatttgctttgaactttataatcctcgggtccaggag attcaggtggtcaaattagagaaacggctggatgatagcttgctatacttacgagatgccct tcctgaatatagcacttttgatgtgaatatgaagccagtagtacaagagcctaaccaaaaag ttcctgttaatgagctgaaagtaaaaatgaagcctaagccctggtctaaacgctgggaacg tccaaattttaatattaaaggaatcagatttgatctttgtttaactgaacagcaaatgaaagaa gctcagaagtggaatcagccatggcttgaatttgatatgatgagggaatatgatacttcaaa aattgaagctgcaatatggaaggaaattgaagcgtcgaaaaggtcttgattctgagaatga atttggttagttgcagaagatacattggctctaagaggatatattttgagaccaatttaatttca tttataagaacatagtaattaagtgaactaagcattcattgttttattaatacttttttctaaaata aaacttgtacaccagtttattactctaaaaagagaattacacatgccaaatggaccaatgtcc atttgcttattggaggcaaagctacaatagaagtcagagcatcaccagaatggtctttaatg agcatggaacctgagcaaagggaataggtgggatgaatttttttttttaattgtgaaacaattc ataagcacaatatgatttacagaataataaacattcatgtacccactatcaggttaagaaata gaacatttattaatatgtaggaatgttaagaaataaaacatttaataagatctcagaagactcc agtaaatctgcaattgtatctctctccttttaaatgtaaatatcatcttgacttgttaattattccc ttgcatttcttttagtttactgccaacacatatattcttcaacaatatatttaattttgaaaaacctg aaaaaaaaaacctgttagcaagtataaaggggcagtattactattattgcatgaaggcttca agggaaacgttacagtctttgggtcatagtctggcttcagcttcctctgagagtttacagag gccaattttgagcaaattcatggctaaggttatgagtgagttctgctaaacagaaggctcac cacaaggtatctggcaggattatactgggtagctggatgttgcagaaatgtggttagagga agtaaactgttttttgatgctcacagcatgatgaatcaaactctgtatcttaggattaggttaaa acaataccttggtatgatatgagtgttgttgctgatccatgcagcatggattggaaagctgg ggtataagcacacatgctaaagaaaaacatgtaatttggtccatactcacctggatatactgt tcctcaggttaaaaaatacagtactatcctaaatcttgaaggcaactctcagcctatccattg agttaccttcagatctgccctctggttcctagctgtcttgggactaacttctttcctgcgctcag ctgttttctggattccatgttttccattttattgagtactaacttgttttgctgcagcacatcctttg gtagcttctagaggaagtttgtgtggaggtaaaatttttgagaccttgcatgtctcatgtttgat tgatactttatacgtttaggtaggaggtaattttccttcaggactttaaaaatattgttgctccatt ttctttgtttctattgttgtattgagaaatccaatgccattttgatttccccatcataaatttcatgat gatgtgtcttggtgtgggtctatatttatccattgtattgggttttaggtgaacccttccagata gtaactcatttctgtcagttctgggaaacacttagcattggttgatgatttattctctgctgcttt gttctcccaactattatttggatgttggatatccagcactgggtatctattttcttacctccctcc cttgaccccagtctctgtttttttagctctttagctcaatcttccaactctttgctattgtatttaaa atcttaagacccccttcttgatttgtagaagttccttttcttacaaccaaaaagcctttatctatgg	47

[0185]

		atttgttcacagataaggggtattcaatatagtgtatttttttttcatttaaaattgtttgcgcatct atttcctccaaatttctttctgtatttatttttttgttgtctatatttcagacttttccaggatatctgata atctttggctgtcttcttatggttgaaagagggactaaaaagcttggaaagcctttgggttgt gggaaggggctgtctttaggattatctgaatgggctttttgggagtcccctcctccacatga atattttggttttgtcagattccctagaatagaggcttccaatctccttcctggaggggtctgtc caggaaggagattgtctaggggtctgtcagacagcagctttcagctacttccttgatctttttt cactaatgattatatagtcatctaactactgtcaacaagtaatagatatcctatccttcacttgtt tagattatttgctgagataacctctcaaaagaacctctcaaaataaaaggttaacaagagcc tatatcttatatttttcttctctttatcttgttagaagatagctattaaaacctgttctttttctgtcttg ataaacacacttcaatcttggtagaatggtagatgggacagtatattttaggacctaaagctc tgcaaatgtatgatcagcttgtaagtacaggtgctcaaaaacatgtaaacaatcatgctttta ctctgtaggaatatctttaaaattcttgtgaatttttccccagaagtaaagcaaatcttccccca gaaataaaattaaatgtgcataatctaaagctttttttttttattgtggtaggatatatatataaaa cataatttgccattgtaaacattttaaatttacaagtcagaggcattaattacatcacaatgttgt gaaattattactactatttccaaaatttttctcatcaccccaaactgaaactctgtaactgttgag caataacctcattcctgtatctctcccaaccccaggtaacctcaaatctttctttttatctttgag acaaggtctcattctatcactcaggtaggagtgcagtggtgtgatcatagctcattgcagcc tcaaaatcctgggctcaagcaatcctccttgagtagctaagactataggcacacattaactg cgcctggctgattttgtttttttgtagagatgtggtcttgctatgtttcccatgctggtcttgagttc ctggcctcaagcagtccttaagattcatccatgttgtggcatgtgtcagaatttcatttgttttta tgactaaataatattccattgtatgtatatacattttgttcatccatcttctgatgaacactgggat atgtctacctttttggctattgtgaataatgctgcagtaaacattgacataacaagtatgtatttg attgcctgtttctaagttctttttgggtatacatcttgagtagaattgctagataatgtcatgttttat ttctcttgtgatttcttcttcgatcccctggttgagtgtgttaatttctacatgtttatgaatttccca ctgtttttttgttattgatttccaagttcattccattgtgattagagaagatacttagtatgattttaa tgtttttgagaattggtgtgtggcctgatagatggtctgtcctggagaatgttcctcatacactt gagcaaaatatttatcatgctattgttgactgtagttttctatatgtctcttaggtcaaggtggttt acaatgtgttaaggttctctttttttaaaaaaatttttgcacagagtatctttttctatgtgttccat gtatttgtgtctttggagctatagtctcttgtagacagcatatcactatcttgttttgttttgttttt ctgtccattctgccaatttctgccttttgattggaaaatttaatccatttgcatttaaagtaattaa ggaaggactttcttctaccatttaacacttcttctatatgtcatatactttttggcccctcatttcc tctttatggccttctttttctgtttttttgtagtgaactagtctgattctctttccactccccttttgtgta tatttgttagatgttttatttgtggttgctatggggattatagttaacatcctacacttaaaacaat ctaatttaaactgataccaatttaccttcaatagcatacaaaatctctactcctgtaaagctctg cccctgccccccttatgttattgatggcacaaattgcctaataaataatttatagttatttgtatg agtttgtcttttaaatcatttaggaaataaaaagtggagttagaaaacagtatgatagtaatac tgacttttatatttgtcaatatatttatcttattttggatccttatttcattatatagatttgagttactg tctagtgcccttccatttcggcccaaaggattcccttatgcatttcttgcagggcaagtctaat tgtaataaactccctcagcttttgttttatctgagaatgtcttgatttctcccttatttttgatggat aattttgccagatacatgaatttttggtaacagtatttttctttcagcactttaaatatgtcatccc actaccttctgacttcatggtttctcatgagatattagatgttataaaatttgaggattcctcatt cttgatgagtcagttctgtcttattgcttttcggatttgctcagcttttgtctttgacagtttgatta taacgcggctcagtgtgggtctctgagtttatcccacttagagtttgttgagtttcttggagtc atagatttatgtcttttatcaaattttggacatatttggctattatttcttcaatttttttcactgcttct ttcttttccttctgaaatattcttaatgtatatgttggtctgtttgatgctgtctcaccagtttcttag gctgtgttctctttgttcctcagacttgattattgcagttgcccttctttttatttttttcaagtttgtt gattcttctccctgttcagatcaactgttgaactcctctagtgaatttatttcagttactgtacttttt cagctccaagatttatctttggttccttttttataacgtctgtgtctttattgatattctcattttgttca tatgtctctttcttcctttagttctttgtccatgttttccttagctctttgggcttatttaagacaatt gtttaaagtctttgcatagtaagtccaatgtctgtgtttcttcagggatggttttcattattttgtttt caatgagccatactttcctgtgtctttgtatgctgtcttttttgttgttgaaaactgtatgtttgaac atcataacgtggtggccctgaaaatcagatattcccccccttcctgagagttagttttatttttatt attgaagattgtagcagtctattgctacatgtgcagtcatttccaaactatttttgcaaagactg tattccttctgtgtgtcatcactgaagtctctgttccttagtttgtgtttaatagtttgacatagatt tccttgaaaggagttaaaactagcagaaaaatctctctcccagtctttccagtctttgtagatt	

[0186]

		ggttctgtgctgggcttttccattaatacttagccaggcttgtactgagcctaacaatcaggc ccaaaagcgtagggtctttgcagatcttgtctgagcatgcttcttgctgtgtatgcacgtagtt ttctaaatctccctgtatgtgctgttgaatattctaatttcccaaagaaactcctttgcagcttttt ctcacagaacatagatggtttttttggatatcttgaccatagtctttcgacccaggtgtttgcgg ttgttagttcaccttacacttttttcaagcattgcctactgcttacgatgagtgctctgtcaatcc tttaagtagccccagacaggctaccagagacttaaacaagaatttgtaagttctgctcagct tcctctagaaatggggatcagggtccaagacagaatgcagttgctgatttcaagactgctg caacaccagggagcttgtgggggaagggcaagcagaaatgtcacaaagctttcttgcca ttttaaagttgcctgttcttgactcagcatttgcttcattgctataaacttttactgtttttcagagt tctgataaaattggctatgcctgttcctgctttaaaaaatatatatatatttttttagggattgggg tctcactatactgaccaggctggtcttgaacttctggcctcaagccatcctctcatttcagctt cccaaagtgctgcaattacacgcgtgaaccaccacacccagcccctgcttgtttttcaatgt gcctactccaccatgttgctcaagtatgtatattttctaaactaccttgtagtgttgtgatggga aataaatccctgagccttttgaataactcagagagatcaaaaacttagtttatcctattcgaag gattagaaaaatgatatatctttcacttttcagggataggctcctcattagaaggctcctatgt gccgatgctgtacaagacatttcatttctcttaatgtttacaacaagcttgttgccaaggctga tcttgaactcctggcctcaaacgatcctcccagctcagtctcacaaagtgttgggatgtctg gccaactaatgactatcttaactcttgtgtttcaatgtttatgccttcttttatcttgactgattgta tgactatgtcttctagaacaatgttgaacagaaatggtgagagcagacatccttgctttaata tttcaccattatatatgatgttaggtatagatttttctcacagatgccttttatcagattgaggaat ttatattcctactttgccgaaaggtttttgtagtatgaggggtgctgaattttgtcaaacacttt ttcggtaataattgagatgattggttctgcagtcatcgagatgtggattttctcctttattctgttc gtgagtgattacactggttgactaatgttaaaacaaccttactttccaggaataaaccctatta tctttttataca	
PSMC4	NM_153001.2	tgcgggtacggacagcgcatgagcttatgttgagggcggagcccagaccagcccttcgt cctatcctgcccttccagcacctctcagccgtaacttaaactacacttcccagaagcctcct cagccagggacttccgttgtcgtcagcggaagcggtgacagatcatcccaggccacaca gaggccggcttggtcactatggaggagataggcatcttggtggagaaggctcaggatga gatcccagcactgtccgtgtcccggccccagaccggcctgtccttcctgggccctgagcc tgaggacctggaggacctgtacagccgctacaaggaggaggtgaagcgaatccaaagc atcccgctggtcatcggacaatttctggaggctgtggatcagaatacagccatcgtgggct ctaccacaggctccaactattatgtgcgcatcctgagcaccatcgatcgggagctgctcaa gcccaacgcctcagtggccctccacaagcacagcaatgcactggtggacgtgctgcccc ccgaagccgacagcagcatcatgatgctcacctcagaccagaagccagatgtgatgtac gcggacatcggaggcatggacatccagaagcaggaggtgcgggaggccgtggagctc ccgctcacgcatttcgagctctacaagcagatcggcatcgatccccccgaggcgtcctc atgtatggcccacctggctgtgggaagaccatgttggcaaaggcggtggcacatcacac aacagctgcattcatccgggtcgtgggctcggagtttgtacagaagtatctgggtgaggg cccccgcatggtccgggatgtgttccgcctggccaaggagaatgcacctgccatcatctt catagacgagattgatgccatcgccaccaagagattcgatgctcagacaggggccgaca gggaggttcagaggatcctgctggagctgctgaatcagatggatggatttgatcagaatgt caatgtcaaggtaatcatggccacaaacagagcagacaccctggatccggccctgctac ggccaggacggctggaccgtaaaattgaatttccacttcctgaccgccgccagaagagat tgattttctccactatcactagcaagatgaacctctctgaggaggttgacttggaagactatg tggcccggccagataagatttcaggagctgatattaactccatctgtcaggagagtggaat gttggctgtccgtgaaaaccgctacattgtcctggccaaggacttcgagaaagcatacaa gactgtcatcaagaaggacgagcaggagcatgagttttacaagtgacccttcccttccctc caccacaccactcaggggctggggcttctctcgcacccccagcacctctgtcccaaaacc tcattccctttttttctttacccaggattggtttcttcaataaatagataagatcgaatccatttaatt tcttcttagaagtttaactcctttggagaatgtgggccttgaataggatcctctgggtccctctt aatctgacagatgagcagacgaggtgcatggcctgggttgcagcttgagagaaccaaaa tattcaaaccagatgacttccaaaatgtggggaaagggatggaaaatgaacctgagatgg agtccttaatcacgggataaagccctgtgcatctccctcatttcctacaggtaaaagacagt aaagaaattcaggtcacaggccttgggagttcataggaaggagatgtccagtgctgtcca gtagaacttt	48

[0187]	*SF3A1*	NM_005877.5	ggtcccggaagtgcgccagtcgtaccttcgcggccgcaactcgctcggccgccgccatc ttgcgagctcgtcgtactgaccgagcggggaggctgtcttgaggcggcaccgctcaccg acaccgaggcggactggcagccctgagcgtcgcagtcatgccggccggacccgtgca ggcggtgcccccgccgccgcccgtgcccacggagcccaaacagcccacagaagaag aagcatcttcaaaggaggattctgcaccttctaagccagttgtggggattatttaccctcctc cagaggtcagaaatattgttgacaagactgccagctttgtggccagaaacgggcctgaatt tgaagctaggatccgacagaacgagatcaacaaccccaagttcaactttctgaaccccaa tgacccttaccatgcctactaccgccacaaggtcagcgagttcaaggaagggaaggctc aggagccgtccgccgccatccccaaggtcatgcagcagcagcagcagaccacccagc agcagctgccccagaaggtccaagcccaagtaatccaagagaccatcgtgcccaaaga gcctcctcctgagtttgagttcattgctgatcctccctctatctcagccttcgacttggatgtg gtgaagctgacggctcagtttgtggccaggaatgggcgccagtttctgacccagctgatg cagaaagagcagcgcaactaccagtttgactttctccgcccacagcacagcctcttcaact acttcacgaagctagtggaacagtacaccaagatcttgattccacccaaaggtttattttcaa agctcaagaaagaggctgaaaaccccgagaagttttggatcaggtgtgttaccgagtgg aatgggccaaattccaggaacgtgagaggaagaaggaagaagaggagaaggagaag gagcgggtggcctatgctcagatcgactggcatgattttgtggtggtggaaacagtggact tccaacccaatgagcaagggaacttccctccccccaccacgccagaggagctgggggc ccgaatcctcattcaggagcgctatgaaaagtttggggagagtgaggaagttgagatgga ggtcgagtctgatgaggaggatgacaaacaggagaaggcggaggagcctccttcccag ctggaccaggacacccaagtacaagatatggatgagggttcagatgatgaagaagaagg gcagaaagtgcccccaccccccagagacacccatgcctccacctctgccccccaactccag accaagtcattgtccgcaaggattatgatcccaaagcctccaagcccttgcctccagcccc tgctccagatgagtatcttgtgtccccccattactggggagaagatccccgccagcaaaatg caggaacacatgcgcattggacttcttgaccctcgctggctggagcagcgggatcgctcc atccgtgagaagcagagcgatgatgaggtgtacgcaccaggtctggatattgagagcag cttgaagcagttggctgagcggcgtactgacatcttcggtgtagaggaaacagccattggt aagaagatcggtgaggaggagatccagaagccagaggaaaaggtgacctgggatggc cactcaggcagcatggcccggacccagcaggctgcccaggccaacatcaccctccagg agcagattgaggccattcacaaggccaaaggcctggtgccagaggatgacactaaaga gaagattggccccagcaagcccaatgaaatccctcaacagccaccgccaccatcttcag ccaccaacatccccagctcggctccacccatcacttcagtgccccgaccacccacaatgc cacctccagttcgtactacagttgtctccgcagtacccgtcatgccccggcccccaatggc atctgtggtccggctgcccccaggctcagtgatcgcccccatgccgcccatcatccacgc gcccagaatcaacgtggtgcccatgcctccctcggcccctcctattatggcccccgccc acccccatgattgtgccaacagcctttgtgcctgctccacctgtggcacctgtcccagctc cagccccaatgccccctgtgcatccccccacctcccatggaagatgagcccacctccaaa aaactgaagacagaggacagcctcatgccagaggaggagttcctgcgcagaaacaagg gtccagtgtccatcaaagtccaggtgcccaacatgcaggataagacggaatggaaactg aatgggcaggtgctggtcttcaccctcccactcacggaccaggtctctgtcattaaggtga agattcatgaagccacaggcatgcctgcagggaaacagaagctacagtatgagggtatct tcatcaaagattccaactcactggcttactacaacatggccaatggcgcagtcatccacctg gccctcaaggagagaggcgggaggaagaagtagacaagaggaacctgctgtcaagtc cctgccattttgcctctcctgtctcccacccccctgccccagacccaggagccccccctgaggg ctttgccttgcctgcatatttgtttcgctcttactcagtttgggaattcaaattgtcctgcagagg ttcattcccctgacccctttccccacattggtaagagtagctgggttttctaagccactctctgg aatctctttgtgttagggtctcgatttgaggacattcatttcttcagcagcccattagcaactga gagcccagggatgtcctacaggatagtttcatagtgacaggtggcacttggctaatagaat atggctgatattgtcattaatcattttgtaccttgacatgggttgtctaataaaactcggaccct tcttgtgaaatcagttaaataagacttgtctcggtcacctgtgccctgtccagactcgaggca gtggtaacactgcacagtgctatgtggcttctctttgaggatttttgggttttgtaactaaattct tgctgccctcatacttttttatgtattagaatcatattcgtattgccctttttaaaacattgggatcct ccaaaggcctgccccatgtatttaacagtaatacaggaagcatggcaggcaccatgcaaa ccaaggatggatggtgcagtccctgtgtcagtgggcggtggtttcctgctggcctggaatc actcatcacctgattgattggctctgtggtcctgggcaggtgcctcataggtgtgtggatatg	49

[0188]

		atgacgtttctttaaaatgtatgtatttaacaaatacttaattgtattaaggtcatgtaccaagga tttgataaagtttaaataatttactctctactttttatccattttatccattttaactcatgtaatcctca tgtgagtattcctgtttaacacttgagtaaactgaggcacagagaacataagttgcatgccat agtcacacactgtgaaagtgaaaagagaatgtgtgcaaaacacgtcacagtcctggtttct gagtaaaggcaggctgttatctttagaatcaagctatcacagggagataggcaatgctgtg ggtgttggaggaaggtgagagcctgttgctaacaatttcctggttttaaagctaaggctgatt ttattgggaagatctcacatgtgtggtgggcccctgagagttcccagtgccttttatttgcagtcc ttccatttggacctcctagctgccccatcaggtcatctccagggctcagaggggtgagacc atttcccaaggtcacagaaccagctctctagtcaccaccctgcctctccctctcacccaga gtcagtaccagttttatggctttattacaaactgctgggtccctcccatttttcaacttgattgat gggatgtcatcccttatcctgtctgacatttgcctctggcctggttgctagaagtttgcccca ggggcaagagttgaaatttggcttcctgaggtgggctttgtggtttgcgtccctaaagtgag cccactactggttgcttgtccatggccaacaccagaaatcccctgagcactacctgggtct cattccaagaaggaagagggtcaggagacctggggagtctcatattccaagttcttctttct ttctgggagcagtgggcagttcatggtgttagggcactcacccccacagactggcaaacc ctgcaggacttccgtggctgaggctgtgaccggaggccaggaatgccgttgggtggatt gtgagtgaatgggccctttgagctgccctctagagagcaaatccagtttcctggagctcct gaatgaatatctgtactggctcgctcagatgcagaagctccattgaccatgaggccttgtga acatcagtggccacaggcccagtgtgctgcttggcactgcactagtttaggacctgcagc atgtaggtagcgtcctagtgtttataatacaaagctgctctgcacagcttttctgattcttcttg caatctcctgaggattatctgccccatttttaaaacgaggtggaatacccaaggtcatgtag ccagtgagtgctctggaaagccaaagcagctcatcccttcctggggaccacactgctctg ctccaccagaccacactatgaaataggaataagtgctcctgttgcaggactgctgggaaa acaggtggtgtgggacttaagtcaccataattttgaagacttgcatgcagagggctccagg aattgtagacattaaggaatttcactttcagttctacccactacttaagtacttgtcatgtactct tagaggaggccagtaatgatcagaaccatttttactttaaaattaataatattgtattagagaat atattaaatggttatattgggttatgttaggatatatacttgaatggaaatacatgtactattagc aatcatatttcatttatccctgtaattagacaagaaagcataatatagctctactcatgggtac acataccagtgtataagatttttagaagtttacttttttaaaaataaaagcaaaatgtaagatctt aaaaaaaaaaaaaaaaaa	
PUM1	NM_001020658.1	agtgggccgccatgttgtcggagtgaaaggtaaggggggagcgagagcgccagagaga gaagatcgggggggctgaaatccatcttcatcctaccgctccgcccgtgttggtggaatga gcgttgcatgtgtcttgaagagaaaagcagtgctttggcaggactctttcagcccccacct gaaacatcaccctcaagaaccagctaatcccaacatgcctgttgttttgacatctggaacag ggtcgcaagcgcagccacaaccagctgcaaatcaggctcttgcagctgggactcactcc agccctgtcccaggatctataggagttgcaggccgttcccaggacgacgctatggtggac tacttctttcagaggcagcatggtgagcagcttgggggaggaggaagtggaggaggcg gctataataatagcaaacatcgatggcctactggggataacattcatgcagaacatcaggt gcgttccatggatgaactgaatcatgattttcaagcacttgctctggagggaagagcgatg ggagagcagctcttgccaggtaaaaagttttgggaaacagatgaatccagcaaagatgg accaaaaggaatattcctgggtgatcaatggcgagacagtgcctggggaacatcagatca ttcagtttcccagccaatcatggtgcagagaagacctggtcagagtttccatgtgaacagtg aggtcaattctgtactgtccccacgatcggagagtgggggactaggcgttagcatggtgg agtatgtgttgagctcatccccgggcgattcctgtctaagaaaaggaggatttggcccaag ggatgcagacagtgatgaaaacgacaaaggtgaaaagaagaacaagggtacgtttgatg gagataagctaggagatttgaaggaggagggtgatgtgatggacaagaccaatggtttac cagtgcagaatgggattgatgcagacgtcaaagattttagccgtacccctggtaattgcca gaactctgctaatgaagtggatcttctgggtccaaaccagaatggttctgagggcttagcc cagctgaccagcaccaatggtgccaagcctgtggaggatttctccaacatggagtcccag agtgtcccctggaccccatggaacatgtgggcatggagcctcttcagtttgattattcagg cacgcaggtacctgtggactcagcagcagcaactgtgggacttttgactacaattctcaa caacagctgttccaaagacctaatgcgcttgctgtccagcagttgacagctgctcagcagc agcagtatgcactggcagctgctcatcagccgcacatcggtttagctcccgctgcgtttgtc ccaatccatacatcatcagcgctgctcccccagggacggacccctacacagctggattg gctgcagcagcgacactaggcccagctgtggtccctcaccagtattatggagttactccct	50

[0189]

		ggggagtctaccctgccagtcttttccagcagcaagctgccgctgccgctgcagcaacta attcagctaatcaacagaccaccccacaggctcagcaaggacagcagcaggttctccgt ggaggagccagccaacgtcctttgaccccaaaccagaaccagcagggacagcaaacg gatccccttgtggcagctgcagcagtgaattctgcccttgcatttggacaaggtctggcag caggcatgccaggttatccggtgttggctcctgctgcttactatgaccaaactggtgccctt gtagtgaatgcaggcgcgagaaatggtcttggagctcctgttcgacttgtagctcctgccc cagtcatcattagttcctcagctgcacaagcagctgttgcagcagccgcagcttcagcaaa tggagcagctggtggtcttgctggaacaacaaatggaccatttcgcccctttaggaacacag cagcctcagccccagccccagcagcagcccaataacaacctggcatccagttctttctac ggcaacaactctctgaacagcaattcacagagcagctccctcttctcccagggctctgccc agcctgccaacacatccttgggattcggaagtagcagttctctcggcgccaccctgggat ccgcccttggagggtttggaacagcagttgcaaactccaacactggcagtggctcccgcc gtgactccctgactggcagcagtgacctttataagaggacatcgagcagcttgaccccat tggacacagtttttataacggccttagcttttcctcctctcctggacccgtgggcatgcctctc cctagtcagggaccaggacattcacagacaccacctccttccctctcttcacatggatcctc ttcaagcttaaacctgggaggactcacgaatggcagtggaagatacatctctgctgctcca ggcgctgaagccaagtaccgcagtgcaagcagcgcctccagcctcttcagcccgagca gcactcttttctcttcctctcgtttgcgatatggaatgtctgatgtcatgccttctggcaggagc aggcttttggaagattttcgaaacaaccggtaccccaatttacaactgcgggagattgctgg acatataatggaatttttcccaagaccagcatgggtccagattcattcagctgaaactggagc gtgccacaccagctgagcgccagcttgtcttcaatgaaatcctccaggctgcctaccaact catggtggatgtgtttggtaattacgtcattcagaagttctttgaatttggcagtcttgaacag aagctggctttggcagaacggattcgaggccacgtcctgtcattggcactacagatgtatg gctgccgtgttatccagaaagctcttgagtttattccttcagaccagcaggtaattaatgaga tggttcgggaactagatggccatgtcttgaagtgtgtgaaagatcagaatggcaatcacgt ggttcagaaatgcattgaatgtgtacagccccagtctttgcaatttatcatcgatgcgtttaag ggacaggtatttgccttatccacacatccttatggctgccgagtgattcagagaatcctgga gcactgtctccctgaccagacactccctattttagaggagcttcaccagcacacagagcag cttgtacaggatcaatatggaaattatgtaatccaacatgtactggagcacggtcgtcctga ggataaaagcaaaattgtagcagaaatccgaggcaatgtacttgtattgagtcagcacaaa tttgcaagcaatgttgtggagaagtgtgttactcacgcctcacgtacggagcgcgctgtgct catcgatgaggtgtgcaccatgaacgacggtccccacagtgccttatacaccatgatgaa ggaccagtatgccaactacgtggtccagaagatgattgacgtggcggagccaggccag cggaagatcgtcatgcataagatccggccccacatcgcaactcttcgtaagtacacctatg gcaagcacattctggccaagctggagaagtactacatgaagaacggtgttgacttagggc ccatctgtggcccccctaatggtatcatctgaggcagtgtcacccgctgttccctcattccc gctgacctcactggcccactggcaaatccaaccagcaaccagaaatgttctagtgtagag tctgagacgggcaagtggttgctccaggattactccctcctccaaaaaaggaatcaaatcc acgagtggaaaagcctttgtaaatttaattttattacacataacatgtactatttttttaattgac taattgccctgctgttttactggtgtataggatacttgtacataggtaaccaatgtacatggga ggccacatattttgttcactgttgtatctatatttcacatgtggaaactttcagggtggttggttt aacaaaaaaaaaaaagctttaaaaaaaaaaagaaaaaaaggaaaaggttttagctcatttgc ctggccggcaagttttgcaaatagctcttccccacctcctcattttagtaaaaaacaaacaaa aacaaaaaaacctgagaagtttgaattgtagttaaatgaccccaaactggcatttaacactg tttataaaaaatatatatatatatatatatatatatatatatgaaaaaggtttcagagttgctaaagct tcagtttgtgacattaagtttatgaaattctaaaaaatgccttttttggagactatattatgctga agaaggctgttcgtgaggaggagatgcgagcacccagaacgtcttttgaggctgggcgg gtgtgattgtttactgcctactggatttttttctattaacattgaaaggtaaaatctgattatttag catgagaaaaaaaaatccaactctgcttttggtcttgcttctataaatatatagtgtatacttgg tgtagactttgcatatatacaaatttgtagtattttcttgttttgatgtctaatctgtatctataatgt accctagtagtcgaacatactttttgattgtacaattgtacatttgtatacctgtaatgtaaatgtg gagaagtttgaatcaacataaacacgttttttggtaagaaaagagaattagccagccctgtg cattcagtgtatattctcacctttatggtcgtagcatatagtgttgtatattgtaaattgtaatttc aaccagaagtaaatttttttctttgaaggaataaatgttctttatacagcctagttaatgtttaaa aagaaaaaaatagcttggttttatttgtcatctagtctcaagtatagcgagattctttctaaatgt	

[0190]

		tattcaagattgagttctcactagtgtttttttaatcctaaaaaagtaatgttttgattttgtgaca gtcaaaaggacgtgcaaaagtctagccttgcccgagctttccttacaatcagagcccctct caccttgtaaagtgtgaatcgcccttccctttgtacagaagatgaactgtattttgcattttgt ctacttgtaagtgaatgtaacatactgtcaattttccttgtttgaatatagaattgtaacactaca cggtgtacatttccagagccttgtgtatatttccaatgaacttttttgcaagcacacttgtaacc atatgtgtataattaacaaacctgtgtatgcttatgcctgggcaactatttttttgtaactcttgtgt agattgtctctaaacaatgtgtgatctttatttttgaaaaatacagaactttggaatctgaaaaaa aaaaaaaaaaaaaaaaaaaaaaaa	
ACTB	NM_001101.4	gagtgagcggcgcggggccaatcagcgtgcgccgttccgaaagttgccttttatggctcg agcggccgcggcggcgccctataaaacccagcggcgcgacgcgccaccaccgccga gaccgcgtccgccccgcgagcacagagcctcgcctttgccgatccgccgcccgtccac acccgccgccagctcaccatggatgatgatatcgccgcgctcgtcgtcgacaacggctc cggcatgtgcaaggccggcttcgcgggcgacgatgccccccgggccgtcttcccctcca tcgtggggcgccccaggcaccagggcgtgatggtgggcatgggtcagaaggattcctat gtgggcgacgaggcccagagcaagagaggcatcctcaccctgaagtaccccatcgagc acggcatcgtcaccaactgggacgacatggagaaaatctggcaccacaccttctacaatg agctgcgtgtggctcccgaggagcaccccgtgctgctgaccgaggcccccctgaaccc caaggccaaccgcgagaagatgacccagatcatgtttgagaccttcaacaccccagcca tgtacgttgctatccaggctgtgctatccctgtacgcctctggccgtaccactggcatcgtg atggactccggtgacggggtcacccacactgtgcccatctacgaggggtatgccctcccc catgccatcctgcgtctggacctggctggccgggacctgactgactacctcatgaagatc ctcaccgagcgcggctacagcttcaccaccacggccgagcgggaaatcgtgcgtgaca ttaaggagaagctgtgctacgtcgcccctggacttcgagcaagagatggccacggctgctt ccagctcctccctggagaagagctacgagctgcctgacggccaggtcatcaccattggc aatgagcggttccgctgccctgaggcactcttccagccttccttcctgggcatggagtcct gtggcatccacgaaactaccttcaactccatcatgaagtgtgacgtggacatccgcaaag acctgtacgccaacacagtgctgtctggcggcaccaccatgtaccctggcattgccgaca ggatgcagaaggagatcactgccctggcacccagcacaatgaagatcaagatcattgct cctcctgagcgcaagtactccgtgtggatcggcggctccatcctggcctcgctgtccacct tccagcagatgtggatcagcaagcaggagtatgacgagtccggcccctccatcgtccac cgcaaatgcttctaggcggactatgacttagttgcgttacacccttttcttgacaaaacctaac ttgcgcagaaaacaagatgagattggcatggctttatttgttttttttgttttgttttggttttttttt ttttttggcttgactcaggatttaaaaactggaacggtgaaggtgacagcagtcggttggag cgagcatccccccaaagttcacaatgtggccgaggactttgattgcacattgttgttttttttaat agtcattccaaatatgagatgcgttgttacaggaagtcccttgccatcctaaaagccacccc acttctctctaaggagaatggcccagtcctctcccaagtccacacaggggaggtgatagc attgctttcgtgtaaattatgtaatgcaaaatttttttaatcttcgccttaatacttttttatttttgtttt attttgaatgatgagccttcgtgcccccccttcccccttttttgtcccccaacttgagatgtatg aaggcttttggtctccctgggagtgggtggaggcagccagggcttacctgtacactgactt gagaccagttgaataaaagtgcacaccttaaaaatgaggaaaaaaaaaaaaaaaaaa	51
GAPD	NM_002046.6	gctctctgctcctcctgttcgacagtcagccgcatcttcttttgcgtcgccagccgagccac atcgctcagacaccatggggaaggtgaaggtcggagtcaacggatttggtcgtattgggc gcctggtcaccagggctgcttttaactctggtaaagtggatattgttgccatcaatgacccct tcattgacctcaactacatggtttacatgttccaatatgattccacccatggcaaattccatgg caccgtcaaggctgagaacgggaagcttgtcatcaatggaaatcccatcaccatcttcca ggagcgagatccctccaaaatcaagtggggcgatgctggcgctgagtacgtcgtggagt ccactggcgtcttcaccaccatggagaaggctggggctcatttgcagggggggagccaaa agggtcatcatctctgccccctctgctgatgccccatgttcgtcatgggtgtgaaccatga gaagtatgacaacagcctcaagatcatcagcaatgcctcctgcaccaccaactgcttagc acccctggccaaggtcatccatgacaactttggtatcgtggaaggactcatgaccacagtc catgccatcactgccacccagaagactgtggatggcccctccgggaaactgtggcgtgat ggccgcggggctctccagaacatcatccctgcctctactggcgctgccaaggctgtggg caaggtcatccctgagctgaacgggaagctcactggcatggccttccgtgtccccactgc caacgtgtcagtggtggacctgacctgccgtctagaaaaacctgccaaatatgatgacatc aagaaggtggtgaagcaggcgtcggagggccccctcaagggcatcctgggctacactg	52

[0191]

		agcaccaggtggtctcctctgacttcaacagcgacacccactcctccacctttgacgctgg ggctggcattgccctcaacgaccactttgtcaagctcatttcctggtatgacaacgaatttgg ctacagcaacagggtggtggacctcatggcccacatggcctccaaggagtaagacccct ggaccaccagccccagcaagagcacaagaggaagagagagaccctcactgctgggg agtccctgccacactcagtcccccaccacactgaatctcccctcctcacagttgccatgta gacccctgaagaggggagggcctagggagccgcaccttgtcatgtaccatcaataaa gtaccctgtgctcaaccagttaaaaaaaaaaaaaaaaaaaa	
[0191]	*GUSB*	NM_000181.3	gtcctcaaccaagatggcgcggatggcttcaggcgcatcacgacaccggcgcgtcacg cgacccgccctacgggcacctcccgcgcttttcttagcgccgcagacggtggccgagcg ggggaccgggaagcatggcccgggggtcggcggttgcctgggcggcgctcgggccg ttgttgtggggctgcgcgctggggctgcagggcgggatgctgtacccccaggagagcc cgtcgcgggagtgcaaggagctggacggcctctggagcttccgcgccgacttctctgac aaccgacgccggggcttcgaggagcagtggtaccggcggccgctgtgggagtcaggc cccaccgtggacatgccagttccctccagcttcaatgacatcagccaggactggcgtctg cggcattttgtcggctgggtgtggtacgaacgggaggtgatcctgccggagcgatggac ccaggacctgcgcacaagagtggtgctgaggattggcagtgcccattcctatgccatcgt gtgggtgaatggggtcgacacgctagagcatgaggggggctacctccccttcgaggcc gacatcagcaacctggtccaggtggggcccctgccctcccggctccgaatcactatcgc catcaacaacacactcacccccaccaccctgccaccagggaccatccaatacctgactg acacctccaagtatcccaagggttactttgtccagaacacatattttgacttttcaactacgc tggactgcagcggtctgtacttctgtacacgacacccaccacctacatcgatgacatcacc gtcaccaccagcgtggagcaagacagtgggctggtgaattaccagatctctgtcaaggg cagtaacctgttcaagttggaagtgcgtcttttggatgcagaaaacaaagtcgtggcgaat gggactgggacccagggccaacttaaggtgccaggtgtcagcctctggtggccgtacct gatgcacgaacgccctgcctatctgtattcattggaggtgcagctgactgcacagacgtca ctggggcctgtgtctgacttctacacactccctgtggggatccgcactgtggctgtcacca agagccagttcctcatcaatgggaaaccttttctatttccacggtgtcaacaagcatgaggat gcggacatccgagggaagggcttcgactggccgctgctggtgaaggacttcaacctgct tcgctggcttggtgccaacgctttccgtaccagccactacccctatgcagaggaagtgatg cagatgtgtgaccgctatgggattgtggtcatcgatgagtgtcccggcgtgggcctggcg ctgccgcagttcttcaacaacgtttctctgcatcaccacatgcaggtgatggaagaagtggt gcgtagggacaagaaccaccccgcggtcgtgatgtggtctgtggccaacgagcctgcgt cccacctagaatctgctggctactacttgaagatggtgatcgctcacaccaaatccttggac ccctcccggcctgtgacctttgtgagcaactctaactatgcagcagacaaggggctccg tatgtggatgtgatctgtttgaacagctactactcttggtatcacgactacgggcacctggag ttgattcagctgcagctggccacccagtttgagaactggtataagaagtatcagaagccca ttattcagagcgagtatggagcagaaacgattgcagggtttcaccaggatccacctctgat gttcactgaagagtaccagaaaagtctgctagagcagtaccatctgggtctggatcaaaaa cgcagaaaatacgtggttggagagctcatttggaattttgccgatttcatgactgaacagtc accgacgagagtgctggggaataaaaaggggatcttcactcggcagagacaaccaaaa agtgcagcgttccttttgcgagagagatactggaagattgccaatgaaaccaggtatcccc actcagtagccaagtcacaatgtttggaaaacagcctgtttacttgagcaagactgatacca cctgcgtgtcccttcctccccgagtcagggcgacttccacagcagcagaacaagtgcctc ctggactgttcacggcagaccagaacgtttctggcctgggttttgtggtcatctattctagca gggaacactaaaggtggaaataaaagattttctattatggaaataaagagttggcatgaaa gtggctactgaaaaaaaaaaaaaaaaaaaaaaaa	53
	RPLP0	NM_001002.3	gtctgacgggcgatggcgcagccaatagacaggagcgctatccgcggtttctgattggct actttgttcgcattataaaaggcacgcgcgggcgcgaggcccttctctcgccaggcgtcct cgtggaagtgacatcgtctttaaaccctgcgtggcaatccctgacgcaccgccgtgatgc ccagggaagacagggcgacctggaagtccaactacttccttaagatcatccaactattgg atgattatccgaaatgtttcattgtgggagcagacaatgtgggctccaagcagatgcagca gatccgcatgtcccttcgcgggaaggctgtggtgctgatgggcaagaacaccatgatgc gcaaggccatccgagggcacctggaaaacaacccagctctggagaaactgctgcctcat atccgggggaatgtgggctttgtgttcaccaaggaggacctcactgagatcagggacatg ttgctggccaataaggtgccagctgctgcccgtgctggtgccattgccccatgtgaagtca	54

[0192]

		ctgtgccagcccagaacactggtctcgggcccgagaagacctccttttccaggctttagg tatcaccactaaaatctccaggggcaccattgaaatcctgagtgatgtgcagctgatcaag actggagacaaagtgggagccagcgaagccacgctgctgaacatgctcaacatctcccc cttctcctttgggctggtcatccagcaggtgttcgacaatggcagcatctacaaccctgaag tgcttgatatcacagaggaaactctgcattctcgcttcctggagggtgtccgcaatgttgcc agtgtctgtctgcagattggctacccaactgttgcatcagtaccccattctatcatcaacggg tacaaacgagtcctggccttgtctgtggagacggattacaccttcccacttgctgaaaaggt caaggccttcttggctgatccatctgcctttgtggctgctgcccctgtggctgctgccacca cagctgctcctgctgctgctgcagccccagctaaggttgaagccaaggaagagtcggag gagtcggacgaggatatgggatttggtctctttgactaatcaccaaaaagcaaccaactta gccagttttatttgcaaaacaaggaaataaaggcttacttctttaaaaagtaaaaaaaaaaaa aaaaaaaaaaaaa	
TFRC	NM_003234.3	agagcgtcgggatatcgggtggcggctcgggacggaggacgcgctagtgtgagtgcg ggcttctagaactacaccgaccctcgtgtcctcccttcatcctgcggggctggctggagcg gccgctccggtgctgtccagcagccatagggagccgcacggggagcgggaaagcggt cgcggccccaggcggggcggccgggatggagcggggccgcgagcctgtggggaag gggctgtggcggcgcctcgagcggctgcaggttcttctgtgtggcagttcagaatgatgg atcaagctagatcagcattctctaacttgtttggtggagaaccattgtcatatacccggttca gcctggctcggcaagtagatggcgataacagtcatgtggagatgaaacttgctgtagatg aagaagaaaatgctgacaataacacaaaggccaatgtcacaaaaccaaaaaggtgtagt ggaagtatctgctatgggactattgctgtgatcgtctttttcttgattggatttatgattggctac ttgggctattgtaaaggggtagaaccaaaaactgagtgtgagagactggcaggaaccga gtctccagtgagggaggagccaggagaggacttccctgcagcacgtcgcttatattggg atgacctgaagagaaagttgtcggagaaactggacagcacagacttcaccggcaccatc aagctgctgaatgaaaattcatatgtccctcgtgaggctggatctcaaaaagatgaaaatct tgcgttgtatgttgaaaatcaatttcgtgaatttaaactcagcaaagtctggcgtgatcaacat tttgttaagattcaggtcaaagacagcgctcaaaactcggtgatcatagttgataagaacgg tagacttgtttacctggtggagaatcctgggggttatgtggcgtatagtaaggctgcaacag ttactggtaaactggtccatgctaattttggtactaaaaaagattttgaggatttatacactcct gtgaatggatctatagtgattgtcagagcagggaaaatcacctttgcagaaaaggttgcaa atgctgaaagcttaaatgcaattggtgtgttgatatacatggaccagactaaatttcccattgt taacgcagaactttcattctttggacatgctcatctggggacaggtgacccttacacacctg gattcccttccttcaatcacactcagtttccaccatctcggtcatcaggattgcctaatatacct gtccagacaatctccagagctgctgcagaaaagctgtttgggaatatggaaggagactgt ccctctgactggaaaacagactctacatgtaggatggtaacctcagaaagcaagaatgtg aagctcactgtgagcaatgtgctgaaagagataaaaattcttaacatctttggagttattaaa ggctttgtagaaccagatcactatgttgtagttggggcccagagagatgcatggggccctg gagctgcaaaatccggtgtaggcacagctctcctattgaaacttgcccagatgttctcagat atggtcttaaaagatgggtttcagcccagcagaagcattatctttgccagttggagtgctgg agactttggatcggttggtgccactgaatggctagagggataccttttcgtccctgcatttaaa ggctttcacttatattaatctggataaagcggttcttggtaccagcaacttcaaggtttctgcc agcccactgttgtatacgcttattgagaaaacaatgcaaaatgtgaagcatccggttactgg gcaatttctatatcaggacagcaactgggccagcaaagttgagaaactcactttagacaat gctgctttccctttccttgcatattctggaatcccagcagtttctttctgtttttgcgaggacaca gattatccttatttgggtaccaccatggacacctataaggaactgattgagaggattcctga gttgaacaaagtggcacgagcagctgcagaggtcgctggtcagttcgtgattaaactaac ccatgatgttgaattgaacctggactatgagaggtacaacagccaactgctttcatttgtga gggatctgaaccaatacagagcagacataaaggaaatgggcctgagtttacagtggctgt attctgctcgtggagacttcttccgtgctacttccagactaacaacagatttcgggaatgctg agaaaacagacagatttgtcatgaagaaactcaatgatcgtgtcatgagagtggagtatca cttcctctctccctacgtatctccaaaagagtctcctttccgacatgtcttctggggctccggc tctcacacgctgccagctttactggagaacttgaaactgcgtaaacaaaataacggtgcttt taatgaaacgctgttcagaaaccagttggctctagctacttggactattcagggagctgcaa atgccctctctggtgacgtttgggacattgacaatgagttttaaatgtgatacccatagcttcc atgagaacagcagggtagtctggtttctagacttgtgctgatcgtgctaaattttcagtaggg	55

[0193]

		ctacaaaacctgatgttaaaattccatcccatcatcttggtactactagatgtctttaggcagc agcttttaatacagggtagataacctgtacttcaagttaaagtgaataaccacttaaaaaatg tccatgatggaatattcccctatctctagaatttaagtgctttgtaatgggaactgcctctttcc tgttgttgttaatgaaaatgtcagaaaccagttatgtgaatgatctctctgaatcctaagggct ggtctctgctgaaggttgtaagtggtcgcttactttgagtgatcctccaacttcatttgatgcta aataggagataccaggttgaaagaccttctccaaatgagatctaagcctttccataaggaat gtagctggtttcctcattcctgaaagaaacagttaactttcagaagagatgggcttgttttctt gccaatgaggtctgaaatggaggtccttctgctggataaaatgaggttcaactgttgattgc aggaataaggccttaatatgttaacctcagtgtcatttatgaaaagaggggaccagaagcc aaagacttagtatattttctttttcctctgtcccttcccccataagcctccatttagttctttgttattt ttgtttcttccaaagcacattgaaagagaaccagtttcaggtgtttagttgcagactcagtttg tcagactttaaagaataatatgctgccaaattttggccaaagtgttaatcttaggggagagct ttctgtccttttggcactgagatatttattgtttatttatcagtgacagagttcactataaatggtg ttttttaatagaatataattatcggaagcagtgccttccataattatgacagttatactgtcggt ttttttaaataaaagcagcatctgctaataaaacccaacagatactggaagttttgcatttatg gtcaacacttaagggttttagaaaacagccgtcagccaaatgtaattgaataaagttgaagc taagatttagagatgaattaaatttaattaggggttgctaagaagcgagcactgaccagata agaatgctggttttcctaaatgcagtgaattgtgaccaagttataaatcaatgtcacttaaag gctgtggtagtactcctgcaaaattttatagctcagtttatccaaggtgtaactctaattcccat tttgcaaaatttccagtacctttgtcacaatcctaacacattatcgggagcagtgtcttccata atgtataaagaacaaggtagtttttacctaccacagtgtctgtatcggagacagtgatctcca tatgttacactaagggtgtaagtaattatcgggaacagtgtttcccataattttcttcatgcaat gacatcttcaaagcttgaagatcgttagtatctaacatgtatcccaactcctataattccctatc ttttagttttagttgcagaaacattttgtggtcattaagcattgggtgggtaaattcaaccactg taaaatgaaattactacaaaatttgaaatttagcttgggtttttgttacctttatggtttctccagg tcctctacttaatgagatagtagcatacatttataatgtttgctattgacaagtcattttaacttta tcacattatttgcatgttacctcctataaacttagtgcggacaagttttaatccagaattgacct tttgacttaaagcagagggactttgtatagaaggtttgggggctgtggggaaggagagtcc cctgaaggtctgacacgtctgcctacccattcgtggtgatcaattaaatgtaggtatgaataa gttcgaagctccgtgagtgaaccatcattataaacgtgatgatcagctgtttgtcatagggc agttggaaacggcctcctagggaaaagttcatagggtctcttcaggttcttagtgtcacttac ctagatttacagcctcacttgaatgtgtcactactcacagtctctttaatcttcagttttatcttta atctcctcttttatcttggactgacatttagcgtagctaagtgaaaaggtcatagctgagattc ctggttcgggtgttacgcacacgtacttaaatgaaagcatgtggcatgttcatcgtataaca caatatgaatacagggcatgcattttgcagcagtgagtctcttcagaaaaccctttctacag ttagggttgagttacttcctatcaagccagtacgtgctaacaggctcaatattcctgaatgaa atatcagactagtgacaagctcctggtcttgagatgtcttctcgttaaggagatgggccttttt ggaggtaaaggataaaatgaatgagttctgtcatgattcactattctagaacttgcatgacct ttactgtgttagctctttgaatgttcttgaaattttagactttctttgtaaacaaatgatatgtcctt atcattgtataaaagctgttatgtgcaacagtgtggagattccttgtctgatttaataaaatact taaacactgaaaaaaaaaaa	
18S	X03205.1	tacctggttgatcctgccagtagcatatgcttgtctcaaagattaagccatgcatgtctaagt acgcacggccggtacagtgaaactgcgaatggctcattaaatcagttatggttcctttggtc gctcgctcctctcccacttggataactgtggtaattctagagctaatacatgccgacgggcg ctgaccccctcgcgggggggatgcgtgcatttatcagatcaaaaccaacccggtcagcc cctctccggccccggccgggggcgggcgccggcggctttggtgactctagataacctc gggccgatcgcacgccccccgtggcggcgacgacccattcgaacgtctgccctatcaac tttcgatggtagtcgccgtgcctaccatggtgaccacgggtgacggggaatcagggttcg attccggagagggagcctgagaaacggctaccacatccaaggaaggcagcaggcgcg caaattacccactcccgacccggggaggtagtgacgaaaaataacaatacaggactcttt cgaggccctgtaattggaatgagtccactttaaatcctttaacgaggatccattggagggca agtctggtgccagcagccgcggtaattccagctccaatagcgtatattaaagttgctgcagt taaaaagctcgtagttggatcttgggagcgggcgggcggtccgccgcgaggcgagcca ccgcccgtccccgcccccttgcctctcggcgcccccctcgatgctcttagctgagtgtcccgc ggggcccgaagcgtttactttgaaaaaattagagtgttcaaagcaggcccgagccgcctg	56

		gataccgcagctaggaataatggaataggaccgcggttctattttgttggttttcggaactg aggccatgattaagagggacggccgggggcattcgtattgcgccgctagaggtgaaatt cttggaccggcgcaagacggaccagagcgaaagcatttgccaagaatgttttcattaatca agaacgaaagtcggaggttcgaagacgatcagataccgtcgtagttccgaccataaacg atgccgaccggcgatgcggcggcgttattcccatgacccgccgggcagcttccgggaa accaaagtctttgggttccgggggggagtatggttgcaaagctgaaacttaaaggaattgac ggaagggcaccaccaggagtggagcctgcggcttaatttgactcaacacgggaaacctc acccggcccggacacggacaggattgacagattgatagctctttctcgattccgtgggtg gtggtgcatggccgttcttagttggtggagcgatttgtctggttaattccgataacgaacga gactctggcatgctaactagttacgcgacccccgagcggtcggcgtccccaacttcttag agggacaagtggcgttcagccacccgagattgagcaataacaggtctgtgatgcccttag atgtccggggctgcacgcgcgctacactgactggctcagcgtgtgcctaccctacgccg gcaggcgcgggtaacccgttgaaccccattcgtgatggggatcggggattgcaattattc cccatgaacgaggaattcccagtaagtgcgggtcataagcttgcgttgattaagtccctgc cctttgtacacaccgcccgtcgctactaccgattggatggtttagtgaggccctcggatcg gccccgccgggggtcggcccacggccctggcggagcgctgagaagacggtcgaacttg actatctagaggaagtaaaagtcgtaacaaggtttccgtaggtgaacctgcggaaggatc atta	
[0194]	*PPIA*	NM_021130.4	ggggccgaacgtggtataaaaggggcgggaggccaggctcgtgccgttttgcagacgc caccgccgaggaaaaccgtgtactattagccatggtcaaccccaccgtgttcttcgacatt gccgtcgacggcgagcccttgggccgcgtctcctttgagctgtttgcagacaaggtccca aagacagcagaaaattttcgtgctctgagcactggagagaaaggatttggttataagggtt cctgctttcacagaattattccagggtttatgtgtcagggtggtgacttcacacgccataatg gcactggtggcaagtccatctatggggagaaatttgaagatgagaacttcatcctaaagca tacgggtcctggcatcttgtccatggcaaatgctggacccaacacaaatggttcccagttttt catctgcactgccaagactgagtggttggatggcaagcatgtggtgtttggcaaagtgaaa gaaggcatgaatattgtggaggccatggagcgctttgggtccaggaatggcaagaccag caagaagatcaccattgctgactgtggacaactcgaataagtttgacttgtgttttatcttaac caccagatcattccttctgtagctcaggagagcacccctccaccccatttgctcgcagtatc ctagaatctttgtgctctcgctgcagttccctttgggttccatgttttccttgttccctcccatgc ctagctggattgcagagttaagtttatgattatgaaataaaaactaaataacaattgtcctcgt ttgagttaagagtgttgatgtaggctttatttaagcagtaatgggttacttctgaaacatcact tgtttgcttaattctacacagtacttagatttttttactttccagtcccaggaagtgtcaatgttt gttgagtggaatattgaaaatgtaggcagcaactgggcatggtggctcactgtctgtaatgt attacctgaggcagaagaccacctgagggtaggagtcaagatcagcctgggcaacatag tgagacgctgtctctacaaaaaataattagcctggcctggtggtgcatgcctagtcctagct gatctggaggctgacgtgggaggattgcttgagcctagagtgagctattatcatgccactg tacagcctgggtgttcacagatcttgtgtctcaaaggtaggcagaggcaggaaaagcaag gagccagaattaagaggttgggtcagtctgcagtgagttcatgcatttagaggtgttcttca agatgactaatgtcaaaaattgagacatctgttgcggttttttttttttttttttccctggaatgc agtggcgtgatctcagctcactgcagcctccgcctcctgggttcaagtgattctagtgcctc agcctcctgagtagctgggataatgggcgtgtgccaccatgcccagctaatttttgtatttttt agtatagatggggtttcatcattttgaccaggctggtctcaaactcttgacctcagctgatgc gcctgccttggcctcccaaactgctgagattacagatgtgagccaccgcaccctacctcat tttctgtaacaaagctaagcttgaacactgttgatgttcttgagggaagcatattgggctttag gctgtaggtcaagtttatacatcttaattatggtggaattcctatgtagagtctaaaaagccag gtacttggtgctacagtcagtctccctgcagagggttaaggcgcagactacctgcagtga ggaggtactgcttgtagcatatagagcctctccctagctttggttatggaggctttgaggtttt gcaaacctgaccaatttaagccataagatctggtcaaagggatacccttcccactaaggac ttggtttctcaggaaattatatgtacagtgcttgctggcagttagatgtcaggacaatctaag ctgagaaaaccccttctctgcccaccttaacagacctctagggttcttaacccagcaatcaa gtttgcctatcctagaggtggcggatttgatcatttggtgtgttgggcaatttttgttttactgtc tggttccttctgcgtgaattaccaccaccaccacttgtgcatctcagtcttgtgtgttgtctggt tacgtattccctgggtgataccattcaatgtcttaatgtacttgtggctcagacctgagtgcaa ggtggaaataaacatcaaacatcttttcattatcccta	57

[0195]

PGK1	NM_000291.3	gagagcagcggccgggaaggggcggtgcgggaggcggggtgtggggcggtagtgt gggccctgttcctgcccgcgcggtgttccgcattctgcaagcctccggagcgcacgtcgg cagtcggctccctcgttgaccgaatcaccgacctctctccccagctgtatttccaaaatgtc gctttctaacaagctgacgctggacaagctggacgttaaagggaagcgggtcgttatgag agtcgacttcaatgttcctatgaagaacaaccagataacaaacaaccagaggattaaggct gctgtcccaagcatcaaattctgcttggacaatggagccaagtcggtagtccttatgagcc acctaggccggcctgatggtgtgcccatgcctgacaagtactccttagagccagttgctgt agaactcaaatctctgctgggcaaggatgttctgttcttgaaggactgtgtaggcccagaa gtggagaaagcctgtgccaacccagctgctgggtctgtcatcctgctggagaacctccgc tttcatgtggaggaagaagggaagggaaaagatgcttctgggaacaaggttaaagccga gccagccaaaatagaagctttccgagcttcactttccaagctaggggatgtctatgtcaatg atgcttttggcactgctcacagagcccacagctccatggtaggagtcaatctgccacagaa ggctggtgggtttttgatgaagaaggagctgaactactttgcaaaggccttggagagccca gagcgacccttcctggccatcctgggcggagctaaagttgcagacaagatccagctcatc aataatatgctggacaaagtcaatgagatgattattggtggtggaatggcttttaccttcctta aggtgctcaacaacatggagattggcacttctctgtttgatgaagagggagccaagattgt caaagacctaatgtccaaagctgagaagaatggtgtgaagattaccttgcctgttgactttg tcactgctgacaagtttgatgagaatgccaagactggccaagccactgtggcttctggcat acctgctggctggatgggcttggactgtggtcctgaaagcagcaagaagtatgctgaggc tgtcactcgggctaagcagattgtgtggaatggtcctgtgggggtatttgaatgggaagctt ttgccccggggaaccaaagctctcatggatgaggtggtgaaagccacttctaggggctgca tcaccatcataggtggtggagacactgccacttgctgtgccaaatggaacacggaggata aagtcagccatgtgagcactgggggtggtgccagtttggagctcctggaaggtaaagtcc ttcctggggtggatgctctcagcaatatttagtactttcctgccttttagttcctgtgcacagcc cctaagtcaacttagcattttctgcatctccacttggcattagctaaaaccttccatgtcaaga ttcagctagtggccaagagatgcagtgccaggaacccttaaacagttgcacagcatctca gctcatcttcactgcaccctggatttgcatacattcttcaagatcccatttgaatttttagtgac taaaccattgtgcattctagagtgcatatatttatattttgcctgttaaaaagaaagtgagcagt gttagcttagttctcttttgatgtaggttattatgattagctttgtcactgtttcactactcagcatg gaaacaagatgaaattccatttgtaggtagtgagacaaaattgatgatccattaagtaaaca ataaaagtgtccattgaaaccgtgatttttttttttttcctgtcatactttgttaggaagggtgag aatagaatcttgaggaacggatcagatgtctatattgctgaatgcaagaagtggggcagca gcagtggagagatgggacaattagataaatgtccattctttatcaagggcctactttatggc agacattgtgctagtgcttttattctaacttttatttttatcagttacacatgatcataatttaaaaa gtcaaggcttataacaaaaaagccccagcccattcctcccattcaagattcccactcccca gaggtgaccactttcaactcttgagttttcaggtatatacctccatgtttctaagtaatatgctt atattgttcacttctttttttttattttttaaagaaatctatttcataccatggaggaaggctctgtt ccacatatatttccacttcttcattctctcggtatagttttgtcacaattatagattagatcaaaa gtctacataactaatacagctgagctatgtagtatgctatgattaaatttacttatgtaaaaaaa aaaaaaaaaaa	58
RPL13A	NM_012423.3	cacttctgccgcccctgtttcaagggataagaaaccctgcgacaaaacctcctccttttcca agcggctgccgaagatggcggaggtgcaggtcctggtgcttgatggtcgaggccatctc ctgggccgcctggcggccatcgtggctaaacaggtactgctgggccggaaggtggtggt cgtacgctgtgaaggcatcaacatttctggcaatttctacagaaacaagttgaagtacctgg ctttcctccgcaagcggatgaacaccaaccttcccgaggcccctaccacttccgggccc ccagccgcatcttctggcggaccgtgcgaggtatgctgccccacaaaaccaagcgagg ccaggccgctctggaccgtctcaaggtgtttgacggcatcccaccgccctacgacaaga aaaagcggatggtggttcctgctgccctcaaggtcgtgcgtctgaagcctacaagaaagtt tgcctatctggggcgcctggctcacgaggttggctggaagtaccaggcagtgacagcca ccctggaggagaagaggaaagagaaagccaagatccactaccggaagaagaaacagc tcatgaggctacggaaacaggccgagaagaacgtggagaagaaaattgacaaatacac agaggtcctcaagacccacggactcctggtctgagcccaataaagactgttaattcctcat gcgttgcctgcccttcctccattgttgccctggaatgtacgggacccaggggcagcagca gtccaggtgccacaggcagccctgggacataggaagctgggagcaaggaaagggtctt agtcactgcctcccgaagttgcttgaaagcactcggagaattgtgcaggtgtcatttatctat	59

[0196]

		gaccaataggaagagcaaccagttactatgagtgaaagggagccagaagactgattgga gggccctatcttgtgagtggggcatctgttggactttccacctggtcatatactctgcagctg ttagaatgtgcaagcacttggggacagcatgagcttgctgttgtacacagggtatttctaga agcagaaatagactgggaagatgcacaaccaaggggttacaggcatcgcccatgctcct cacctgtattttgtaatcagaaataaattgcttttaaagaaaaaaaaaaaaaaaaaa	
B2M	NM_004048.2	aatataagtggaggcgtcgcgctggcgggcattcctgaagctgacagcattcgggccga gatgtctcgctccgtggccttagctgtgctcgcgctactctctctttctggcctggaggctat ccagcgtactccaaagattcaggtttactcacgtcatccagcagagaatggaaagtcaaat ttcctgaattgctatgtgtctgggtttcatccatccgacattgaagttgacttactgaagaatg gagagagaattgaaaaagtggagcattcagacttgtctttcagcaaggactggtctttctat ctcttgtactacactgaattcacccccactgaaaaagatgagtatgcctgccgtgtgaacca tgtgactttgtcacagcccaagatagttaagtgggatcgagacatgtaagcagcatcatgg aggtttgaagatgccgcatttggattggatgaattccaaattctgcttgcttgcttttaatattg atatgcttatacacttacactttatgcacaaaatgtagggttataataatgttaacatggacatg atcttctttataattctactttgagtgctgtctccatgtttgatgtatctgagcaggttgctccaca ggtagctctaggagggctggcaacttagaggtggggagcagagaattctcttatccaaca tcaacatcttggtcagatttgaactcttcaatctcttgcactcaaagcttgttaagatagttaag cgtgcataagttaacttccaatttacatactctgcttagaatttgggggaaaatttagaaatat aattgacaggattattggaaatttgttataatgaatgaaacattttgtcatataagattcatattt acttcttatacatttgataaagtaaggcatggttgtggttaatctggtttatttttgttccacaagt taaataaatcataaaacttgatgtgttatctctta	60
YWHAZ	NM_003406.3	ctttctccttccccttcttccgggctcccgtcccggctcatcacccggcctgtggcccactcc caccgccagctggaaccctggggactacgacgtccctcaaaccttgcttctaggagataa aaagaacatccagtcatggataaaaatgagctggttcagaaggccaaactggccgagca ggctgagcgatatgatgacatggcagcctgcatgaagtctgtaactgagcaaggagctga attatccaatgaggagaggaatcttctctcagttgcttataaaaatgttgtaggagcccgtag gtcatcttggagggtcgtctcaagtattgaacaaaagacggaaggtgctgagaaaaaaca gcagatggctcgagaatacagagagaaaattgagacggagctaagagatatctgcaatg atgtactgtctcttttggaaaagttcttgatccccaatgcttcacaagcagagagcaaagtctt ctatttgaaaatgaaaggagattactaccgttacttggctgaggttgccgctggtgatgaca agaaagggattgtcgatcagtcacaacaagcataccaagaagcttttgaaatcagcaaaa aggaaatgcaaccaacacatcctatcagactgggtctggcccttaacttctctgtgttctatt atgagattctgaactccccagagaaagcctgctctcttgcaaagacagcttttgatgaagcc attgctgaacttgatacattaagtgaagagtcatacaaagacagcacgctaataatgcaatt actgagagacaacttgacattgtggacatcggatacccaaggagacgaagctgaagcag gagaaggaggggaaaattaaccggccttccaacttttgtctgcctcattctaaaatttacac agtagaccatttgtcatccatgctgtcccacaaatagtttttgtttacgatttatgacaggttta tgttacttctatttgaatttctatatttcccatgtggtttttatgtttaatattaggggagtagagcc agttaacatttagggagttatctgttttcatcttgaggtggccaatatggggatgtggaatttttt atacaagttataagtgtttggcatagtacttttggtacattgtggcttcaaaagggccagtgta aaactgcttccatgtctaagcaaagaaaactgcctacatactggtttgtcctggcggggaat aaaagggatcattggttccagtcacaggtgtagtaattgtgggtactttaaggtttggagca cttacaaggctgtggtagaatcataccccatggataccacatattaaaccatgtatatctgtg gaatactcaatgtgtacacctttgactacagctgcagaagtgttcctttagacaaagttgtga cccattttactctggataagggcagaaacggttcacattccattatttgtaaagttacctgctg ttagctttcattatttttgctacactcattttatttgtatttaaatgttttaggcaacctaagaacaa atgtaaaagtaaagatgcaggaaaaatgaattgcttggtattcattacttcatgtatatcaagc acagcagtaaaacaaaaacccatgtatttaacttttttttaggatttttgcttttgtgatttttttttt ttgatacttgcctaacatgcatgtgctgtaaaaatagttaacagggaaataacttgagatgat ggctagctttgtttaatgtcttatgaaattttcatgaacaatccaagcataattgttaagaacac gtgtattaaattcatgtaagtggaataaaagttttatgaatggacttttcaactactttctctaca gcttttcatgtaaattagtcttggttctgaaacttctctaaaggaaattgtacatttttttgaaattta ttccttattccctcttggcagctaatgggctcttaccaagtttaaacacaaaatttatcataaca aaaatactactaatataactactgtttccatgtcccatgatccccctctcttcctccccaccctga aaaaaatgagttcctatttttttctgggagagggggggattgattagaaaaaaatgtagtgtgt	61

[0197]

		tccatttaaaattttggcatatggcattttctaacttaggaagccacaatgttcttggcccatca tgacattgggtagcattaactgtaagttttgtgcttccaaatcacttttttggtttttaagaatttctt gatactcttatagcctgccttcaattttgatccttttattctttctatttgtcaggtgcacaagatta ccttcctgttttagccttctgtcttgtcaccaaccattcttacttggtggccatgtacttggaaaa aggccgcatgatctttctggctccactcagtgtctaaggcaccctgcttcctttgcttgcatc ccacagactatttccctcatcctatttactgcagcaaatctctccttagttgatgagactgtgtt tatctccctttaaaaccctacctatcctgaatggtctgtcattgtctgcctttaaaatccttcctct ttcttcctcctctattctctaaataatgatggggctaagttatacccaaagctcactttacaaaa tatttcctcagtactttgcagaaaacaccaaacaaaaatgccattttaaaaaaggtgtatttttt cttttagaatgtaagctcctcaagagcagggacaatgttttctgtatgttctattgtgcctagta cactgtaaatgctcaataaatattgatgatgggaggcagtgagtcttgatgataagggtgag aaactgaaatcccaaacactgttttgttgcttgttttattatgacctcagattaaattgggaaat attggccctttgaataattgtcccaaatattacattcaaataaaagtgcaatggagaaaaaa aaaaa	
SDHA	NM_004168.3	actgcagccccgctcgactccggcgtggtgcgcaggcgcggtatccccctccccgc cagctcgaccccggtgtggtgcgcaggcgcagtctgcgcagggactggcgggactgc gcggcggcaacagcagacatgtcgggggtccggggcctgtcgcggctgctgagcgct cggcgcctggcgctggccaaggcgtggccaacagtgttgcaaacaggaacccgaggtt ttcacttcactgttgatgggaacaagagggcatctgctaaagtttcagattccatttctgctca gtatccagtagtggatcatgaatttgatgcagtggtggtaggcgctggaggggcaggctt gcgagctgcatttggcctttctgaggcagggtttaatacagcatgtgttaccaagctgtttcc taccaggtcacacactgttgcagcacagggaggaatcaatgctgctctggggaacatgg aggaggacaactggaggtggcatttctacgacaccgtgaagggctccgactggctggg ggaccaggatgccatccactacatgacggagcaggccccgccgccgtggtcgagcta gaaaattatggcatgccgtttagcagaactgaagatgggaagatttatcagcgtgcatttgg tggacagagcctcaagtttggaaagggcgggcaggcccatcggtgctgctgtgtggctg atcggactggccactcgctattgcacaccttatatggaaggtctctgcgatatgataccagc tattttgtggagtattttgccttggatctcctgatggagaatggggagtgccgtggtgtcatc gcactgtgcatagaggacgggtccatccatcgcataagagcaaagaacactgttgttgcc acaggaggctacgggcgcacctacttcagctgcacgtctgcccacaccagcactggcga cggcacggccatgatcaccagggcaggccttccttgccaggacctagagtttgttcagttc caccctacaggcatatatggtgctggttgtctcattacggaaggatgtcgtggagagggag gcattctcattaacagtcaaggcgaaaggtttatggagcgatacgcccctgtcgcgaagg acctggcgtctagagatgtggtgtctcggtccatgactctggagatccgagaaggaagag gctgtggccctgagaaagatcacgtctacctgcagctgcaccacctacctccagagcagc tggccacgcgcctgcctggcatttcagagacagccatgatcttcgctggcgtggacgtca cgaaggagccgatccctgtcctccccaccgtgcattataacatgggcggcattcccacca actacaaggggcaggtcctgaggcacgtgaatggccaggatcagattgtgcccggcctg tacgcctgtggggaggccgcctgtgcctcggtacatggtgccaaccgcctcggggcaaa ctcgctcttggacctggttgtctttggtcgggcatgtgccctgagcatcgaagagtcatgca ggcctggagataaagtccctccaattaaaccaaacgctggggaagaatctgtcatgaatct tgacaaattgagatttgctgatggaagcataagaacatcggaactgcgactcagcatgca gaagtcaatgcaaaatcatgctgccgtgttccgtgtgggaagcgtgttgcaagaaggttgt gggaaaatcagcaagctctatggagacctaaagcacctgaagacgttcgaccggggaat ggtctggaacacggacctggtggagaccctggagctgcagaacctgatgctgtgtgcgc tgcagaccatctacggagcagaggcacggaaggagtcacggggcgcgcatgccaggg aagactacaaggtgcggattgatgagtacgattactccaagcccatccaggggcaacag aagaagccctttgaggagcactggaggaagcacaccctgtcctatgtggacgttggcact gggaaggtcactctggaatatagacccgtgatcgacaaaactttgaacgaggctgactgt gccaccgtcccgccagccattcgctcctactgatgagacaagatgtggtgatgacagaat cagcttttgtaattatgtataatagctcatgcatgtgtccatgtcataactgtcttcatacgcttc tgcactctggggaagaaggagtacattgaagggagattggcacctagtggctgggagctt gccaggaacccagtggccagggagcgtggcacttacctttgtcccttgcttcattcttgtga gatgataaaactgggcacagctcttaaataaaatataaatgaacaaactttcttttatttccaa atccatttgaaatattttactgttgtgactttagtcatatttgttgacctaaaaatcaaatgtaatc	62

[0198]

		tttgtattgtgttacatcaaaatccagatattttgtatagtttctttttttctttttctttttttttttttg agacaggatcggtgcagtagtacaatcacagctcactgcagcctcaaactcctgggcag ctcaggtgatcttcctgactcagccttctgagtagttggggctacaggtgtgcaccaccatg cccagctcatttatttttgtaattgtagggacagggtctcactgtgttgcctaggctggtctcaa gtgatcctccctccttggcctcccaaggtgctggaattataggtgtgaacaaaccaaaaaa aaaaaaaa	
HPRT1	NM_000194.2	ggcggggcctgcttctcctcagcttcaggcggctgcgacgagccctcaggcgaacctct cggctttcccgcgcggcgccgcctcttgctgcgcctccgcctcctcctctgctccgccacc ggcttcctcctcctgagcagtcagcccgcgcgccggccggctccgttatggcgacccgc agccctggcgtcgtgattagtgatgatgaaccaggttatgaccttgatttattttgcataccta atcattatgctgaggatttggaaagggtgtttattcctcatggactaattatggacaggactg aacgtcttgctcgagatgtgatgaaggagatgggaggccatcacattgtagccctctgtgt gctcaaggggggctataaattctttgctgacctgctggattacatcaaagcactgaatagaa atagtgatagatccattcctatgactgtagattttatcagactgaagagctattgtaatgacca gtcaacaggggacataaaagtaattggtggagatgatctctcaactttaactggaaagaat gtcttgattgtggaagatataattgacactggcaaaacaatgcagactttgctttccttggtca ggcagtataatccaaagatggtcaaggtcgcaagcttgctggtgaaaaggaccccacga agtgttggatataagccagactttgttggatttgaaattccagacaagtttgttgtaggatatg cccttgactataatgaatacttcagggatttgaatcatgtttgtgtcattagtgaaactggaaa agcaaaatacaaagcctaagatgagagttcaagttgagtttggaaacatctggagtcctatt gacatcgccagtaaaattatcaatgttctagttctgtggccatctgcttagtagagctttttgca tgtatcttctaagaattttatctgttttgtactttagaaatgtcagttgctgcattcctaaactgttt atttgcactatgagcctatagactatcagttccctttgggcggattgttgtttaacttgtaaatg aaaaaattctcttaaaccacagcactattgagtgaaacattgaactcatatctgtaagaaata aagagaagatatattagttttttaattggtattttaatttttatatatgcaggaaagaatagaagt gattgaatattgttaattataccaccgtgtgttagaaaagtaagaagcagtcaattttcacatc aaagacagcatctaagaagttttgttctgtcctggaattattttagtagtgtttcagtaatgttga ctgtattttccaacttgttcaaattattaccagtgaatctttgtcagcagttccctttaaatgcaa atcaataaattcccaaaaatttaaaaaaaaaaaaaaaaaaaaaa	63
TOX4	NM_001303523.1	agcagagagaacacacgtccttgcggaagtgacggcagttccgagtccagtgggggcg gtgggagcgatgagggtctgagacggtgggagcggttgtgtgaagatggagacattcca tacaccaagcttgggtgatgaggaatttgaaatcccacctatctccttggattctgatccctc attggctgtctcagatgtggttggccactttgatgacctggcagacccttcctcttcacagga tggcagtttttcagcccagtatggggtccagacattggacatgcctgtgggcatgacccat ggcttgatggagcagggcgggggctcctgagtgggggcttgaccatggacttggacc actctataggaactcagtatagtgccaacccacctgttacaattgatgtaccaatgacagac atgacatctggcttgatggggcatagccagttgaccaccattgatcagtcagaactgagttc ccagctgggtttgagcctaggggtggcaccatcctgccacctgcccagtcacctgaag atcgtctttcaaccacccctcacctactagttcacttcacgaggatggtgttgaggatttccg gaggcaacttcccagccagaagacagtcgtggtggaagcagggaaaaagcagaaggc cccaaagaagagaaaaaagaaagatcctaatgaacctcagaaaccagtttcagcatatgc tttattctttcgtgatacacaggctgccatcaagggacagaatcctaatgccacttttggtga ggtttcaaaaattgtggcctccatgtgggatagtcttggagaggagcaaaaacaggtatat aagaggaaaactgaggctgccaagaaagagtatctgaaggcactggctgcttacaaaga caaccaggagtgtcaggccactgtggaaacagtggaattggatccagcaccaccatcac aaactccttctccacctcctatggctactgttgacccagcatctccagcaccagcttcaatag agccccctgccctgtccccatccattgttgttaactccacccctttcatcctatgtggcaaacc aggcatcttctggagctgggggtcagcccaatatcaccaagttgattattaccaaacaaat gttgccctcttctattactatgtctcaaggagggatggttactgttatcccagccacagtggt gacctcccgggggctccaactaggccaaaccagtacagctactatccagcccagtcaac aagcccagattgtcactcggtcagtgttgcaggcagcagcagctgctgctgctgctgcttc	64

[0199]

tatgcaactgcctccaccccgactacagccccctccattacaacagatgccacagccccc
gactcagcagcaagttaccattctgcagcagcctcctccactccaggccatgcaacagcc
tccacctcagaaagttcgaatcaatttacagcaacagcctcctcctctgcagatcaagagtg
tgcctctacccactttgaaaatgcagactaccttagtcccaccaactgtggaaagtagtcct
gagcggcctatgaacaacagccctgaggcccatacagtggaggcaccttctcctgagac
tatctgtgagatgatcacagatgtagttcctgaggttgagtctccttctcagatggatgttgaa
ttggtgagtgggtctcctgtggcactctcaccccagcctcgatgtgtgaggtctggttgtga
gaaccctcccattgtgagtaaggactgggacaatgaatactgcagcaatgagtgtgtggt
gaagcactgcagggatgtattcttggcctgggtagcctctagaaattcaaacacagtggtg
tttgtgaaatagtccttcctgttctccaagccagtgaagagttatctgctgggaaagtgtcca
agagcctgtttttgaaacacaagctgggcttctggtagtgcctcatcacaacccatgatggc
tgttcatgtttcacccctttttcttccttcagcagaggccaggctatggagcagggccactga
atttgctgtaatctggagatgctttttactttcaaccataagcggtaatagcagaggaaaggg
tgaagggagtctgggcaagcaaagcatagagatggtggggtggtggtggggttgaaga
aacttgttggtataattgtcataggacttgcctaaaatattattaaaattacgggagtgtactca
gctttgagcctaggagaaaatgccactgtgtgcatccattttaaagggttccctcataaaaa
aatgttattccccattatcacatcagtacactgctttgaaaacaaaactttttcaacatgggcat
actgggctacatggaaaatgacatcacccaggagtgatttctctttatatatattatttctgca
gttaccatccttatctgagttatcacagttcatgaatctaagaggcggaactctacatcattag
taagaggttccaccaaagtctaaagttgtattcacttgtgtttgatgaactatctttaaaagac
cataggtctatcattatttcttagacataatctaaagaaaaacagactagagaagccacctg
gttgtaacagaataagcagaagtttacagcatgatagtccaagtggtgataactttaaataa
aactcaaatttttactgtttgtagacaggaatgctgtcctagagaacctcctcctcaaccagc
tacgtacatagttttatcctatgcattcctgttttctgtgtgttttttgttttttttttttttttttttttga
gacagagtctcgctctgtcacccaggctggagtgcagtggtgcgacctcagctcactgaa
acctctgcctcccgggttcaagcgattctcctgcatcagcctcccgagtagctaggattaca
ggcgcccgccactacgcccagctaatttgtggtatttttagtagagacagggtttcaccatg
ttggccaggctggtctcgaactcctgacctcatgatccgcccgccttgacctcccaaagtg
ctgggattacaggcatgagccaccgcacccagcctgcattcctgttttttaatggttttgga
gggtagcagtagagatggggtctcactatgttgcccagtctagtcttgaactcctgggctac
agttaccctcctacctcggcttcccaaagtgctcggattacaggtgtgagccactgtgccta
gcctataatgatcattttaatgtttcccatgcactcatttagtttgaaccttcacagcaacccaa
tgaggtaatactcccatttcacatataatactgagagatgagttgcacaagattatacactgtt
aagtagcagagccagaatggacttcagaatcccaactacaatacaaatgtttatttaaataa
agaagaaagctattgtacaaatatcactcttcaggtttagcttacagagccatggctatggat
tcttagctctgtaaggaagtgcttctataaattcttaggtttagagatgataccatctgggtac
ctttgcttgaaccgtgcaaccacatctgggtctagtaggtggatcccatccagttggtttcca
agggtgatcctgaaacagtgtaaaaggaggggcaaaccagaaatcctggaattagagg
gtttaatattgttaaaaaatgcataccaaatgaagactgcctatcatcatatcaaatatgccaa
ttctaaaaagagcttaacattagaatagtatatggtagaattactagttcagaattggcataga
ttctggtgttaaaatagactggatctgtattatctgagggttagtaactaatgcttagccaggc
ctgcttcacagagttgctaccagggagtattctttggataagcaaaatgctagcagcatgtg
ttttaagctctgttaaggggtgaaagatgtaattattgacagattaaatagataacttcgtaac
caccaggggcagattcaatacatcacagaatggctgaggaagatccttgggttgtgaag
agagtagaaaccctagggagcagtgcttttgggtcctagaacctgttgagtttctaatgaat
atttgtagaatctcataaaacagtttaaatacaagcttaagtggcttatgaatcctgtgaagct
catttatggactagtgtaaaacaatgtgaagctctactaagttctgtccttaatcataaataata
gccccttgaggactagcctgttctctggtcaccttaccagttgggttgcacattgtgtggtcg

[0200]

		tccaaataactcaatcttgcgagtgccaggagatagtctttcaatcatgccatagatttcatct ggtttatgactggtggaacgaacctaggaaataaaaactagctgctttttaagttacacaag aaaaaa	
TPT1	NM_001286272.1	cttcgtgccacgtcaccgcctgcgtcgcttccggaggcgcagcgggcgatgacgtagag ggacgtgccctctatatgaggttggggagcggctgagtcggccttttccgcccgctcccc cctccccccgagcgccgctccggctgcaccgcgctcgctccgagtttcaggctcgtgcta agctagcgccgtcgtcgtctcccttcagtcgccatcatgattatctaccgggacctcatcag ccacgatgagatgttctccgacatctacaagatccgggagatcgcggacgggttgtgcct ggaggtggaggggaagatggtcagtaggacagaaggtaacattgatgactcgctcattg gtggaaatgcctccgctgaaggccccgagggcgaaggtaccgaaagcacagtaatcac tggtgtcgatattgtcatgaaccatcacctgcaggaaacaagtttcacaaaagaagcctac aagaagtacatcaaagattacatgaaatcaatcaaagggaaacttgaagaacagagacca gaaagagtaaaacctttatgacaggggctgcagaacaaatcaagcacatccttgctaattt caaaaactaccagttctttattggtgaaaacatgaatccagatggcatggttgctctattgga ctaccgtgaggatggtgtgaccccatatatgattttctttaaggatggtttagaaatggaaaa atgtgatgcaaaagaaagaaatccctgcgctttctgtctgtctttgtggcggcccagattga attggggaatacatctttagcctggaaatgtaggctgcatgttaatggtaatgtaacttttgca gtgtaatgtttgaaaaatattaatgtagtttttgcttttacagtaacaaatgtggcaattattttgg atctatcacctgtcatcataactggcttctgcttgtcatccacacaacaccaggacttaagac aaatgggactgatgtcatcttgagctcttcatttattttgactgtgatttatttggagtggaggc attgtttttaagaaaaacatgtcatgtaggttgtctaaaaataaaatgcatttaaactcatttga gagaatgccttttagtttaatgcatatttaaactaaattgatcctgtagtgttcctggagaagct agagcctgattgtaggctactactcatcaattaacttctacagtggagactacttctgggact ggaatataaaaaagaatcaaaggttctgattttgagttgcaataaagggaaagaccatgct catagcagtgccaacatctgaagtgtggagccttacccatttcatcacctacaacggaagt agttaactggaagagattaccaagagaataaaaagagactcattcagtggaagcaactttg tctcagcttatttcacataaagagagcgaagtcttttgggatgaatgttaattaaactccctgg taactagaacagggactggcaaactagcctatctgaccacctgttttgtacactttaaggtg gttggttgccttttaaatggttgaggggaaaagaataccttgtgggatatggaatttaagttc gagtccagttttattggaacgtggctatgcttattcatttatggattgactgtggctgttgtcag tgcatgagcagagttgtgtctaacagactagagcctgcaagtttgccagcccctgatttaaa agatgaaggtacacagaatgtgggctggctggtgggcaaaggggtaaaaatgttctctat attgtatctgaaaagatggggtgtctgaataagaaaatgcatctatttgacagacctggagc agttgctatctgctgctatggtttccaccacagatgcaagaagaacatgtccttgcgctttcc gtctgtctaattgtggcagctgagattgaatagaggaatacaggaggaaaaaaagcggga agagtttttgaggcaggtcggtcacccaggcttgtagtgcagtggcacaagcaactcact gcattctctgcatcctgtgctcaagccattttcccacctcagtctcactagttgctgggactgc aggcatgcacccctatgcccagctaatttttgtagagaccgagtatcgcttagttgcccagg gtggtctcaactcctgggctcaaggagatctgcccacctcagcctcccaaagtgcaggcc tagcctgggaggggaattttcaaaacgtgagttttgggaaatagtctatcagccttacctgg ttgattacacttgtaaaagaaagattaaaagcaggccagtgactctggtctgcttgaacatgt gaatgtagtggtttgagcaatctggagtttgccctagtgtcaaattccagactgtccatagtg tccaaaacctgaggcagatactaatgttaacccccagcaccccgtgattggaaacaaacc taaatacgtattgggaacttaatagcaattttaagcattctgatagatttttttgtagggatgggg tcatgccatgtggcccaggctggtctgaaaactctggcctcaagtgatctcaagctttggcc ttctaaagtgttgggattacaggtgtgaggcattgcacctggcttagcgttctgatttgacatt gtaatgaaaagtgtgagtctcatctacagggccttttgtcctctgaaatgatagcaggaagg gaattttcaggcagtggtcaaagctggggaaaccaggatagtgaagaaggccttgaggt	65

[0201]

		gagagatggaagctaattggtgaactagccttggaagcctgaaacagacaagtagcaatt cagagactttgtgggctccactgctccaacttgttttgaagattttcagttctgcagaagagg tatttccccagttgtcctttcagtgctcttagctgttttcccaacatccagatccaatcaaggct gggacatagcattttatcatgtctatttaagtcagaagtgatgaaccccagctgtttacctcat ggtaaaccttgaagattccaggtagaatcttctcagactttgaagactgtctcattttatatctt tttctcgttattcctagggtcaagacgttttgggcaagaataaggatgtgaacatcagaaag ctcataacattttgtttttgatgctaagtttaacaaaggcatgctttagtagcctgtgggcccta gggtttgttaaagtgtggagaacaactgagtggagcaagaggacttttctaggaaggtcct tgtaatgtgacatttgaaaacaaatgaaggtgtggaagtaggccatgtggatatcaggaca aaccattccaggccaagacaacagcagttagtctggagtgtgatgtgttctgggaaaaaa gtggccactttgctaacccaagaagacaggaagggttgtaaagcagtgggagtgtgcaa ggaaggaagaccagacctcaaggaaaccacaggcgctctgagcagaagagttacatga tatgactcaaatttttaaaggatcactttggctgccaggtggcagggtaaaagcatagaata attgtgtataatgtgtttttaaggcaaagatagtggcttagtctagggtagtagactgaggtg gtaggaaatgaagatagagacaacaggatatgctggtgggtgaggatggatttaatgttg atacaagtattttggtctgagcgtttggaagaaagttggcactgaggtgggaagtcgagttt agttttgttagttttggatgtgttaagtttgagatgctgattcttcagagaagtctaagctggag aactatatagagagtggaaagataacaatagacattgaaagccatgatacaggataaggt catttggagagaggatagactgcattccaacatgagattggttgacaaagagaaaccaac aaaggtaattaagaggtgctcccactgcacttgtactcagaaggctgaggtaggattgtta gaggccagcctgggcaccacagggagaccccatctctaaaatttagccaggaaccatgg ctcatgcctgtagccccaggaatttgggaggctgagtggggaggatcgcttgaggtcag gagtttgagaccagcctgggcaacatagggagacctaaaaaaaattaattgggcatctgta gtcccagctactcaggcggctgagctgagaggatggcttgagtccgagagattgagggt gcagtgagctgtgatcataccactgcactccagcctgggcggcagtgagacactatctga aaaaagtttaaaaattttaaaaaagaaggaactgcccctgaggtaagaaccaagggagg gcctcccagaggtcaggtggaaaaagttttaggaaggaggaagtagtcaacagggttac ctgttgcaaagtacttaagtaatatgaggcctgatagtggtaaacttgactaccgttggatttc actagtgggaaaggaagtctaattaaaatgcactcaagagactaacagtcgcaggcatga aatacaatacaggtacatggttttttattatgtgtgcatctgcttcagtaataggtgtgaattact catttggatcattaggagtttcaaaatctagttaaatgactagatttttgttgatgtaaattctgtc attctgaactgcagggattgtcagtaacttaactgcaaactaaactggtgataattatggtaa aattgcaagacgagcaataaatctcaaccaacttgagagaacactgataa	

[0202] 定义

[0203] 本公开中使用的冠词“一(a)”和“一个(an)”是指一个或多于一个(即至少一个)该冠词的语法对象。举例来说,“要素”意指一个要素或多于一个要素。

[0204] 除非另外指明,否则术语“和/或”在本公开中用于意指“和”或者“或”。

[0205] 本文使用的术语“多核苷酸”和“核酸分子”可互换使用,意指长度为至少10个碱基或碱基对的核苷酸(核糖核苷酸或脱氧核苷酸或者任一类型核苷酸的修饰形式)的聚合形式,并且意指包括DNA的单链和双链形式。本文使用的在微阵列分析中用作探针的核酸分子或核酸序列优选地包含核苷酸链,更优选地包含DNA和/或RNA。在其他实施方案中,核酸分子或核酸序列包含其他种类的核酸结构,比如DNA/RNA螺旋体、肽核酸(PNA)、锁核酸(LNA)和/或核酶。因此,本文使用的术语“核酸分子”还涵盖包含表现出与天然核苷酸相同功能的非天然核苷酸、修饰的核苷酸和/或非核苷酸构建单元的链。

[0206] 本文使用的在多核苷酸的上下文中使用的术语“杂交(hybridize)”、“杂交(hybridizing)”、“杂交(hybridizes)”等意指常规杂交条件,比如在50%甲酰胺/6XSSC/0.1%SDS/100μg/ml ssDNA中杂交,其中杂交温度高于37摄氏度,和以0.1XSSC/0.1%SDS洗

涤的温度高于55℃,并且优选地为严格杂交条件。

[0207] 本文使用的术语“标准化”或“标准化者”是指根据标准值表示差异值,以针对由由于样品处理、样品制备和测量方法所致的技术变化而不是样品中生物标志物浓度的生物学变化而引起的影响进行调整。例如,当测量差异表达的蛋白的表达时,可根据表达基本恒定的标准蛋白表达的绝对值来表示该蛋白表达的绝对值。

[0208] 术语“诊断”和“诊断学”还分别涵盖术语“预后(prognosis)”和“预后的(prognostics)”,以及经两个或更多个时间点应用此类程序以监测随着时间推移的诊断和/或预后,和以此为基础的统计学建模。此外,术语诊断包括:a.预测(确定患者是否将可能发展侵袭性疾病(过度增殖性/侵入性)),b.预后(预测患者是否将可能在将来的预先选择的时间具有更好或更坏的结果);c.治疗选择,d.治疗药物监测,以及e.复发监测。

[0209] “准确性”是指测量或计算的数量(测试报告值)与其实际(或真实)值的符合程度。临床准确性与真实结果(真阳性(TP)或真阴性(TN))相对于错误分类结果(假阳性(FP)或假阴性(FN))的比例有关,并可表示为灵敏度、特异性、阳性预测值(PPV)或阴性预测值(NPV),或表示为可能性、优势比等量度。

[0210] 本文使用的术语“生物样品”是指可能含有一种或多种生物标志物的生物来源的任何样品。生物样品的实例包括组织、器官或体液,比如全血、血浆、血清、组织、灌洗液或用于检测疾病的任何其他样本。

[0211] 本文使用的术语“受试者”是指哺乳动物,优选地为人。在一些实施方案中,受试者具有至少一种前列腺癌症状。在一些实施方案中,受试者具有患前列腺癌的素因或家族史。受试者还可先前被诊断患有前列腺癌并且被测试癌症的复发。在一些实施方案中,受试者患有良性前列腺增生。

[0212] 本文使用的关于病症的“治疗(Treating)”或“治疗(treatment)”可指预防病症、减缓病症的发作或发展速度、降低发展病症的风险、预防或延迟与病症相关症状的发展、减少或终止与病症相关的症状、产生病症的完全或部分消退或其某种组合。

[0213] 生物标志物的水平可能由于疾病的治疗而变化。生物标志物水平的变化可通过本公开进行测量。生物标志物水平的变化可用于监测疾病或治疗的进展。

[0214] “改变的”、“变化的”或“明显不同的”是指离合理可比的状态、概况、测量值等可检测的变化或差异。这种变化可为全有或全无。它们可为递增的而不必是线性的。它们可按数量级计。变化可为增加或减少5%、10%、20%、30%、40%、50%、60%、70%、80%、90%、95%、99%、100%或更多,或者介于0%-100%之间的任何值。或者,变化可为1倍、1.5倍、2倍、3倍、4倍、5倍或更多,或者介于1倍-5倍之间的任何值。变化可为统计学显著的,p值为0.1、0.05、0.001或0.0001。

[0215] 术语“稳定的疾病”是指对前列腺癌的存在的诊断,然而,前列腺癌已被治疗并保持稳定状态,即不是进行性的,如通过成像数据和/或最佳临床判断确定的。

[0216] 术语“进行性疾病”是指对高度活动性前列腺癌状态的存在的诊断,即其尚未治疗并且不稳定,或者已被治疗并且对疗法没有产生反应,或者已被治疗并且活动性疾病仍然存在,如通过成像数据和/或最佳临床判断确定的。

[0217] 术语“肿瘤性疾病”是指细胞或组织的任何异常生长为良性的(非癌性的)或恶性的(癌性的)。例如,肿瘤性疾病可为前列腺癌。

[0218] 术语“肿瘤性组织”是指异常生长的细胞块。

[0219] 术语“非肿瘤性组织”是指正常生长的细胞块。

[0220] 术语“免疫疗法”可指激活免疫疗法或抑制免疫疗法。如本领域技术人员将意识到的,激活免疫疗法是指使用诱导、增强或促进免疫反应(包括例如T细胞反应)的治疗剂,而抑制免疫疗法是指使用干扰、阻抑或抑制免疫反应(包括例如T细胞反应)的治疗剂。激活免疫疗法可包括使用检查点抑制剂。激活免疫疗法可包括给予受试者激活刺激性检查点分子的治疗剂。刺激性检查点分子包括(但不限于)CD27、CD28、CD40、CD122、CD137、OX40、GITR和ICOS。激活刺激性检查点分子的治疗剂包括(但不限于)MEDI0562、TGN1412、CDX-1127、脂质运载蛋白。

[0221] 本文中的术语“抗体”以最广义使用,并且涵盖各种抗体结构,包括(但不限于)单克隆抗体、多克隆抗体、多特异性抗体(例如双特异性抗体)和抗体片段,只要其表现出期望的抗原-结合活性。与靶标结合的抗体是指以下抗体,其能够以足够的亲和力结合靶标,使得抗体可用作靶向靶标的诊断和/或治疗剂。在一个实施方案中,抗靶标抗体与不相关的非靶标蛋白结合的程度小于抗体与靶标结合的约10%,如例如通过放射免疫测定(RIA)或biacore测定测量的。在某些实施方案中,与靶标结合的抗体的解离常数(Kd)为<1μM、<100nM、<10nM、<1nM、<0.1nM、<0.01nM或<0.001nM(例如108M或更小,例如108M-1013M,例如109M-1013M)。在某些实施方案中,抗靶标抗体与不同物种之间保守的靶标的表位结合。

[0222] “阻断性抗体”或“拮抗性抗体”为部分或完全阻断、抑制、干扰或中和其结合的抗原的正常生物学活性的抗体。例如,拮抗性抗体可通过免疫细胞受体(例如T细胞受体)阻断信号传导,从而从功能障碍状态恢复T细胞对抗原刺激的功能反应(例如增殖、细胞因子产生、靶细胞杀伤)。

[0223] “激动性抗体”或“激活性抗体”为模拟、促进、刺激或增强其结合的抗原的正常生物学活性的抗体。激动性抗体还可通过其结合的抗原增强或启动信号传导。在一些实施方案中,激动性抗体在不存在天然配体的情况下引起或激活信号传导。例如,激动性抗体可增加记忆性T细胞增殖,增加记忆性T细胞的细胞因子产生,抑制调节性T细胞功能,和/或抑制调节性T细胞抑制效应性T细胞功能,比如效应性T细胞增殖和/或细胞因子产生。

[0224] “抗体片段”是指除完整抗体以外的分子,其包含完整抗体的一部分,该部分结合完整抗体结合的抗原。抗体片段的实例包括(但不限于)Fv、Fab、Fab’、Fab’-SH、F(ab’)2;双抗体;线性抗体;单链抗体分子(例如scFv);和由抗体片段形成的多特异性抗体。

[0225] 给予受试者化学疗法可包括给予治疗有效剂量的至少一种化学治疗剂。化学治疗剂包括(但不限于)13-顺式视黄酸、2-CdA、2-氯脱氧腺苷、5-氮杂胞苷、5-氟尿嘧啶、5-FU、6-巯基嘌呤、6-MP、6-TG、6-硫鸟嘌呤、阿贝西利(Abemaciclib)、醋酸阿比特龙(Abiraterone acetate)、Abraxane、Accutane、放线菌素D(Actinomycin-D)、Adcetris、曲妥珠单抗-美坦新偶联物(Ado-Trastuzumab Emtansine)、阿霉素(Adriamycin)、Adrucil、阿法替尼(Afatinib)、飞尼妥(Afinitor)、安归宁(Agrylin)、Ala-Cort、阿地白介素(Aldesleukin)、阿仑单抗(Alemtuzumab)、安圣莎(Alecensa)、阿来替尼(Alectinib)、力比泰(Alimta)、阿利维甲酸(Alitretinoin)、Alkaban-AQ、爱克兰(Alkeran)、全反式视黄酸(All-transretinoic Acid)、α-干扰素(Alpha Interferon)、六甲密胺(Altretamine)、布吉他滨(Alunbrig)、氨甲蝶呤(Amethopterin)、阿米福汀(Amifostine)、氨鲁米特

(Aminoglutethimide)、阿那格雷(Anagrelide)、安得乐(Anandron)、阿那曲唑(Anastrozole)、阿帕鲁胺(Apalutamide)、阿拉伯糖胞嘧啶(Arabinosylcytosine)、Ara-C、阿法达贝泊汀(Aranesp)、阿可达(Aredia)、瑞宁德(Arimidex)、阿诺新(Aromasin)、阿仑恩(Arranon)、三氧化二砷(Arsenic Trioxide)、阿泽拉(Arzerra)、天冬酰胺酶(Asparaginase)、阿特珠单抗(atezolizumab)、Atra、安维汀(Avastin)、阿维鲁单抗(Avelumab)、Axicabtagene Ciloleucel、阿昔替尼(Axitinib)、阿扎胞苷(Azacitidine)、阿维鲁单抗(Bavencio)、Bcg、Beleodaq、贝利司他(Belinostat)、本达莫司汀(Bendamustine)、Bendeka、Besponsa、贝伐珠单抗(Bevacizumab)、贝沙罗汀(Bexarotene)、百克沙(Bexxar)、比卡鲁胺(Bicalutamide)、Bicnu、硫酸博莱霉素(Blenoxane)、博莱霉素(Bleomycin)、博纳吐单抗(Blinatumomab)、Blincyto、硼替佐米(Bortezomib)、博舒替尼(Bosulif)、博舒替尼(Bosutinib)、本妥昔单抗(Brentuximab Vedotin)、布格替尼(Brigatinib)、白消安(Busulfan)、白舒非(Busulfex)、C225、卡巴他赛(Cabazitaxel)、卡波替尼(Cabozantinib)、亚叶酸钙(Calcium Leucovorin)、坎帕斯(Campath)、开普拓(Camptosar)、喜树碱-11(Camptothecin-11)、卡培他滨(Capecitabine)、卡普里萨(Caprelsa)、Carac、卡铂(Carboplatin)、卡非佐米(Carfilzomib)、卡莫司汀(Carmustine)、卡莫司汀糯米纸囊剂(Carmustine Wafer)、康士得(Casodex)、CCI-779、Ccnu、Cddp、Ceenu、色瑞替尼(Ceritinib)、司比定(Cerubidine)、西妥昔单抗(Cetuximab)、苯丁酸氮芥(Chlorambucil)、顺铂(Cisplatin)、嗜橙菌因子(CitrovorumFactor)、克拉屈滨(Cladribine)、氯法拉滨(Clofarabine)、Clolar、考比替尼(Cobimetinib)、卡博替尼(Cometriq)、可的松(Cortisone)、可美淨(Cosmegen)、考比替尼(Cotellic)、Cpt-11、克唑替尼(Crzotinib)、环磷酰胺(Cyclophosphamide)、Cyramza、塞塔德伦(Cytadren)、阿糖胞苷(Cytarabine)、阿糖胞苷脂质体(Cytarabine Liposomal)、赛德萨-U(Cytosar-U)、环磷酰胺(Cytoxan)、达拉非尼(Dabrafenib)、达卡巴嗪(Dacarbazine)、达克金(Dacogen)、更生霉素(Dactinomycin)、达雷木单抗(Daratumumab)、达贝泊汀α(DarbepoetinAlfa)、达扎雷西(Darzalex)、达沙替尼(Dasatinib)、道诺霉素(Daunomycin)、柔红霉素(Daunorubicin)、柔红霉素阿糖胞苷(Daunorubicin Cytarabine)(脂质体)、盐酸柔红霉素(daunorubicin-hydrochloride)、柔红霉素脂质体(Daunorubicin Liposomal)、DaunoXome、地卡特隆(Decadron)、地西他滨(Decitabine)、地加瑞克(Degarelix)、泼尼松龙(Delta-Cortef)、德尔塔松(Deltasone)、地尼白介素(Denileukin Diftitox)、地诺单抗(Denosumab)、脂质体阿糖胞苷注射剂(DepoCyt)、地塞米松(Dexamethasone)、醋酸地塞米松(Dexamethasone Acetate)、地塞米松磷酸钠(Dexamethasone Sodium Phosphate)、地塞松(Dexasone)、右雷佐生(Dexrazoxane)、Dhad、Dic、Diodex、多西他赛(Docetaxel)、Doxil、多柔比星(Doxorubicin)、多柔比星脂质体(Doxorubicin Liposomal)、Droxia、DTIC、Dtic-Dome、杜拉龙(Duralone)、德瓦鲁单抗(Durvalumab)、依库珠单抗(Eculizumab)、氟优(Efudex)、埃伦斯(Ellence)、埃罗妥珠单抗(Elotuzumab)、乐沙定(Eloxatin)、爱施巴(Elspar)、艾曲波帕(Eltrombopag)、Emcyt、埃罗妥珠单抗(Empliciti)、恩西地平(Enasidenib)、恩杂鲁胺(Enzalutamide)、表阿霉素(Epirubicin)、依泊汀α(EpoetinAlfa)、爱必妥(Erbitux)、艾立布林(Eribulin)、爱维德(Erivedge)、厄利达(Erleada)、厄洛替尼(Erlotinib)、欧文氏菌属L-天冬酰胺酶(Erwinia L-asparaginase)、雌莫司汀(Estramustine)、氨磷汀(Ethyol)、

凡毕复(Etopophos)、依托泊苷(Etopophos)、磷酸依托泊苷(Etoposide Phosphate)、优乐克辛(Eulexin)、依维莫司(Everolimus)、易维特(Evista)、依西美坦(Exemestane)、法乐通(Fareston)、帕比司他(Farydak)、芙仕得(Faslodex)、菲马拉(Femara)、非格司亭(Filgrastim)、费蒙格(Firmagon)、氟尿苷(Floxuridine)、福达华(Fludara)、氟达拉滨(Fludarabine)、Fluoroplex、氟尿嘧啶(Fluorouracil)、氟尿嘧啶(乳膏)、氟甲睾酮(Fluoxymesterone)、氟他米特(Flutamide)、亚叶酸(Folinic Acid)、普拉曲沙(Folotyn)、氟尿苷(Fudr)、氟维司群(Fulvestrant)、G-Csf、奥妥珠单抗(Gazyva)、吉非替尼(Gefitinib)、吉西他滨(Gemcitabine)、吉妥珠单抗奥唑米星(Gemtuzumab ozogamicin)、健择(Gemzar)、吉泰瑞(Gilotrif)、格列卫(Gleevec)、洛莫司汀(Gleostine)、格立得糯米纸囊剂(Gliadel Wafer)、Gm-Csf、戈舍瑞林(Goserelin)、非格司亭(Granix)、粒细胞集落刺激因子(Granulocyte-Colony Stimulating Factor)、粒细胞巨噬细胞集落刺激因子(Granulocyte Macrophage Colony Stimulating Factor)、Halaven、哈乐泰斯停(Halotestin)、赫赛汀(Herceptin)、海塞多(Hexadrol)、克瘤灵(Hexalen)、六甲蜜胺(Hexamethylmelamine)、Hmm、和美新(Hycamtin)、羟基脲(Hydrea)、醋酸氢化可的松(Hydrocort Acetate)、氢化可的松(Hydrocortisone)、氢化可的松磷酸钠(Hydrocortisone Sodium Phosphate)、氢化可的松琥珀酸钠(Hydrocortisone Sodium Succinate)、氢化可的松磷酸盐(Hydrocortone Phosphate)、羟基脲(Hydroxyurea)、爱博斯(Ibrance)、替伊莫单抗(Ibritumomab)、替伊莫单抗(Ibritumomab Tiuxetan)、依鲁替尼(Ibrutinib)、普纳替尼(Iclusig)、力达霉素(Idamycin)、依达比星(Idarubicin)、艾代拉里斯(Idelalisib)、恩西地平(Idhifa)、Ifex、IFN-α、异环磷酰胺(Ifosfamide)、IL-11、IL-2、依鲁替尼(Imbruvica)、甲磺酸伊马替尼(Imatinib mesylate)、英飞凡(Imfinzi)、咪唑甲酰胺(Imidazole Carboxamide)、Imlygic、英立达(Inlyta)、伊珠单抗奥唑米星(Inotuzumab Ozogamicin)、干扰素-α、干扰素α-2b(PEG缀合物)、白细胞介素-2、白介素细胞-11、Intron A(干扰素α-2b)、伊匹木单抗(Ipilimumab)、易瑞沙(Iressa)、伊立替康(Irinotecan)、伊立替康(Irinotecan)(脂质体)、异维甲酸(Isotretinoin)、罗米地辛(Istodax)、伊沙贝比隆(Ixabepilone)、艾沙佐米(Ixazomib)、伊沙匹隆(Ixempra)、捷格非(Jakafi)、卡巴他赛(Jevtana)、赫赛莱(Kadcyla)、健痊得(Keytruda)、门冬酰胺酶(Kidrolase)、击癌利(Kisqali)、替沙来塞(Kymriah)、卡非佐米(Kyprolis)、Lanacort、兰瑞肽(Lanreotide)、拉帕替尼(Lapatinib)、拉特鲁沃(Lartruvo)、L-天冬酰胺酶(L-Asparaginase)、爱博新(Lbrance)、Lcr、来那度胺(Lenalidomide)、乐伐替尼(Lenvatinib)、乐卫玛(Lenvima)、来曲唑(Letrozole)、亚叶酸(Leucovorin)、留可然((Leukeran)、沙格司亭(Leukine)、亮丙瑞林(Leuprolide)、长春新碱(Leurocristine)、克拉立平(Leustatin)、脂质体Ara-C、液体Pred、洛莫司汀(Lomustine)、曲氟尿苷复方片(Lonsurf)、L-PAM、L-沙可来新(L-Sarcolysin)、利普安(Lupron)、利普安贮库型混悬剂(LupronDepot)、利普卓(Lynparza)、硫酸长春新碱脂质体注射液(Marqibo)、甲基苄肼(Matulane)、玛西德克斯(Maxidex)、氮芥(Mechlorethamine)、盐酸氮芥(Mechlorethamine Hydrochloride)、甲泼尼龙(Medralone)、美卓乐(Medrol)、梅格施(Megace)、甲地孕酮(Megestrol)、醋酸甲地孕酮(Megestrol Acetate)、曲美替尼(Mekinist)、巯嘌呤(Mercaptopurine)、美司钠(Mesna)、美钠针剂(Mesnex)、甲氨蝶呤(Methotrexate)、甲氨蝶

呤钠(Methotrexate Sodium)、甲基泼尼松龙(Methylprednisolone)、泼尼松(Meticorten)、米哚妥林(Midostaurin)、丝裂霉素(Mitomycin)、丝裂霉素-C(Mitomycin-C)、米托蒽醌(Mitoxantrone)、甲泼尼龙(M-Prednisol)、MTC、MTX、氮芥(Mustargen)、氮芥(Mustine)、突变霉素(Mutamycin)、马勒兰(Myleran)、Mylocel、麦罗塔(Mylotarg)、诺维本(Navelbine)、耐昔妥珠单抗(Necitumumab)、奈拉滨(Nelarabine)、环磷酰胺注射剂(Neosar)、奈拉替尼(Neratinib)、马来酸奈拉替尼(Nerlynx)、培非格司亭(Neulasta)、迈格乐(Neumega)、优保津(Neupogen)、雷沙瓦(Nexavar)、Nilandron、尼洛替尼(Nilotinib)、尼鲁米特(Nilutamide)、尼拉罗(Ninlaro)、尼喷提(Nipent)、尼拉帕尼(Niraparib)、氮芥(Nitrogen Mustard)、纳武单抗(Nivolumab)、诺瓦得士(Nolvadex)、诺安托(Novantrone)、罗米司亭(Nplate)、奥比妥珠单抗(Obinutuzumab)、奥曲肽(Octreotide)、醋酸奥曲肽(Octreotide Acetate)、索尼德吉(Odomzo)、奥法木单抗(Ofatumumab)、奥拉帕尼(Olaparib)、奥拉单抗(Olaratumab)、奥马西他辛(Omacetaxine)、Oncospar、安可平(Oncovin)、安能得(Onivyde)、昂他克(Ontak)、Onxal、欧狄沃(Opdivo)、奥普瑞白介素(Oprelvekin)、奥拉普雷德(Orapred)、欧乐松(Orasone)、奥希替尼(Osimertinib)、甲氨蝶呤皮下注射剂(Otrexup)、奥沙利铂(Oxaliplatin)、紫杉醇(Paclitaxel)、蛋白结合型紫杉醇(Paclitaxel protein-bound)、帕博西尼(Palbociclib)、帕米膦酸盐(Pamidronate)、帕尼单抗(Panitumumab)、帕比司他(Panobinostat)、盘雷汀(Panretin)、伯尔定(Paraplatin)、帕唑帕尼(Pazopanib)、泼尼松磷酸钠制剂(Pediapred)、PEG干扰素(Peg Interferon)、培门冬酶(Pegaspargase)、培非格司亭(Pegfilgrastim)、佩乐能(Peg-Intron)、PEG-L-天冬酰胺酶(PEG-L-asparaginase)、派姆单抗(Pembrolizumab)、培美曲塞(Pemetrexed)、喷司他汀(Pentostatin)、帕捷特(Perjeta)、帕妥珠单抗(Pertuzumab)、苯丙氨酸氮芥(Phenylalanine Mustard)、Platinol、Platinol-AQ、泊马度胺(Pomalidomide)、Pomalyst、普纳替尼(Ponatinib)、耐昔妥珠单抗(Portrazza)、普拉曲沙(Pralatrexate)、泼尼松龙(Prednisolone)、泼尼松(Prednisone)、Prelone、丙卡巴肼(Procarbazine)、普罗克里特(Procrit)、普留淨(Proleukin)、博力加(prolia)、具有卡莫司汀植入物的普利司盘20(Prolifeprospan 20)、艾曲博帕(Promacta)、普列威(Provenge)、巯嘌呤(Purinethol)、镭223二氯化物(Radium 223Dichloride)、雷洛昔芬(Raloxifene)、雷莫芦单抗(Ramucirumab)、Rasuvo、瑞格非尼(Regorafenib)、瑞复美(Revlimid)、瑞玛特斯(Rheumatrex)、瑞博西尼(Ribociclib)、美罗华(Rituxan)、美罗华与透明质酸酶组合(Rituxan Hycela)、利妥昔单抗(Rituximab)、利妥昔单抗透明质酸酶(Rituximab Hyalurodinase)、罗扰素-A(Roferon-A)(干扰素α-2a)、罗米地辛(Romidepsin)、罗米司亭(Romiplostim)、鲁贝克(Rubex)、盐酸红比霉素(Rubidomycin Hydrochloride)、芦卡帕尼(Rubraca)、瑞卡帕布(Rucaparib)、鲁索替尼(Ruxolitinib)、雷德帕斯(Rydapt)、善得定(Sandostatin)、善得定LAR(Sandostatin LAR)、沙格司亭(Sargramostim)、司妥昔单抗(Siltuximab)、西普鲁塞-T(Sipuleucel-T)、舒立瑞(Soliris)、氢化可的松琥珀酸钠(Solu-Cortef)、甲强龙制剂(Solu-Medrol)、索马杜林(Somatuline)、索尼德吉(Sonidegib)、索拉非尼(Sorafenib)、施达赛(Sprycel)、Sti-571、拜万戈(Stivarga)、链脲佐菌素(Streptozocin)、SU11248、舒尼替尼(Sunitinib)、索坦(Sutent)、西尔凡特(Sylvant)、新锐伯(Synribo)、达拉非尼(Tafinlar)、泰瑞沙

(Tagrisso)、Talimogene Laherparepvec、他莫昔芬(Tamoxifen)、特罗凯(Tarceva)、塔革雷汀(Targretin)、达希纳(Tasigna)、泰素(Taxol)、泰索帝(Taxotere)、阿替唑嗪(Tecentriq)、替莫达(Temodar)、替莫唑胺(Temozolomide)、替西罗莫司(Temsirolimus)、替尼泊苷(Teniposide)、塞替派(Tespa)、沙利度胺(Thalidomide)、Thalomid、TheraCys、硫鸟嘌呤(Thioguanine)、硫鸟嘌呤片剂(Thioguanine Tabloid)、硫代磷酰胺(Thiophosphoramide)、塞替派粉针剂(Thioplex)、塞替派(Thiotepa)、Tice、替沙来塞(Tisagenlecleucel)、拓扑杀(Toposar)、拓扑替康(Topotecan)、托瑞米芬(Toremifene)、驮瑞塞尔(Torisel)、托西莫单抗(Tositumomab)、曲贝替定(Trabectedin)、曲美替尼(Trametinib)、曲妥珠单抗(Trastuzumab)、存达(Treanda)、双羟萘酸曲普瑞林(Trelstar)、维甲酸(Tretinoin)、特克氨(Trexall)、曲氟尿苷/替吡嘧啶(Trifluridine/Tipiracil)、双羟萘酸曲普瑞林(Triptorelin pamoate)、三氧化二砷(Trisenox)、噻替哌(Tspa)、T-VEC、泰克布(Tykerb)、戊柔比星(Valrubicin)、Valstar、凡德他尼(Vandetanib)、VCR、维克替比(Vectibix)、长春碱(Velban)、万珂(Velcade)、维罗非尼(Vemurafenib)、Venclexta、维奈克拉(Venetoclax)、凡毕士(VePesid)、玻玛西林(Verzenio)、维甲酸(Vesanoid)、醋酸亮丙瑞林植入剂(Viadur)、委丹扎(Vidaza)、长春碱(Vinblastine)、硫酸长春碱(Vinblastine Sulfate)、硫酸长春新碱注射剂(Vincasar Pfs)、长春新碱(Vincristine)、长春新碱脂质体(Vincristine Liposomal)、长春瑞滨(Vinorelbine)、酒石酸长春瑞滨(Vinorelbine Tartrate)、维莫德吉(Vismodegib)、Vlb、VM-26、伏立诺他(Vorinostat)、维全特(Votrient)、VP-16、威猛(Vumon)、维克斯酮(Vyxeos)、赛可瑞胶囊(Xalkori Capsules)、希罗达(Xeloda)、狄迪诺塞麦(Xgeva)、Xofigo、安可坦(Xtandi)、易普利姆玛(Yervoy)、Yescarta、曲贝替定(Yondelis)、阿柏西普(Zaltrap)、链脲霉素(Zanosar)、Zarxio、则乐(Zejula)、佐博伏(Zelboraf)、泽娃灵(Zevalin)、右雷佐生(Zinecard)、阿柏西普(Ziv-aflibercept)、诺雷德(Zoladex)、唑来膦酸(Zoledronic Acid)、Zolinza、择泰(Zometa)、Zydelig、赞可达(Zykadia)、Zytiga或其任何组合。

[0226] 术语试剂或化合物的“有效量”和“治疗有效量”在最广义上用于指非毒性但足够量的活性剂或化合物以提供期望的效果或益处。

[0227] 术语“益处”以最广义使用,并且是指任何期望的作用,并且具体地讲包括本文定义的临床益处。可通过评价各种终点来衡量临床益处,例如在某种程度上抑制疾病的进展,包括减慢和完全阻止;减少疾病发作和/或症状的数量;减少病灶大小;抑制(即减少、减慢或完全停止)疾病细胞浸润到邻近的周围器官和/或组织;抑制(即减少、减慢或完全停止)疾病的传播;降低自身免疫反应,其可能(但不一定)导致疾病病灶的消退或消融;在某种程度上减轻与该障碍相关的一种或多种症状;治疗后无病表现例如无进展生存期的长度增加;提高总体生存率;更高的应答率;和/或治疗后给定时间点的死亡率降低。

[0228] 术语“癌症”和“癌性”是指或描述哺乳动物中的生理状况,其一般地特征为不受控制的细胞生长。该定义包括良性和恶性癌症。癌症的实例包括(但不限于)癌、淋巴瘤、母细胞瘤、肉瘤和白血病。这种癌症的更具体实例包括肾上腺皮质癌、膀胱尿路上皮癌、浸润性乳腺癌、宫颈鳞状细胞癌、宫颈内腺癌、胆管癌、结肠腺癌、淋巴样肿瘤弥漫性大B细胞淋巴瘤、食管癌、多形性成胶质细胞瘤、头颈部鳞状细胞癌、肾脏嫌色细胞癌、肾透明细胞癌、肾

乳头状细胞癌、急性髓细胞性白血病、脑低级神经胶质瘤、肝细胞癌、肺腺癌、肺鳞状细胞癌、间皮瘤、卵巢浆液性囊腺癌、胰腺腺癌、嗜铬细胞瘤、副神经节瘤、前列腺腺癌、直肠腺癌、肉瘤、皮肤黑色素瘤、胃腺癌、睾丸生殖细胞肿瘤、甲状腺癌、胸腺瘤、子宫癌肉瘤、葡萄膜黑色素瘤。其他实例包括乳腺癌、肺癌、淋巴瘤、黑色素瘤、肝癌、结直肠癌、卵巢癌、膀胱癌、肾癌或胃癌。癌症的其他实例包括神经内分泌癌、非小细胞肺癌(NSCLC)、小细胞肺癌、甲状腺癌、子宫内膜癌、胆管癌、食管癌、肛门癌、唾液腺癌、外阴癌或子宫颈癌。

[0229] 术语“肿瘤”是指所有肿瘤性细胞生长和增殖,无论是恶性还是良性,以及所有癌前和癌性细胞和组织。术语“癌症”、“癌性”、“细胞增殖性障碍”、“增殖性障碍”和“肿瘤”如本文所指并不相互排斥。

[0230] 本文使用的术语“约”当与数值和/或范围结合使用时通常是指接近所述数值和/或范围的那些数值和/或范围。在一些情况下,术语“约”可意指在所述值的±10%之内。例如,在一些情况下,“约100[单位]”可意指在100的±10%之内(例如从90到110)。

实施例

[0231] 本公开通过以下实施例进一步说明,这些实施例不应解释为在范围或精神上将本公开限制于本文所述的具体程序。应当理解,提供这些实施例是为了说明某些实施方案,并且并不由此旨在限制本公开的范围。应进一步理解的是,可能不得不诉诸于可本身呈现于本领域技术人员的各种其他实施方案、其修改和等同形式,而不背离本公开的精神和/或所附权利要求的范围。

[0232] 实施例1.38-标志物基因组的推导

[0233] 两个微阵列数据集(E-GEOD-46691和E-GEOD-46602,表2)用作推导队列(n=595个样品)。将随机森林算法应用于每个数据集,以鉴定预测每个集合内的表型多样性的最重要的转录物集合。每个微阵列数据集分别包含22011和54675个探针的集合。随机森林驱动标志物选择算法跨越两个数据集将n=129个转录物鉴定为预测疾病进展。其中n=30在两个数据集中均呈现出高预测重要性分数(图1A-1B)。然后使用3个微阵列数据集(E-GEOD-62116、E-GEOD-62667、E-GEOD-72220,表2)来验证推定的前列腺癌特征。对于验证队列(n=564个样品)中的每个转录物均获得预测重要性和Kruskal-Wallis p值,并跨越3个数据集取平均值(图2)。文献检查将ARv7变体、ERG-TRMS22融合基因和AR1/AR2信号传导鉴定为包含和评估的另外基因集。

[0234] 对来自前列腺癌(n=20)和匹配的正常血液(n=20)的血液样品的初步数据集中的转录物进行评估,确认了37个基因的表达作为PCA的标志物(表3)。证明这些基因与正常前列腺相比较,在PCA肿瘤组织中高度表达,并且可用于有效地区分肿瘤与对照(表3)。其还区分了7种不同的PCA细胞系:22Rv1和EOO6AA-hT(局灶性);VCaP;PC-3;LNCaP;来自两个正常前列腺上皮细胞系PWR-1E和RWPE-1的DU145和MDA PCa2b(均为转移性)(图4)。这些数据证明候选靶转录物由肿瘤转化的前列腺上皮细胞产生,并且在血液中可检测。

[0235] 使用来自对照(n=100)和PCA(n=21)样品的全血中这37种标志物的标准化基因表达,建立了前列腺癌疾病的人工智能模型。将数据集随机分为训练和测试分区,分别用于模型创建和验证。评估了12种算法(XGB、RF、glmnet、cforest、CART、treebag、knn、nnet、SVM-径向、SVM-线性、NB和mlp)。表现最好的算法(XGB-“梯度提升”)最好地预测了训练数

据。在测试集中,XGB产生预测样品的概率分数。每个概率分数反映未知样品属于“对照”还是“PCA”类别的算法的“确定性”。例如,未知样品S1可具有以下概率向量[对照=20%,PCA=80%]。该样品会被认为PCA样品。

[0236] 表2.用于推导前列腺癌特异性基因特征的所有公共微阵列数据集的概述.

[0237]

登录号	样品计数	数据集描述
E-GEOD-46691	545	*Gleason 评分 5 - 10* 5 分(n=3) 6 分(n = 60) 7 分(n = 271) 8 分(n = 68) 9 分(n = 134) 10 分(n = 9)
E-GEOD-46602	50	良性前列腺(n = 14) 前列腺肿瘤(n = 36)
E-GEOD-62116	235	*Gleason 评分 5 - 10* 5 分(n = 1) 6 分(n = 17) 7 分(n = 119) 8 分(n = 39) 9 分(n = 58) 10 分(n = 1)
E-GEOD-62667	182	Gleason 评分 6 - 9 6 分(n = 25) 7 分(n = 112) 8 分(n = 23) 9 分(n = 22)
E-GEOD-72220	147	正常组织(n = 90) 肿瘤组织(n = 57

[0238]

[0239] 表3:37种PCA标志物基因组(不包括管家基因)

[0240]

前列腺癌生物标志物基因		NCBI 染色体位置	UniGene ID	RefSeq	外显子边界	测定位置	扩增子长度
符号	名称						
AAMP	脉管关联迁移细胞蛋白	Chr.2: 218264129 - 218270209	Hs.83347	NM_001087.4	2 - 3	395	58
ANO7	Anoctamin 7	Chr.2: 241188509 - 241239602	Hs.163909	NM_001001891.3	5 - 6	686	60
AR	雄激素受体	Chr.X: 67544032 - 67730619	Hs.76704	NM_000044.3	2 - 3	2882	144
AR-V7	雄激素受体转录物变体 7	AR 截短					73
C16orf89	16 号染色体开放阅读框 89	Chr.16: 5042772 - 5066145	Hs.11782	NM_001098514.2	5 - 6	995	75
CHTOP	PRMT1 的染色质靶标	Chr.1: 153633982 - 153646306	Hs.611057	NM_001206612.1	2 - 3	445	66
COL1A1	I 型胶原 α1	Chr.17: 50184096 - 50201648	Hs.172928	NM_000088.3	1 - 2	230	66
EDC4	mRNA 脱帽蛋白增强子 4	Chr.16: 67873023 - 67884514	Hs.75682	NM_014329.4	27 - 28	4089	72

[0241]

FGFR2	成纤维细胞生长因子受体 2	Chr.10: 121478330 - 121598656	Hs.533683	NM_000141.4	13 - 14	2516	74
FXYD7	含 FXYD 结构域的离子转运调控因子 7	Chr.19: 35143250 - 35154302	Hs.134729	NM_022006.1	5 - 6	300	89
FYCO1	含有 FYVE 和卷曲螺旋结构域的 1	Chr.3: 45917899 - 45995824	Hs.200227	NM_024513.3	11 - 12	3651	59
HNRNPU	核不均一核糖核蛋白 U	Chr.1: 244842123 - 244864720	Hs.106212	NM_004501.3	8 - 9	1773	79
HPN	hepsin	Chr.19: 35040506 - 35066573	Hs.182385	NM_002151.2	10 - 11	1052	89
KRT15	角蛋白 15	Chr.17: 41513745 - 41522413	Hs.654570	NM_002275.3	7 - 8	1461	81
KRT23	角蛋白 23	Chr.17: 40922696 - 40937643	Hs.9029	NM_001282433.1	5 - 6	1045	90
MAN2B2	甘露糖苷酶 α 2B 类成员 2	Chr.4: 6575174 - 6622403	Hs.188464	NM_001292038.1	5 - 6	716	55
MAX	MYC 相关因子 X	Chr.14: 65006101 - 65102695	Hs.285354	NM_001320415.1	3 - 4	377	61
MRPS25	线粒体核糖体蛋白 S25	Chr.3: 15042251 - 15065337	Hs.657764	NM_022497.4	2 - 3	380	80
NDUFS2	NADH: 泛醌氧化还原酶核心亚基 S2	Chr.1: 161197377 - 161214395	Hs.173611	NM_001166159.1	3 - 4	632	80
PPARGC1A	PPARG 辅激活因子 1α	Chr.4: 23792021 - 24472975	Hs.527078	NM_013261.3	7 - 8	998	83
PPRC1	过氧化物酶体增殖物激活受体 γ，辅激活因子相关 1	Chr.10: 102132994 - 102150333	Hs.533551	NM_001288727.1	1 - 2	224	55
RAD23A	RAD23 同源物 A，核苷酸切除修复蛋	Chr.19: 12945814 -	Hs.643267	NM_001270362.1	1 - 2	203	74

[0242]

	白	12953643					
REPIN 1	复制启动因子 1	Chr.7: 150368228 - 150374044	Hs.647086	NM_013 400.3	3 - 4	474	70
SDR39 U1	短链脱氢酶/还原酶家族 39U 成员 1	Chr.14: 24439766 - 24442905	Hs.643552	NM_020 195.2	4 - 5	358	91
SETBP 1	SET 结合蛋白 1	Chr.18: 44680173 - 45068510	Hs.435458	NM_001 130110.1	2 - 3	882	70
SLC14 A1	溶质载体家族 14 成员 1 (Kidd 血型)	Chr.18: 45724123 - 45752520	Hs.101307	NM_001 128588.3	7 - 8	1057	80
SLC18 A2	溶质载体家族 18 成员 A2	Chr.10: 117241073 - 117279430	Hs.596992	NM_003 054.4	15 - 16	1605	145
SMC4	染色体的结构维持 4	Chr.3: 160399304 - 160434962	Hs.58992	NM_001 002800.2	5 - 6	1134	91
SPARC	富含半胱氨酸的酸性分泌蛋白	Chr.5: 151661096 - 151687054	Hs.111779	NM_001 309443.1	6 - 7	650	76
SQLE	角鲨烯环氧酶	Chr.8: 124998478 - 125022283	Hs.71465	NM_003 129.3	9 - 10	2368	109
STRIP1	striatin 相互作用蛋白 1	Chr.1: 110031577 - 110054641	Hs.584996	NM_001 270768.1	12 - 13	1303	64
STX12	突触融合蛋白 12	Chr.1: 27773183 - 27824452	Hs.523855	NM_177 424.2	1 - 2	248	70
TMPRS S2_1	TMPRSS2-ERG 融合物	TMPRSS2 外显子 1 和 ERG 外显子 4 融合物		DQ20477 2.1		49	106
TMPRS S2_2	TMPRSS2-ERG 融合物			OM_TM PRSS2-E RG_T2E 4_COSF2 8.0		58	88
TRIM2 9	含有三联基序的 29	Chr.11: 120111286 - 120138179	Hs.504115	NM_012 101.3	2 - 3	1025	62

[0243]

UNC45 A	unc-45 肌球蛋白伴侣蛋白 A	Chr.15: 90929980 - 90954093	Hs.389461	NM_001 039675.1	20 - 21	3095	62
XPC	XPC 复合体亚单位, DNA 损伤识别和修复因子	Chr.3: 14145147 - 14178672	Hs.475538	NM_004 628.4	2 - 3	403	104

[0244] 实施例2.临床效用

[0245] 与具有良性前列腺增生的男性(17±13%)和对照(8±9%)相比较,PCA(63±

19％)中的ProstaTest分数显著(p<0.001)升高(图5)。在对照和增生之间的水平上没有差异。在验证中区分前列腺癌患者(n＝125)与对照(n＝201)的测试效用的数据(接受者操作曲线分析和量度)包括在图6中。分数显示曲线下面积(AUROC)为0.97。量度为:灵敏度:92％和特异性:99％(图7)。Youden指数J为0.94和区分对照的Z统计量为38.9。

[0246] Probit-风险评估图鉴定出ProstaTest分数>30对于在血液样品中预测PCA的准确度为50％准确(图8)。在ProstaTest分数≥32时其增加到60％,而在分数>34时其为>80％。因此,该工具可准确地区分对照与前列腺癌疾病。

[0247] 与低等级(Gleason 5+6)PCA(41±7％)相比较,高等级(Gleason评分≥7:70±19％)的ProstaTest分数显著(p<0.001)升高。区分高等级与低等级分数的测试效用的数据(接受者操作曲线分析和量度)包括在图9中。分数显示曲线下面积(AUROC)为0.98。量度为:灵敏度:100％和特异性:88％。Youden指数J为0.87。相比之下,PSA水平显示出AUROC为64％。灵敏度和特异性分别为54％和87％。用于区分ProstaTest与PSA的Z统计量为3.05(p＝0.002)。

[0248] 手术之前和之后对PCA队列的具体评估鉴定出,肿瘤的完全移除和无疾病迹象与ProstaTest的显著降低(p<0.0001)相关(图10)。水平并无明显不同于对照或具有前列腺增生的那些。对独立队列的评估鉴定出,接受治疗并对治疗产生反应的患者表现出的分数明显低于诊断患有疾病的那些患者的分数(p<0.001)(图11)。疗法包括激素和化学疗法。因此,该工具可准确地鉴定前列腺癌疾病中的治疗反应。

[0249] 参考文献:

[0250] Ferlay J,Steliarova-Foucher E,Lortet-Tieulent J,Rosso S,Coebergh JW,Comber H,Forman D,Bray F.Cancer incidence and mortality patterns in Europe:estimates for 40countries in 2012.Eur J Cancer.2013;49:1374-403.doi:10.016/j.ejca.2012.12.027.Epub 32月26日.

[0251] Jemal A,Fedewa SA,Ma J,Siegel R,Lin CC,Brawley O,Ward EM.Prostate Cancer Incidence and PSA Testing Patterns in Relation to USPSTF Screening Recommendations.JAMA.2015;314:2054-61.doi:10.1001/jama.2015.14905.

[0252] Nam RK,Satkunavisam R,Chin JL,Izawa J,Trachtenberg J,Rendon R,Bell D,Singal R,Sherman C,Sugar L,Chagin K,Kattan WM.Next-generation prostate cancerrisk calculator forprimary care physicians.Can Urol Assoc J.2017;1.

[0253] The Molecular Taxonomy of Primary Prostate Cancer.Cell.2015;163:1011-25.doi:10.6/j.cell.2015.10.025.

[0254] Lalonde E,Ishkanian AS,Sykes J,Fraser M,Ross-Adams H,Erho N,Dunning MJ,Halim S,Lamb AD,Moon NC,Zafarana G,Warren AY,Meng X,等人Tumour genomic and microenvironmental heterogeneity for integrated prediction of 5-year biochemical recurrence of prostate cancer:a retrospective cohort study.Lancet Oncol.2014;15:1521-32.doi:10.016/S470-2045(14)71021-6.Epub 2014年11月13日.

[0255] Barbieri CE,Baca SC,Lawrence MS,Demichelis F,Blattner M,Theurillat JP,White TA,Stojanov P,Van Allen E,Stransky N,Nickerson E,Chae SS,Boysen G,等人Exome sequencing identifies recurrent SPOP,FOXA1 and MED12 mutations in

prostate cancer.Nat Genet.2012;44:685-9.doi:10.1038/ng.2279.

[0256] Tomlins SA,Rhodes DR,Perner S,Dhanasekaran SM,Mehra R,Sun XW,Varambally S,Cao X,Tchinda J,Kuefer R,Lee C,Montie JE,Shah RB,等人Recurrent fusion of TMPRSS2 and ETS transcription factor genes in prostate cancer.Science.2005;310:644-8.doi:10.1126/science.1117679.

[0257] Pettersson A,GraffRE,Bauer SR,Pitt MJ,Lis RT,Stack EC,Martin NE,Kunz L,Penney KL,Ligon AH,Suppan C,Flavin R,Sesso HD,等人The TMPRSS2:ERG rearrangement,ERG expression,and prostate cancer outcomes:a cohort study and meta-analysis.Cancer Epidemiol Biomarkers Prev.2012;21:1497-509.doi:10.158/055-9965.EPI-12-0042.Epub 2012年6月26日.

[0258] Antonarakis ES,Lu C,Luber B,Wang H,Chen Y,Nakazawa M,Nadal R,Paller CJ,Denmeade SR,Carducci MA,Eisenberger MA,Luo J.Androgen Receptor Splice Variant 7and Efficacy of Taxane Chemotherapy in Patients With Metastatic Castration-Resistant Prostate Cancer.JAMA Oncol.2015;1:582-91.doi:10.1001/jamaoncol.2015.1341.

[0259] Velonas VM,Woo HH,dos Remedios CG,Assinder SJ.Current status ofbiomarkers for prostate cancer.Int J Mol Sci.2013;14:11034-60.doi:10.3390/ijms140611034.

[0260] Schroder FH,Hugosson J,Roobol MJ,Tammela TL,Zappa M,Nelen V,Kwiatkowski M,Lujan M,Maattanen L,Lilja H,Denis LJ,Recker F,Paez A,等人Screening and prostate cancer mortality:results of the European Randomised Study of Screening for Prostate Cancer(ERSPC)at 13years of follow-up.Lancet.2014;384:2027-35.doi:10.1016/S0140-6736(14)60525-0.Epub 2014年8月6日.

[0261] Schroder FH,Carter HB,Wolters T,van den Bergh RC,Gosselaar C,Bangma CH,Roobol MJ.Early detection ofprostate cancer in 2007.Part1:PSA and PSA kinetics.Eur Urol.2008;53:468-77.doi:10.1016/j.eururo.2007.10.047.Epub 11月5日.

[0262] Cooperberg MR,Pasta DJ,Elkin EP,Litwin MS,Latini DM,Du Chane J,Carroll PR.The University of California,San Francisco Cancer of the Prostate Risk Assessment score:a straightforward and reliable preoperative predictor ofdisease recurrence after radical prostatectomy.J Urol.2005;173:1938-42.doi:10.097/01.ju.0000158155.33890.e7.

[0263] Troyer DA,Lucia MS,de Bruine AP,Mendez-Meza R,Baldewijns MM,Dunscomb N,Van Engeland M,McAskill T,Bierau K,Louwagie J,Bigley JW.Prostate cancer detected by methylated gene markers in histopathologically cancer-negative tissues from men with subsequent positive biopsies.Cancer Epidemiol Biomarkers Prev.2009;18:2717-22.doi:10.1158/055-9965.EPI-09-0068.Epub 2009年9月15日.

[0264] Van Neste L,Partin AW,Stewart GD,Epstein JI,Harrison DJ,Van Criekinge W.Risk score predicts high-grade prostate cancer in DNA-methylation positive, histopathologically negative biopsies.Prostate.2016;76:1078-87.doi:10.02/pros.23191.Epub 2016年4月28日.

[0265] Stewart GD,Van Neste L,Delvenne P,Delree P,Delga A,McNeill SA,O'Donnell M,Clark J,Van Criekinge W,Bigley J,Harrison DJ.Clinical utility of an epigenetic assay to detect occult prostate cancer in histopathologically negative biopsies:results of the MATLOC study.J Urol.2013;189:1110-6.doi:10.016/j.juro.2012.08.219.Epub 10月8日.

[0266] Day JR,Jost M,Reynolds MA,Groskopf J,Rittenhouse H.PCA3:from basic molecular science to the clinical lab.Cancer Lett.2011;301:1-6.doi:10.1016/j.canlet.2010.10.019.Epub 11月18日.

[0267] Cuzick J,Swanson GP,Fisher G,Brothman AR,Berney DM,Reid JE,Mesher D,Speights VO,Stankiewicz E,Foster CS,Moller H,Scardino P,Warren JD,等人Prognostic value of an RNA expression signature derived from cell cycle proliferation genes in patients with prostate cancer:a retrospective study.Lancet Oncol.2011;12:245-55.doi:10.1016/S470-2045(10)70295-3.

[0268] Erho N,Crisan A,Vergara IA,Mitra AP,Ghadessi M,Buerki C,Bergstralh EJ,Kollmeyer T,Fink S,Haddad Z,Zimmermann B,Sierocinski T,Ballman KV,等人Discovery and validation of a prostate cancer genomic classifier that predicts early metastasis following radical prostatectomy.PLoS One.2013;8:e66855.doi:10.1371/journal.pone.0066855.2013年印刷.

[0269] Karnes RJ,Bergstralh EJ,Davicioni E,Ghadessi M,Buerki C,Mitra AP,Crisan A,Erho N,Vergara IA,Lam LL,Carlson R,Thompson DJ,Haddad Z,等人Validation of a genomic classifier that predicts metastasis following radical prostatectomy in an at riskpatientpopulation.J Urol.2013;190:2047-53.doi:10.1016/j.juro.2013.06.017.Epub 6月11日.

[0270] Knezevic D,Goddard AD,Natraj N,Cherbavaz DB,Clark-Langone KM,Snable J,Watson D,Falzarano SM,Magi-Galluzzi C,Klein EA,Quale C.Analytical validation ofthe Oncotype DX prostate cancer assay-a clinical RT-PCR assay optimized for prostate needle biopsies.BMC Genomics.2013;14:690.:10.1186/471-2164-14-690.

[0271] Klein EA,Cooperberg MR,Magi-Galluzzi C,Simko JP,Falzarano SM,Maddala T,Chan JM,Li J,Cowan JE,Tsiatis AC,Cherbavaz DB,Pelham RJ,Tenggara-Hunter I,等人A17-gene assay to predict prostate cancer aggressiveness in the context of Gleason grade heterogeneity,tumor multifocality,and biopsy undersampling.Eur Urol.2014;66:550-60.doi:10.1016/j.eururo.2014.05.004.Epub 5月16日.

[0272] Zhao SG,Evans JR,Kothari V,Sun G,Larm A,Mondine V,Schaeffer EM,Ross

AE,Klein EA,Den RB,Dicker AP,Karnes RJ,Erho N,等人The Landscape of Prognostic Outlier Genes in High-Risk Prostate Cancer.Clin Cancer Res.2016;22:1777-86.doi:10.158/078-0432.CCR-15-1250.Epub 2015年12月2日.

[0273] Zhao SG,Chang SL,Spratt DE,Erho N,Yu M,Ashab HA,Alshalalfa M,Speers C,Tomlins SA,Davicioni E,Dicker AP,Carroll PR,Cooperberg MR,等人Development and validation of a 24-gene predictor of response to postoperative radiotherapy in prostate cancer:a matched,retrospective analysis.Lancet Oncol.2016;17:1612-20.doi:10.016/S470-2045(16)30491-0.Epub 2016年10月12日.

[0274] Ross RW,Galsky MD,Scher HI,Magidson J,Wassmann K,Lee GS,Katz L,Subudhi SK,Anand A,Fleisher M,Kantoff PW,Oh WK.A whole-blood RNA transcript-based prognostic model in men with castration-resistant prostate cancer:a prospective study.Lancet Oncol.2012;13:1105-13.doi:10.016/S470-2045(12)70263-2.Epub 2012年10月9日.

[0275] Olmos D,Brewer D,Clark J,Danila DC,Parker C,Attard G,Fleisher M,Reid AH,Castro E,Sandhu SK,Barwell L,Oommen NB,Carreira S,等人Prognostic value ofblood mRNA expression signatures in castration-resistant prostate cancer:a prospective,two-stage study.Lancet Oncol.2012;13:1114-24.doi:10.016/S470-2045(12)70372-8.Epub 2012年10月9日.

[0276] Danila DC,Anand A,Schultz N,Heller G,Wan M,Sung CC,Dai C,Khanin R,Fleisher M,Lilja H,Scher HI.Analytic and clinical validation of a prostate cancer-enhanced messenger RNA detection assay in whole blood as a prognostic biomarker for survival.Eur Urol.2014;65:1191-7.doi:10.016/j.eururo.2013.07.006.Epub 7月26日.

[0277] Wang L,Gong Y,Chippada-Venkata U,Heck MM,Retz M,Nawroth R,Galsky M,Tsao CK,Schadt E,de Bono J,Olmos D,Zhu J,Oh WK.A robust blood gene expression-based prognostic model for castration-resistant prostate cancer.BMC Med.2015;13:201.:10.1186/s12916-015-0442-0.

[0278] Kohli M,Young CY,Tindall DJ,Nandy D,McKenzie KM,Bevan GH,Donkena KV.Whole blood defensin mRNA expression is a predictive biomarker ofdocetaxel response in castration-resistant prostate cancer.Onco Targets Ther.2015;8:1915-22.:10.2147/OTT.S86637.eCollection 2015.

[0279] Diaz-Uriarte R,Alvarez de Andres S.Gene selection and classification of microarray data using random forest.BMC Bioinformatics.2006;7:3.doi:10.1186/1471-2105-7-3.

[0280] 等同物

[0281] 尽管已结合上述具体实施方案描述本发明,但是对于本领域普通技术人员而言,其许多备选、修改和其他变型将是显而易见的。所有这种备选、修改和变型旨在落入本发明的精神和范围内。

序列表

<110> 液体活检研究责任有限公司
Modlin, Irvin Mark
Kidd, Mark
Drozdov, Ignat
<120> 用于前列腺癌检测和治疗的方法
<130> LBIO-005/001WO
<150> US 62/633,675
<151> 2018-02-22
<160> 65
<170> PatentIn 版本 3.5
<210> 1
<211> 1842
<212> DNA
<213> 智人
<400> 1

[0001]

ctgctgggga gtcgcctacg cctacttcct gccgggagga ggggctcgag ttccgcgtcg 60
tcgcgcagag ctgactctgg gaggcgtttg ggcccagaga agtggatccg ccgcttgcgc 120
cgcatggagt ccgaatcgga aagcggggct gctgctgaca ccccccccact ggagacccta 180
agcttccatg gtgatgaaga gattatcgag gtggtagaac ttgatcccgg tccgccggac 240
ccagatgacc tggcccagga gatggaagat gtggactttg aggaagaaga ggaggaagag 300
ggcaacgaag agggctgggt tctagaaccc caggaagggg tggtcggcag catggagggc 360
cccgacgata gcgaggtcac ctttgcattg cactcagcat ctgtgttttg tgtgagcctg 420
gaccccaaga ccaatacctt ggcagtgacc gggggtgaag atgacaaagc cttcgtatgg 480
cggctcagcg atggggagct gctctttgag tgtgcaggcc ataaagactc tgtgacttgt 540
gctggtttca gccatgactc cactctagtg gccacagggg acatgagtgg cctcttgaaa 600
gtgtggcagg tggacactaa ggaggaggtc tggtcctttg aagcgggaga cctggagtgg 660
atggagtggc atcctcgggc acctgtcctg ttggcgggca cagctgacgg caacacctgg 720
atgtggaaag tcccgaatgg tgactgcaag accttccagg gtcccaactg cccagccacc 780
tgtggccgag tcctccctga tgggaagaga gctgtggtag gctatgaaga tgggaccatc 840
aggatttggg acctgaagca gggaagccct atccatgtac tgaaagggac tgagggtcac 900
cagggcccac tcacctgtgt tgctgccaac caggatggca gcttgatcct aactggctct 960
gtggactgcc aggccaagct ggtcagtgcc accaccggca aggtggtggg tgtttttaga 1020
cctgagactg tggcctccca gcccagcctg ggagaagggg aggagagtga gtccaactcg 1080
gtggagtcct tgggcttctg cagtgtgatg cccctggcag ctgttggcta cctggatggg 1140
accttggcca tctatgacct ggctacgcag actcttaggc atcagtgtca gcaccagtcg 1200
ggcatcgtgc agctgctgtg ggaggcaggc actgccgtgg tatatacctg cagcctggat 1260
ggcatcgtgc gcctctggga cgcccggacc ggccgcctgc ttactgacta ccggggccac 1320
acggctgaga tcctggactt tgccctcagc aaagatgcct ccctggtggt gaccacgtca 1380
ggagaccaca aagcgaaagt attttgtgtc caaaggcctg accgttaatg gctgcagccc 1440
ctgcctgtgt gtctggtgtt gaggggacga agggacccct gcccctgtct gccagcagag 1500
gcagtagggc acagagggaa gaggagggtg gggccctgga tgactttcca gcctcttcaa 1560
ctgacttgct cccctctcct tttcttctct ttagagaccc agcccagggc cctcccaccc 1620
ttgtccagac ctggtgggcc cttcagaggg aggggtggac ctgtttctct ttcactttca 1680
tttgctggtg tgagccatgg ggtgtgtatt tgtatgtggg gagtaggtgt ttgaggttcc 1740
cgttctttcc cttcccaagt ctctgggggt ggaaaggagg aagagatact agttaaagat 1800
tttaaaaatg taaataaaat atacttccca gaaaaaaaaa aa 1842

<210> 2
<211> 4128
<212> DNA

<213> 智人

<400> 2

aaagatagat cctgctccag gagccgggaa gccttgccct ggccagctgt gctgggcacc 60
tcccctgcct gcttcctggc ccacttgcag gcaaggtgag ggcatgcgaa tggctgccac 120
tgcctgggcg gggctccaag ggccaccccc ccccaccctc tgtcccgcag tgaggacggg 180
actctactgc cgagaccagg ctcacgctga gaggtgggcc atgacctccg agacctcttc 240
cggaagccac tgtgccagga gcaggatgct gcggcgacgg gcccaggaag aggacagcac 300
cgtcctgatc gatgtgagcc cccctgaggc agagaagagg ggctcttacg ggagcacagc 360
ccacgcctcg gagccaggtg gacagcaagc ggccgcctgc agagctggga gtcctgccaa 420
gccccggatc gcagacttcg tcctcgtttg ggaggaggac ctgaagctag acaggcagca 480
ggacagtgcc gcccgggaca gaacagacat gcacaggacc tggcgggaga cttttctgga 540
taatcttcgt gcggctgggc tgtgtgtaga ccagcaggac gtccaggacg ggaacaccac 600
agtgcactac gccctcctca gcgcctcctg ggctgtgctc tgctactacg ccgaagacct 660
gcgcctgaag ctgcccttgc aggagttacc caaccaggcc tccaactggt cggccggcct 720
gctggcatgg ctgggcatcc ccaacgtcct gctggaggtt gtgccagacg tacccccga 780
gtactactcc tgccggttca gagtgaacaa gctgccacgc ttcctcggga gtgacaacca 840
ggacaccttc ttcacaagca ccaagaggca ccaaattctg tttgagatcc tggccaagac 900
cccgtatggc cacgagaaga aaaacctgct tgggatccac cagctgctgg cagagggtgt 960
cctcagtgcc gccttccccc tgcatgacgg ccccttcaag acgcccccag agggcccgca 1020
ggctccacgc ctcaaccagc gccaagtcct tttccagcac tgggcgcgct ggggcaagtg 1080
gaacaagtac cagcccctgg accacgtgcg caggtacttc ggggagaagg tggccctcta 1140
cttcgcctgg ctcgggtttt acacaggctg gctcctgcca gcggcagtgg tgggcacact 1200
ggtgttcctg gtgggctgct tcctggtgtt ctcagacata cccacgcagg aactgtgtgg 1260
cagcaaggac agcttcgaga tgtgcccact ttgcctcgac tgccctttct ggctgctctc 1320
cagcgcctgt gccctggccc aggccggccg gctgttcgac cacggcggca ccgtgttctt 1380
[0002] cagcttgttc atggcactgt gggccgtgct gctgctggag tactggaagc ggaagagcgc 1440
cacgctggcc taccgctggg actgctctga ctacgaggac actgaggaga ggcctcggcc 1500
ccagtttgcc gcctcagccc ccatgacagc cccgaacccc atcacgggtg aggacgagcc 1560
ctacttccct gagaggagcc gcgcgcgccg catgctggcc ggctctgtgg tgatcgtggt 1620
gatggtggcc gtggtggtca tgtgcctcgt gtctatcatc ctgtaccgtg ccatcatggc 1680
catcgtggtg tccaggtcgg gcaacaccct tctcgcagcc tgggcctctc gcatcgccag 1740
cctcacgggg tctgtagtga acctcgtctt catcctcatc ctctccaaga tctatgtatc 1800
cctggcccac gtcctgacac gatgggaaat gcaccgcacc cagaccaagt tcgaggacgc 1860
cttcaccctc aaggtgttca tcttccagtt cgtcaacttc tactcctcac ccgtctacat 1920
tgccttcttc aagggcaggt ttgtgggata cccaggcaac taccacacct tgtttggagt 1980
ccgcaatgag gagtgcgcgg ctggaggctg cctgatcgag ctggcacagg agctcctggt 2040
catcatggtg ggcaagcagg tcatcaacaa catgcaggag gtcctcatcc cgaagctaaa 2100
gggctggtgg cagaagttcc ggcttcgctc caagaagagg aaggcgggag cttctgcagg 2160
ggctagccag gggccctggg aggacgacta tgagcttgtg ccctgtgagg gtctgtttga 2220
cgagtacctg gaaatggtgc tgcagttcgg cttcgtcacc atcttcgtgg ccgcctgtcc 2280
gctcgcgccg ctcttcgccc tgctcaacaa ctgggtggag atccgcttgg acgcgcgcaa 2340
gttcgtctgc gagtaccggc gcccggtggc cgagcgcgcc caggacatcg gcatctggtt 2400
ccacatcctg gcgggcctca cgcacctggc ggtcatcagc aacgccttcc tcctggcctt 2460
ctcgtccgac ttcctgccgc gcgcctacta ccggtggacc cgcgcccacg acctgcgcgg 2520
cttcctcaac ttcacgctgg cgcgagcccc gtcctccttc gccgccgcgc acaaccgcac 2580
gtgcaggtat cgggctttcc gggatgacga tggacattat tcccagacct actggaatct 2640
tcttgccatc cgcctggcct tcgtcattgt gtttgagcat gtggttttct ccgttggccg 2700
cctcctggac ctcctggtgc ctgacatccc agagtctgtg gagatcaaag tgaagcggga 2760
gtactacctg gctaagcagg cactggctga gaatgaggtt ctttttggaa cgaacggaac 2820
aaaggatgag cagcccgagg gctcagagct cagctcccac tggacaccct tcacggttcc 2880
caaggccagc cagctgcagc agtgacgcct ggaaggacat ctggtggtcc ttaggggagt 2940

ggcccctcct gagccctgcg agcagcgtcc ttttcctctt ccctcaggca gcggctgtgt 3000
gaaccgctgg ctgctgttgt gcctcatctc tgggcacatt gcctgcttcc ccccagcgcc 3060
ggcttctctc ctcagagcgc ctgtcactcc atccccggca gggagggacc gtcagctcac 3120
aaggccctct ttgtttcctg ctcccagaca taagcccaag gggcccctgc acccaaggga 3180
ccctgtccct cggtggcctc cccaggcccc tggacacgac agttctcctc aggcaggtgg 3240
gctttgtggt cctcgccgcc cctggccaca tcgccctctc ctcttacacc tggtgacctt 3300
cgaatgtttc agagcgcagg gccgttctcc ctcgtgtcct ctggacccac ccgccccttc 3360
ctgccctgtt tgcgcaggga catcacccac atgccccagc tctcggaccc tgcagctctg 3420
tgtcccaggc cacagcaaag gtctgttgaa cccctccctc cattcccagt tatctgggtc 3480
ctctggattc ttctgtttct tgaatcaggc tctgctttcc ccctagccac tacaggcagc 3540
ctctgacagt gccgctttac ttgcattctg cagcaattac atgtgtcctt ttgatccttg 3600
cccaacttcc ctccctctcc cagctcctgg cccctggccc agggcccctc ttgctgtttt 3660
tacctctgtt ccttggggcc tagtacccag caagcaccca aatgggggag gttttgggat 3720
gagaggagga aacgtgtata cctgtaacat ctggtggctc ttcccccaga agtttgtgtt 3780
catacataat tgttttccac gctggatcat aatgtgacgt gcagttctgc cctgtgctgg 3840
ggagccacat gaagcttccc ctggctaact tgctaccccg cagcaatccc agtgtggccg 3900
tctgcttgct aaaaaatgga tctgtgctca tctgtattga tgtccttgga gttctacaag 3960
tggaacttaa gtgtcaaaaa gaatatgtgg tttttagctg agcgtggtgg ctcacacctg 4020
taatcccagg actttgggag gctgaggcag gaggattaca aggtcaggag ttcgggacta 4080
gcctgtccaa catggtgaaa ccctgtcttt actaaaaatg caaaaatt 4128

<210> 3
<211> 10661
<212> DNA
<213> 智人
<400> 3

[0003] cgagatcccg gggagccagc ttgctgggag agcgggacgg tccggagcaa gcccagaggc 60
agaggaggcg acagagggaa aaagggccga gctagccgct ccagtgctgt acaggagccg 120
aagggacgca ccacgccagc cccagcccgg ctccagcgac agccaacgcc tcttgcagcg 180
cggcggcttc gaagccgccg cccggagctg ccctttcctc ttcggtgaag tttttaaaag 240
ctgctaaaga ctcggaggaa gcaaggaaag tgcctggtag gactgacggc tgcctttgtc 300
ctcctcctct ccaccccgcc tccccccacc ctgccttccc cccctccccc gtcttctctc 360
ccgcagctgc ctcagtcggc tactctcagc caaccccccc caccaccctt ctccccaccc 420
gccccccccgc ccccgtcggc ccagcgctgc cagcccgagt ttgcagagag gtaactccct 480
ttggctgcga gcgggcgagc tagctgcaca ttgcaaagaa ggctcttagg agccaggcga 540
ctggggagcg gcttcagcac tgcagccacg acccgcctgg ttaggctgca cgcggagaga 600
accctctgtt ttcccccact ctctctccac ctcctcctgc cttccccacc ccgagtgcgg 660
agccagagat caaaagatga aaaggcagtc aggtcttcag tagccaaaaa acaaaacaaa 720
caaaaacaaa aaagccgaaa taaaagaaaa agataataac tcagttctta tttgcaccta 780
cttcagtgga cactgaattt ggaaggtgga ggattttgtt tttttctttt aagatctggg 840
catcttttga atctaccctt caagtattaa gagacagact gtgagcctag cagggcagat 900
cttgtccacc gtgtgtcttc ttctgcacga gactttgagg ctgtcagagc gctttttgcg 960
tggttgctcc cgcaagtttc cttctctgga gcttcccgca ggtgggcagc tagctgcagc 1020
gactaccgca tcatcacagc ctgttgaact cttctgagca agagaagggg aggcggggta 1080
agggaagtag gtggaagatt cagccaagct caaggatgga agtgcagtta gggctgggaa 1140
gggtctaccc tcggccgccg tccaagacct accgaggagc tttccagaat ctgttccaga 1200
gcgtgcgcga agtgatccag aacccgggcc ccaggcaccc agaggccgcg agcgcagcac 1260
ctcccggcgc cagtttgctg ctgctgcagc agcagcagca gcagcagcag cagcagcagc 1320
agcagcagca gcagcagcag cagcagcagc agcaagagac tagccccagg cagcagcagc 1380
agcagcaggg tgaggatggt tctccccaag cccatcgtag aggccccaca ggctacctgg 1440
tcctggatga ggaacagcaa ccttcacagc cgcagtcggc cctggagtgc caccccgaga 1500
gaggttgcgt cccagagcct ggagccgccg tggccgccag caaggggctg ccgcagcagc 1560

tgccagcacc tccggacgag gatgactcag ctgccccatc cacgttgtcc ctgctgggcc 1620
ccactttccc cggcttaagc agctgctccg ctgaccttaa agacatcctg agcgaggcca 1680
gcaccatgca actccttcag caacagcagc aggaagcagt atccgaaggc agcagcagcg 1740
ggagagcgag ggaggcctcg ggggctccca cttcctccaa ggacaattac ttaggggca 1800
cttcgaccat ttctgacaac gccaaggagt tgtgtaaggc agtgtcggtg tccatgggcc 1860
tgggtgtgga ggcgttggag catctgagtc caggggaaca gcttcggggg gattgcatgt 1920
acgccccact tttgggagtt ccacccgctg tgcgtcccac tccttgtgcc ccattggccg 1980
aatgcaaagg ttctctgcta gacgacagcg caggcaagag cactgaagat actgctgagt 2040
attccccttt caagggaggt tacaccaaag ggctagaagg cgagagccta ggctgctctg 2100
gcagcgctgc agcagggagc tccgggacac ttgaactgcc gtctaccctg tctctctaca 2160
agtccggagc actggacgag gcagctgcgt accagagtcg cgactactac aactttccac 2220
tggctctggc cggaccgccg ccccctccgc cgcctcccca tccccacgct cgcatcaagc 2280
tggagaaccc gctggactac ggcagcgcct gggcggctgc ggcggcgcag tgccgctatg 2340
gggacctggc gagcctgcat ggcgcgggtg cagcgggacc cggttctggg tcaccctcag 2400
ccgccgcttc ctcatcctgg cacactctct tcacagccga agaaggccag ttgtatggac 2460
cgtgtggtgg tggtgggggt ggtggcggcg gcggcggcgg cggcggcggc ggcggcggcg 2520
gcggcggcgg cggcgaggcg ggagctgtag ccccctacgg ctacactcgg ccccctcagg 2580
ggctggcggg ccaggaaagc gacttcaccg cacctgatgt gtggtaccct ggcggcatgg 2640
tgagcagagt gccctatccc agtcccactt gtgtcaaaag cgaaatgggc ccctggatgg 2700
atagctactc cggaccttac ggggacatgc gtttggagac tgccagggac catgttttgc 2760
ccattgacta ttactttcca ccccagaaga cctgcctgat ctgtggagat gaagcttctg 2820
ggtgtcacta tggagctctc acatgtggaa gctgcaaggt cttcttcaaa agagccgctg 2880
aagggaaaca gaagtacctg tgcgccagca gaaatgattg cactattgat aaattccgaa 2940
ggaaaaattg tccatcttgt cgtcttcgga aatgttatga agcagggatg actctgggag 3000
cccggaagct gaagaaactt ggtaatctga aactacagga ggaaggagag gcttccagca 3060
[0004] ccaccagccc cactgaggag acaacccaga agctgacagt gtcacacatt gaaggctatg 3120
aatgtcagcc catctttctg aatgtcctgg aagccattga gccaggtgta gtgtgtgctg 3180
gacacgacaa caaccagccc gactcctttg cagccttgct ctctagcctc aatgaactgg 3240
gagagagaca gcttgtacac gtggtcaagt gggccaaggc cttgcctggc ttccgcaact 3300
tacacgtgga cgaccagatg gctgtcattc agtactcctg gatggggctc atggtgtttg 3360
ccatgggctg gcgatccttc accaatgtca actccaggat gctctacttc gcccctgatc 3420
tggttttcaa tgagtaccgc atgcacaagt cccggatgta cagccagtgt gtccgaatga 3480
ggcacctctc tcaagagttt ggatggctcc aaatcacccc ccaggaattc ctgtgcatga 3540
aagcactgct actcttcagc attattccag tggatgggct gaaaaatcaa aaattctttg 3600
atgaacttcg aatgaactac atcaaggaac tcgatcgtat cattgcatgc aaaagaaaaa 3660
atcccacatc ctgctcaaga cgcttctacc agctcaccaa gctcctggac tccgtgcagc 3720
ctattgcgag agagctgcat cagttcactt ttgacctgct aatcaagtca cacatggtga 3780
gcgtggactt tccggaaatg atggcagaga tcatctctgt gcaagtgccc aagatccttt 3840
ctgggaaagt caagcccatc tatttccaca cccagtgaag cattggaaac cctatttccc 3900
caccccagct catgcccccc ttcagatgtc ttctgcctgt tataactctg cactactcct 3960
ctgcagtgcc ttggggaatt tcctctattg atgtacagtc tgtcatgaac atgttcctga 4020
attctatttg ctgggctttt tttttctctt tctctccttt ctttttcttc ttccctccct 4080
atctaaccct cccatggcac cttcagactt tgcttcccat tgtggctcct atctgtgttt 4140
tgaatggtgt tgtatgcctt taaatctgtg atgatcctca tatggcccag tgtcaagttg 4200
tgcttgttta cagcactact ctgtgccagc cacacaaacg tttacttatc ttatgccacg 4260
ggaagtttag agagctaaga ttatctgggg aaatcaaaac aaaaacaagc aaacaaaaaa 4320
aaaaagcaaa aacaaaacaa aaaataagcc aaaaaacctt gctagtgttt tttcctcaaa 4380
aataaataaa taaataaata aatacgtaca tacatacaca catacataca aacatataga 4440
aatccccaaa gaggccaata gtgacgagaa ggtgaaaatt gcaggcccat ggggagttac 4500
tgatttttc atctcctccc tccacgggag actttatttt ctgccaatgg ctattgccat 4560
tagagggcag agtgacccca gagctgagtt gggcaggggg gtggacagag aggagaggac 4620

aaggagggca atggagcatc agtacctgcc cacagccttg gtccctgggg gctagactgc 4680
tcaactgtgg agcaattcat tatactgaaa atgtgcttgt tgttgaaaat ttgtctgcat 4740
gttaatgcct caccccccaaa ccctttttctc tctcactctc tgcctccaac ttcagattga 4800
ctttcaatag tttttctaag acctttgaac tgaatgttct cttcagccaa aacttggcga 4860
cttccacaga aaagtctgac cactgagaag aaggagagca gagatttaac cctttgtaag 4920
gccccatttg gatccaggtc tgctttctca tgtgtgagtc agggaggagc tggagccaga 4980
ggagaagaaa atgatagctt ggctgttctc ctgcttagga cactgactga atagttaaac 5040
tctcactgcc actacctttt ccccaccttt aaaagacctg aatgaagttt tctgccaaac 5100
tccgtgaagc cacaagcacc ttatgtcctc ccttcagtgt tttgtgggcc tgaatttcat 5160
cacactgcat ttcagccatg gtcatcaagc ctgtttgctt cttttgggca tgttcacaga 5220
ttctctgtta agagccccca ccaccaagaa ggttagcagg ccaacagctc tgacatctat 5280
ctgtagatgc cagtagtcac aaagatttct taccaactct cagatcgctg gagcccttag 5340
acaaactgga aagaaggcat caaagggatc aggcaagctg ggcgtcttgc ccttgtcccc 5400
cagagatgat accctcccag caagtggaga agttctcact tccttcttta gagcagctaa 5460
aggggctacc cagatcaggg ttgaagagaa aactcaatta ccagggtggg aagaatgaag 5520
gcactagaac cagaaaccct gcaaatgctc ttcttgtcac ccagcatatc cacctgcaga 5580
agtcatgaga agagagaagg aacaaagagg agactctgac tactgaatta aaatcttcag 5640
cggcaaagcc taaagccaga tggacaccat ctggtgagtt tactcatcat cctcctctgc 5700
tgctgattct gggctctgac attgcccata ctcactcaga ttccccacct ttgttgctgc 5760
ctcttagtca gagggaggcc aaaccattga gactttctac agaaccatgg cttctttcgg 5820
aaaggtctgg ttggtgtggc tccaatactt tgccacccat gaactcaggg tgtgccctgg 5880
gacactggtt ttatatagtc ttttggcaca cctgtgttct gttgacttcg ttcttcaagc 5940
ccaagtgcaa gggaaaatgt ccacctactt tctcatcttg gcctctgcct ccttacttag 6000
ctcttaatct catctgttga actcaagaaa tcaagggcca gtcatcaagc tgcccatttt 6060
aattgattca ctctgtttgt tgagaggata gtttctgagt gacatgatat gatccacaag 6120
[0005] ggtttccttc cctgatttct gcattgatat taatagccaa acgaacttca aaacagcttt 6180
aaataacaag ggagagggga acctaagatg agtaatatgc caatccaaga ctgctggaga 6240
aaactaaagc tgacaggttc ccttttgggg gtgggataga catgttctgg ttttctttat 6300
tattacacaa tctggctcat gtacaggatc acttttagct gttttaaaca gaaaaaaata 6360
tccaccactc ttttcagtta cactaggtta cattttaata ggtcctttac atctgttttg 6420
gaatgatttt catcttttgt gatacacaga ttgaattata tcattttcat atctctcctt 6480
gtaaatacta gaagctctcc tttacatttc tctatcaaat ttttcatctt tatgggtttc 6540
ccaattgtga ctcttgtctt catgaatata tgtttttcat ttgcaaaagc caaaaatcag 6600
tgaaacagca gtgtaattaa aagcaacaac tggattactc caaatttcca aatgacaaaa 6660
ctagggaaaa atagcctaca caagccttta ggcctactct ttctgtgctt gggtttgagt 6720
gaacaaagga gattttagct tggctctgtt ctcccatgga tgaaaggagg aggatttttt 6780
ttttcttttg gccattgatg ttctagccaa tgtaattgac agaagtctca ttttgcatgc 6840
gctctgctct acaaacagag ttggtatggt tggtatactg tactcacctg tgagggactg 6900
gccactcaga cccacttagc tggtgagcta gaagatgagg atcactcact ggaaaagtca 6960
caaggaccat ctccaaacaa gttggcagtg ctcgatgtgg acgaagagtg aggaagagaa 7020
aaagaaggag caccagggag aaggctccgt ctgtgctggg cagcagacag ctgccaggat 7080
cacgaactct gtagtcaaag aaaagagtcg tgtggcagtt tcagctctcg ttcattgggc 7140
agctcgccta ggcccagcct ctgagctgac atgggagttg ttggattctt tgtttcatag 7200
ctttttctat gccataggca atattgttgt tcttggaaag tttattattt ttttaactcc 7260
cttactctga gaaagggata ttttgaagga ctgtcatata tctttgaaaa aagaaaatct 7320
gtaatacata tatttttatg tatgttcact ggcactaaaa aatatagaga gcttcattct 7380
gtcctttggg tagttgctga ggtaattgtc caggttgaaa aataatgtgc tgatgctaga 7440
gtccctctct gtccatactc tacttctaaa tacatatagg catacatagc aagttttatt 7500
tgacttgtac tttaagagaa aatatgtcca ccatccacat gatgcacaaa tgagctaaca 7560
ttgagcttca agtagcttct aagtgtttgt ttcattaggc acagcacaga tgtggccttt 7620
ccccccttct ctcccttgat atctggcagg gcataaaggc ccaggccact tcctctgccc 7680

cttcccagcc ctgcaccaaa gctgcatttc aggagactct ctccagacag cccagtaact 7740
acccgagcat ggcccctgca tagccctgga aaaataagag gctgactgtc tacgaattat 7800
cttgtgccag ttgcccaggt gagagggcac tgggccaagg gagtggtttt catgtttgac 7860
ccactacaag gggtcatggg aatcaggaat gccaaagcac cagatcaaat ccaaaactta 7920
aagtcaaaat aagccattca gcatgttcag tttcttggaa aaggaagttt ctacccctga 7980
tgcctttgta ggcagatctg ttctcaccat taatcttttt gaaaatcttt taaagcagtt 8040
tttaaaaaga gagatgaaag catcacatta tataaccaaa gattacattg tacctgctaa 8100
gataccaaaa ttcataaggg caggggggga gcaagcatta gtgcctcttt gataagctgt 8160
ccaaagacag actaaaggac tctgctggtg actgacttat aagagctttg tgggtttttt 8220
tttccctaat aatatacatg tttagaagaa ttgaaaataa tttcgggaaa atgggattat 8280
gggtccttca ctaagtgatt ttataagcag aactggcttt ccttttctct agtagttgct 8340
gagcaaattg ttgaagctcc atcattgcat ggttggaaat ggagctgttc ttagccactg 8400
tgtttgctag tgcccatgtt agcttatctg aagatgtgaa accttgctg ataagggagc 8460
atttaaagta ctagattttg cactagaggg acagcaggca gaaatcctta tttctgccca 8520
ctttggatgg cacaaaaagt tatctgcagt tgaaggcaga aagttgaaat acattgtaaa 8580
tgaatatttg tatccatgtt tcaaaattga aatatatata tatatatata tatatatata 8640
tatatatata tagtgtgtgt gtgtgttctg atagctttaa ctttctctgc atctttatat 8700
ttggttccag atcacacctg atgccatgta cttgtgagag aggatgcagt tttgttttgg 8760
aagctctctc agaacaaaca agacacctgg attgatcagt taactaaaag ttttctcccc 8820
tattgggttt gacccacagg tcctgtgaag gagcagaggg ataaaaagag tagaggacat 8880
gatacattgt actttactag ttcaagacag atgaatgtgg aaagcataaa aactcaatgg 8940
aactgactga gatttaccac agggaaggcc caaacttggg gccaaaagcc tacccaagtg 9000
attgaccagt ggccccctaa tgggacctga gctgttggaa gaagagaact gttccttggt 9060
cttcaccatc cttgtgagag aagggcagtt tcctgcattg gaacctggag caagcgctct 9120
atctttcaca caaattccct cacctgagat tgaggtgctc ttgttactgg gtgtctgtgt 9180
[0006] gctgtaattc tggttttgga tatgttctgt aaagattttg acaaatgaaa atgtgttttt 9240
ctctgttaaa acttgtcaga gtactagaag ttgtatctct gtaggtgcag gtccatttct 9300
gcccacaggt agggtgtttt tctttgatta agagattgac acttctgttg cctaggacct 9360
cccaactcaa ccatttctag gtgaaggcag aaaaatccac attagttact cctcttcaga 9420
catttcagct gagataacaa atcttttgga atttttтcac ccatagaaag agtggtagat 9480
atttgaattt agcaggtgga gtttcatagt aaaaacagct tttgactcag ctttgattta 9540
tcctcatttg atttggccag aaagtaggta atatgcattg attggcttct gattccaatt 9600
cagtatagca aggtgctagg ttttttcctt tccccacctg tctcttagcc tggggaatta 9660
aatgagaagc cttagaatgg gtggcccttg tgacctgaaa cacttcccac ataagctact 9720
taacaagatt gtcatggagc tgcagattcc attgcccacc aaagactaga acacacacat 9780
atccatacac caaaggaaag acaattctga aatgctgttt ctctggtggt tccctctctg 9840
gctgctgcct cacagtatgg gaacctgtac tctgcagagg tgacaggcca gatttgcatt 9900
atctcacaac cttagccctt ggtgctaact gtcctacagt gaagtgcctg gggggttgtc 9960
ctatcccata agccacttgg atgctgacag cagccaccat cagaatgacc cacgcaaaaa 10020
aaagaaaaaa aaaattaaaa agtcccctca caacccagtg acacctttct gctttcctct 10080
agactggaac attgattagg gagtgcctca gacatgacat tcttgtgctg tccttggaat 10140
taatctggca gcaggaggga gcagactatg taaacagaga taaaaattaa ttttcaatat 10200
tgaaggaaaa aagaaataag aagagagaga gaaagaaagc atcacacaaa gattttctta 10260
aaagaaacaa ttttgcttga aatctcttta gatggggctc atttctcacg gtggcacttg 10320
gcctccactg ggcagcagga ccagctccaa gcgctagtgt tctgttctct ttttgtaatc 10380
ttggaatctt ttgttgctct aaatacaatt aaaaatggca gaaacttgtt tgttggacta 10440
catgtgtgac tttgggtctg tctctgcctc tgctttcaga aatgtcatcc attgtgtaaa 10500
atattggctt actggtctgc cagctaaaac ttggccacat cccctgttat ggctgcagga 10560
tcgagttatt gttaacaaag agacccaaga aaagctgcta atgtcctctt atcattgttg 10620
ttaatttgtt aaaacataaa gaaatctaaa atttcaaaaa a 10661
<210> 4

<211> 3641
<212> DNA
<213> 智人
<400> 4

gacactgaat ttggaaggtg gaggattttg ttttttttctt ttaagatctg ggcatctttt 60
gaatctaccc ttcaagtatt aagagacaga ctgtgagcct agcagggcag atcttgtcca 120
ccgtgtgtct tcttctgcac gagactttga ggctgtcaga gcgctttttg cgtggttgct 180
cccgcaagtt tccttctctg gagcttcccg caggtgggca gctagctgca gcgactaccg 240
catcatcaca gcctgttgaa ctcttctgag caagagaagg ggaggcgggg taagggaagt 300
aggtggaaga ttcagccaag ctcaaggatg gaagtgcagt tagggctggg aagggtctac 360
cctcggccgc cgtccaagac ctaccgagga gctttccaga atctgttcca gagcgtgcgc 420
gaagtgatcc agaacccggg ccccaggcac ccagaggccg cgagcgcagc acctcccggc 480
gccagtttgc tgctgcagca gcagcagcag cagcagcagc agcagcagca gcagcagcag 540
cagcagcagc agcagcagca gcagcagcag cagcagcagc aagagactag ccccaggcag 600
cagcagcagc agcagggtga ggatggttct ccccaagccc atcgtagagg ccccacaggc 660
tacctggtcc tggatgagga acagcaacct tcacagccgc agtcggccct ggagtgccac 720
cccgagagag gttgcgtccc agagcctgga gccgccgtgg ccgccagcaa ggggctgccg 780
cagcagctgc cagcacctcc ggacgaggat gactcagctg ccccatccac gttgtccctg 840
ctgggcccca ctttccccgg cttaagcagc tgctccgctg accttaaaga catcctgagc 900
gaggccagca ccatgcaact ccttcagcaa cagcagcagg aagcagtatc cgaaggcagc 960
agcagcggga gagcgaggga ggcctcgggg gctcccactt cctccaagga caattactta 1020
gggggcactt cgaccatttc tgacaacgcc aaggagttgt gtaaggcagt gtcggtgtcc 1080
atgggcctgg gtgtggaggc gttggagcat ctgagtccag gggaacagct tcgggggggat 1140
tgcatgtacg ccccactttt gggagttcca cccgctgtgc gtcccactcc ttgtgcccca 1200
ttggccgaat gcaaaggttc tctgctagac gacagcgcag gcaagagcac tgaagatact 1260
[0007] gctgagtatt ccccttttcaa gggaggttac accaaagggc tagaaggcga gagcctaggc 1320
tgctctggca gcgctgcagc agggagctcc gggacacttg aactgccgtc taccctgtct 1380
ctctacaagt ccggagcact ggacgaggca gctgcgtacc agagtcgcga ctactacaac 1440
tttccactgg ctctggccgg accgccgccc cctccgccgc ctccccatcc ccacgctcgc 1500
atcaagctgg agaacccgct ggactacggc agcgcctggg cggctgcggc ggcgcagtgc 1560
cgctatgggg acctggcgag cctgcatggc gcgggtgcag cgggacccgg ttctgggtca 1620
ccctcagccg ccgcttcctc atcctggcac actctcttca cagccgaaga aggccagttg 1680
tatggaccgt gtggtggtgg tgggggtggt ggcggcggcg gcggcggcgg cggcggcggc 1740
ggcggcggcg aggcgggagc tgtagccccc tacggctaca ctcggccccc tcaggggctg 1800
gcgggccagg aaagcgactt caccgcacct gatgtgtggt accctggcgg catggtgagc 1860
agagtgccct atcccagtcc cacttgtgtc aaaagcgaaa tgggcccctg gatggatagc 1920
tactccggac cttacgggga catgcgtttg gagactgcca gggaccatgt tttgcccatt 1980
gactattact ttccacccca gaagacctgc ctgatctgtg gagatgaagc ttctgggtgt 2040
cactatggag ctctcacatg tggaagctgc aaggtcttct tcaaaagagc cgctgaaggg 2100
aaacagaagt acctgtgcgc cagcagaaat gattgcacta ttgataaatt ccgaaggaaa 2160
aattgtccat cttgtcgtct tcggaaatgt tatgaagcag ggatgactct gggagaaaaa 2220
ttccgggttg gcaattgcaa gcatctcaaa atgaccagac cctgaagaaa ggctgacttg 2280
cctcattcaa aatgagggct ctagagggct ctagtggata gtctggagaa acctggcgtc 2340
tgaggcttag gagcttaggt ttttgctcct caacacagac tttgacgttg gggttggggg 2400
ctactctctt gattgctgac tccctccagc gggaccaata gtgttttcct acctcacagg 2460
gatgttgtga ggacgggctg tagaagtaat agtggttacc actcatgtag ttgtgagtat 2520
catgattatt gtttcctgta atgtggcttg gcattggcaa agtgcttttt gattgttctt 2580
gatcacatat gatgggggcc aggcactgac tcaggcggat gcagtgaagc tctggctcag 2640
tcgcttgctt ttcgtggtgt gctgccagga agaaactttg ctgatgggac tcaaggtgtc 2700
accttggaca agaagcaact gtgtctgtct gaggttcctg tggccatctt tatttgtgta 2760
ttaggcaatt cgtatttccc ccttaggttc tagccttctg gatcccagcc agtgacctag 2820

atcttagcct caggccctgt cactgagctg aaggtagtag ctgatccaca gaagttcagt 2880
aaacaaggac cagatttctg cttctccagg agaagaagcc agccaacccc tctcttcaaa 2940
cacactgaga gactacagtc cgactttccc tcttacatct agccttactg tagccacact 3000
ccttgattgc tctctcacat cacatgcttc tcttcatcag ttgtaagcct ctcattcttc 3060
tcccaagcca gactcaaata ttgtattgat gtcaaagaag aatcacttag agtttggaat 3120
atcttgttct ctctctgctc catagcttcc atattgacac cagtttcttt ctagtggaga 3180
agtggagtct gtgaagccag ggaaacacac atgtgagagt cagaaggact ctccctgact 3240
tgcctggggc ctgtctttcc caccttctcc agtctgtcta aacacacaca cacacacaca 3300
cacacacaca cacacacaca cacacgctct ctctctctct ccccccccaa cacacacaca 3360
ctctctctct cacacacaca cacatacaca cacacttctt tctctttccc ctgactcagc 3420
aacattctgg agaaaagcca aggaaggact tcaggagggg agtttccccc ttctcagggc 3480
agaattttaa tctccagacc aacaagaagt tccctaatgt ggattgaaag gctaatgagg 3540
tttatttta actactttct atttgtttga atgttgcata tttctactag tgaaattttc 3600
ccttaataaa gccattaata cacccaaaaa aaaaaaaaaa a 3641

<210> 5
<211> 1575
<212> DNA
<213> 智人
<400> 5

ctacgcccag gactggccta acctccgctg cctaaccgtc atccccctgc agccaccctt 60
cccagagtcc tttgcccagg ccaccccagg cttcttggca gccctgccgg gccacttgtc 120
ttcatgtctg ccaggggggag gtgggaagga ggtgggagga gggcgtgcag aggcagtctg 180
ggcttggcca gagctcaggg tgctgagcgt gtgaccagca gtgagcagag gccggccatg 240
gccagcctgg ggctgctgct cctgctctta ctgacagcac tgccaccgct gtggtcctcc 300
tcactgcctg ggctggacac tgctgaaagt aaagccacca ttgcagacct gatcctgtct 360
[0008] gcgctggaga gagccaccgt cttcctagaa cagaggctgc ctgaaatcaa cctggatggc 420
atggtggggg tccgagtgct ggaagagcag ctaaaaagtg tccgggagaa gtgggcccag 480
gagcccctgc tgcagccgct gagcctgcgc gtggggatgc tgggggagaa gctggaggct 540
gccatccaga gatccctcca ctacctcaag ctgagtgatc ccaagtacct aagagagttc 600
cagctgaccc tccagcccgg gttttggaag ctcccacatg cctggatcca cactgatgcc 660
tccttggtgt accccacgtt cgggccccag gactcattct cagaggagag aagtgacgtg 720
tgcctggtgc agctgctggg aaccgggacg gacagcagcg agccctgcgg cctctcagac 780
ctctgcagga gcctcatgac caagcccggc tgctcaggct actgcctgtc ccaccaactg 840
ctcttcttcc tctgggccag aatgaggggg tgcacacagg gaccactcca acagagccag 900
gactatatca acctcttctg cgccaacatg atggacttga accgcagagc tgaggccatc 960
ggatacgcct accctacccg ggacatcttc atggaaaaca tcatgttctg tggaatgggc 1020
ggcttctccg acttctacaa gctccggtgg ctggaggcca ttctcagctg gcagaaacag 1080
caggaaggat gcttcgggga gcctgatgct gaagatgaag aattatctaa agctattcaa 1140
tatcagcagc atttttcgag gagagtgaag aggcgagaaa aacaatttcc agatggctgc 1200
tcctcccaca acacagccac agcagtggca gccctgggtg gcttcctata catcctggca 1260
gaatacccca cagcaaacag agagccacac ccatccacac cgccaccacc aagcagccgc 1320
tgagacggac ggttccatgc cagctgcctg gaggaggaac agaccccttt agtcctcatc 1380
ccttagatcc tggagggcac ggatcacatc ctgggaagaa ggcatctgga ggataagcaa 1440
agccacccca acacccaatc ttggaagccc tgagtaggca gggccagggt aggtgggggc 1500
cgggagggac ccaggtgtga acggatgaat aaagttcaac tgcaactgaa aaaaaaaaaa 1560
aaaaaaaaaa aaaaa 1575

<210> 6
<211> 2175
<212> DNA
<213> 智人
<400> 6

tttcccgccc tctagtcgtg cgcggatctg acgcctgacg taattgcgta gacgccattt 60
tagccggtca gacaagcact ggacgtggcg gccattttgt tttggacacc gagcaggagc 120
tggcggccgc tgcagacgaa aggcaggaaa gggcaggccg ggtgagcaga cggatcggcc 180
gactagacag ccaaccagca acaacgaact gagctcgcat actaccgctt acgcatctaa 240
ccaaccgccc atctagctaa cccgagcccc tccaccgtca actcaggttc ggccggtccc 300
cggcccgcct gccggagccg tggtggcagc cccgggagga gcactggcgt ctgtttcctt 360
cgattctcgg gattcgaaga tggctgcaca gtcagcgccg aaagttgtgc taaaaagcac 420
caccaagatg tctctaaatg agcgctttac taatatgctg aagaacaaac agccgacgcc 480
agtgaatatt cgggcttcga tgcagcaaca acagcagcta gccagtgcca gaaacagaag 540
actggcccag cagatggaga atagaccctc tgtccaggca gcattaaaac ttaagcagaa 600
gagcttaaag cagcgcctgg gtaagagtaa catccaggca cggttaggcc gacccatagg 660
ggccctggcc aggggagcaa tcggaggacg aggcctaccc ataatccaga gaggcttgcc 720
cagaggagga ctacgtgggg gacgtgccac cagaacccta cttaggggcg ggatgtcact 780
ccgaggtcaa aacctgctcc gaggtggacg agccgtagct ccccgaatgg gcttaagaag 840
aggtggtgtt cgaggtcgtg gaggtcctgg gagaggggcc ctagggcgtg gagctatggg 900
tcgtggcgga atcggtggta gaggtcgggg tatgataggt cggggaagag ggggctttgg 960
aggccgaggc cgaggccgtg gacgagggag aggtgccctt gctcgccctg tattgaccaa 1020
ggagcagctg gacaaccaat tggatgcata tatgtcgaaa acaaaaggac acctggatgc 1080
tgagttggat gcctacatgg cgcagacaga tcccgaaacc aatgattgaa gcctgcccat 1140
cctcccatga gagactcttg ttagtcaaca catctgtaaa taaccttgag ataacagatg 1200
agaagaaatc tgattgatgc tggatggacc tatcacaata ggctgtggac ttacttgcca 1260
ccagcttgtg catttagtgt gttcctttta ctttttgata ctgtgttgta tgaaaccctt 1320
ttgtcctttg atttggtttt ttgtttttgt ttttttaggg gggaggggggg gtttcccctc 1380
ctttgcccag acttctcttt gaacacaaat gcattagcct tgtggctaga acaccctctt 1440
cctacctctg tctcccctca cttgtcatat gctctgacat gctaacattt cttttgttca 1500
[0009] tccctgttgc ccccacagaa acatcccaga aaaaccggtc agtgttcctt cctccctgat 1560
ccttaggttt ctgaaatagg gttctgttac atcctcttcg atagcctgtt taaaatgttt 1620
agaaggtctg gagctcaaaa atgcgttctt ccacattgat aatttagtaa actgagaaca 1680
ttgacatcac tacagggcag cataagaggt tgcttacatg tggtagcagc tctggtttga 1740
ttcaagttgc taccatgtac attgacagca catataccat aaccagcgtg ttgggttgaa 1800
ttgcactttc tacctttgta tgagatttac agactttcct tctgggtttg tatcatgacc 1860
agaggggtac tatagggttg gtttatactg caatatagag gatcagaagc catttgattt 1920
ggtaggtgtg tcagaaggga gaatgatggc agacgaactg ctggaagagg tcagaagata 1980
gccatgctaa aatgcaatta tatcctcatg tttatcccaa actaatcttg gacttttcca 2040
ctcattagct ttgttttgcc cttgtttccc ttgaaggttt aagttcaacc atattctgtc 2100
aactgttcag tttcagtgga atcttgtatt tctggttcat tataacaaac tgttcgctta 2160
aatccaaaaa aaaaa 2175

<210> 7
<211> 5927
<212> DNA
<213> 智人
<400> 7

tcgtcggagc agacgggagt ttctcctcgg ggtcggagca ggaggcacgc ggagtgtgag 60
gccacgcatg agcggacgct aacccccctcc ccagccacaa agagtctaca tgtctagggt 120
ctagacatgt tcagctttgt ggacctccgg ctcctgctcc tcttagcggc caccgccctc 180
ctgacgcacg gccaagagga aggccaagtc gagggccaag acgaagacat cccaccaatc 240
acctgcgtac agaacggcct caggtaccat gaccgagacg tgtggaaacc cgagccctgc 300
cggatctgcg tctgcgacaa cggcaaggtg ttgtgcgatg acgtgatctg tgacgagacc 360
aagaactgcc ccggcgccga agtccccgag ggcgagtgct gtcccgtctg ccccgacggc 420
tcagagtcac ccaccgacca agaaaccacc ggcgtcgagg gacccaaggg agacactggc 480
ccccgaggcc caaggggacc cgcaggcccc cctggccgag atggcatccc tggacagcct 540

ggacttcccg gacccccggg acccccggga cctcccggac cccctggcct cggaggaaac 600
tttgctcccc agctgtctta tggctatgat gagaaatcaa ccggaggaat ttccgtgcct 660
ggccccatgg gtccctctgg tcctcgtggt ctccctggcc cccctggtgc acctggtccc 720
caaggcttcc aaggtccccc tggtgagcct ggcgagcctg gagcttcagg tcccatgggt 780
ccccgaggtc ccccaggtcc ccctggaaag aatggagatg atggggaagc tggaaaacct 840
ggtcgtcctg gtgagcgtgg gcctcctggg cctcagggtg ctcgaggatt gcccggaaca 900
gctggcctcc ctggaatgaa gggacacaga ggtttcagtg gtttggatgg tgccaaggga 960
gatgctggtc ctgctggtcc taagggtgag cctggcagcc ctggtgaaaa tggagctcct 1020
ggtcagatgg gcccccgtgg cctgcctggt gagagaggtc gccctggagc ccctggccct 1080
gctggtgctc gtggaaatga tggtgctact ggtgctgccg ggcccccctgg tcccaccggc 1140
cccgctggtc ctcctggctt ccctggtgct gttggtgcta agggtgaagc tggtccccaa 1200
gggccccgag gctctgaagg tccccagggt gtgcgtggtg agcctggccc ccctggccct 1260
gctggtgctg ctggccctgc tggaaaccct ggtgctgatg gacagcctgg tgctaaaggt 1320
gccaatggtg ctcctggtat tgctggtgct cctggcttcc ctggtgcccg aggcccctct 1380
ggaccccagg gccccggcgg ccctcctggt cccaagggta acagcggtga acctggtgct 1440
cctggcagca aaggagacac tggtgctaag ggagagcctg gccctgttgg tgttcaagga 1500
ccccctggcc ctgctggaga ggaaggaaag cgaggagctc gaggtgaacc cggacccact 1560
ggcctgcccg gacccccctgg cgagcgtggt ggacctggta gccgtggttt ccctggcgca 1620
gatggtgttg ctggtcccaa gggtcccgct ggtgaacgtg gttctcctgg ccctgctggc 1680
cccaaaggat ctcctggtga agctggtcgt cccggtgaag ctggtctgcc tggtgccaag 1740
ggtctgactg gaagccctgg cagccctggt cctgatggca aaactggccc ccctggtccc 1800
gccggtcaag atggtcgccc cggaccccca ggcccacctg gtgcccgtgg tcaggctggt 1860
gtgatgggat tccctggacc taaaggtgct gctggagagc ccggcaaggc tggagagcga 1920
ggtgttcccg gacccccctgg cgctgtcggt cctgctggca aagatggaga ggctggagct 1980
cagggacccc ctggccctgc tggtcccgct ggcgagagag gtgaacaagg ccctgctggc 2040
[0010] tcccccggat tccagggtct ccctggtcct gctggtcctc caggtgaagc aggcaaacct 2100
ggtgaacagg gtgttcctgg agaccttggc gcccctggcc cctctggagc aagaggcgag 2160
agaggtttcc ctggcgagcg tggtgtgcaa ggtccccctg gtcctgctgg tccccgaggg 2220
gccaacggtg ctcccggcaa cgatggtgct aagggtgatg ctggtgcccc tggagctccc 2280
ggtagccagg gcgcccctgg ccttcaggga atgcctggtg aacgtggtgc agctggtctt 2340
ccagggccta agggtgacag aggtgatgct ggtcccaaag gtgctgatgg ctctcctggc 2400
aaagatggcg tccgtggtct gactggcccc attggtcctc ctggccctgc tggtgccctt 2460
ggtgacaagg gtgaaagtgg tcccagcggc cctgctggtc ccactggagc tcgtggtgcc 2520
cccggagacc gtggtgagcc tggtcccccc ggccctgctg gctttgctgg ccccctggt 2580
gctgacggcc aacctggtgc taaaggcgaa cctggtgatg ctggtgctaa aggcgatgct 2640
ggtcccctg gccctgccgg acccgctgga ccccctggcc ccattggtaa tgttggtgct 2700
cctggagcca aaggtgctcg cggcagcgct ggtcccctg gtgctactgg tttcctggt 2760
gctgctggcc gagtcggtcc tcctggcccc tctggaaatg ctggaccccc tggccctcct 2820
ggtcctgctg gcaaagaagg cggcaaaggt ccccgtggtg agactggccc tgctggacgt 2880
cctggtgaag ttggtccccc tggtcccctt ggccctgctg gcgagaaagg atcccctggt 2940
gctgatggtc ctgctggtgc tcctggtact cccgggcctc aaggtattgc tggacagcgt 3000
ggtgtggtcg gcctgcctgg tcagagagga gagagaggct tccctggtct tcctggcccc 3060
tctggtgaac ctggcaaaca aggtccctct ggagcaagtg gtgaacgtgg tccccctggt 3120
cccatgggcc cccctggatt ggctggaccc cctggtgaat ctggacgtga gggggctcct 3180
ggtgccgaag gttcccctgg acgagacggt tctcctggcg ccaagggtga ccgtggtgag 3240
accggccccg ctggaccccc tggtgctcct ggtgctcctg gtgcccctgg ccccgttggc 3300
cctgctggca agagtggtga tcgtggtgag actggtcctg ctggtcccgc cggtcctgtc 3360
ggccctgttg gcgcccgtgg ccccgccgga ccccaaggcc cccgtggtga caagggtgag 3420
acaggcgaac agggcgacag aggcataaag ggtcaccgtg gcttctctgg cctccagggt 3480
ccccctggcc ctcctggctc tcctggtgaa caaggtccct ctggagcctc tggtcctgct 3540
ggtccccgag gtccccctgg ctctgctggt gctcctggca aagatggact caacggtctc 3600

cctggcccca ttgggccccc tggtcctcgc ggtcgcactg gtgatgctgg tcctgttggt 3660
ccccccggcc ctcctggacc tcctggtccc cctggtcctc ccagcgctgg tttcgacttc 3720
agcttcctgc cccagccacc tcaagagaag gctcacgatg gtggccgcta ctaccgggct 3780
gatgatgcca atgtggttcg tgaccgtgac ctcgaggtgg acaccaccct caagagcctg 3840
agccagcaga tcgagaacat ccggagccca gagggcagcc gcaagaaccc cgcccgcacc 3900
tgccgtgacc tcaagatgtg ccactctgac tggaagagtg gagagtactg gattgacccc 3960
aaccaaggct gcaacctgga tgccatcaaa gtcttctgca acatggagac tggtgagacc 4020
tgcgtgtacc ccactcagcc cagtgtggcc cagaagaact ggtacatcag caagaacccc 4080
aaggacaaga ggcatgtctg gttcggcgag agcatgaccg atggattcca gttcgagtat 4140
ggcggccagg gctccgaccc tgccgatgtg gccatccagc tgaccttcct gcgcctgatg 4200
tccaccgagg cctcccagaa catcacctac cactgcaaga acagcgtggc ctacatggac 4260
cagcagactg gcaacctcaa gaaggccctg ctcctccagg gctccaacga gatcgagatc 4320
cgcgccgagg gcaacagccg cttcacctac agcgtcactg tcgatggctg cacgagtcac 4380
accggagcct ggggcaagac agtgattgaa tacaaaacca ccaagacctc ccgcctgccc 4440
atcatcgatg tggccccctt ggacgttggt gccccagacc aggaattcgg cttcgacgtt 4500
ggccctgtct gcttcctgta aactccctcc atcccaacct ggctccctcc cacccaacca 4560
actttccccc caacccggaa acagacaagc aacccaaact gaaccccctc aaaagccaaa 4620
aaatgggaga caatttcaca tggactttgg aaaatatttt tttcctttgc attcatctct 4680
caaacttagt ttttatcttt gaccaaccga acatgaccaa aaaccaaaag tgcattcaac 4740
cttaccaaaa aaaaaaaaaa aaaaagaata aataaataac tttttaaaaa aggaagcttg 4800
gtccacttgc ttgaagaccc atgcgggggt aagtcccttt ctgcccgttg ggcttatgaa 4860
accccaatgc tgccctttct gctcctttct ccacaccccc cttggggcct cccctccact 4920
ccttcccaaa tctgtctccc cagaagacac aggaaacaat gtattgtctg cccagcaatc 4980
aaaggcaatg ctcaaacacc caagtggccc ccaccctcag cccgctcctg cccgcccagc 5040
acccccaggc cctgggggac ctggggttct cagactgcca aagaagcctt gccatctggc 5100
[0011] gctcccatgg ctcttgcaac atctcccctt cgtttttgag ggggtcatgc cgggggagcc 5160
accagcccct cactgggttc ggaggagagt caggaagggc cacgacaaag cagaaacatc 5220
ggatttgggg aacgcgtgtc aatcccttgt gccgcagggc tgggcgggag agactgttct 5280
gttccttgtg taactgtgtt gctgaaagac tacctcgttc ttgtcttgat gtgtcaccgg 5340
ggcaactgcc tgggggcggg gatgggggca gggtggaagc ggctccccat tttataccaa 5400
aggtgctaca tctatgtgat gggtggggtg gggagggaat cactggtgct atagaaattg 5460
agatgccccc ccaggccagc aaatgttcct ttttgttcaa agtctatttt tattccttga 5520
tatttttctt ttttttttttt tttttttgtg gatggggact tgtgaatttt tctaaaggtg 5580
ctatttaaca tgggaggaga gcgtgtgcgg ctccagccca gcccgctgct cactttccac 5640
cctctctcca cctgcctctg gcttctcagg cctctgctct ccgacctctc tcctctgaaa 5700
ccctcctcca cagctgcagc ccatcctccc ggctccctcc tagtctgtcc tgcgtcctct 5760
gtccccgggt ttcagagaca acttcccaaa gcacaaagca gtttttcccc ctaggggtgg 5820
gaggaagcaa aagactctgt acctattttg tatgtgtata ataatttgag atgtttttaa 5880
ttattttgat tgctggaata aagcatgtgg aaatgaccca aacataa 5927

<210> 8
<211> 4811
<212> DNA
<213> 智人
<400> 8

tttcttctcc ggccctggca ggttccggga gcctcggctc gtgggtgccg gaagtggagg 60
cggttggtgg ggttggcggg gctcagcgac gctgcgcggg tggcggtttg cgaactgcgg 120
gtggactgtg tagtgaccgg cgtcccgctg tctcgccccg tggcgggtga gcgagggtgc 180
gtggtgcgcg gcggcggcgg aacgaacgcg gtgcgggcgg ggcgcccgcc gcagggccca 240
tggcctcctg cgcgagcatc gacatcgagg acgccacgca gcacctgcgg gacatcctca 300
agctggaccg gcccgcgggc ggccccagtg cagagagccc acggccatcc agtgcctaca 360
atggggacct caatggactt ctggtcccag acccgctctg ctcaggtgat agtacctcag 420

caaacaagac tggtcttcgg accatgccac ccattaacct gcaagagaag caggtcatct 480
gtctctcagg agatgatagc tccacctgca ttgggatttt ggccaaggag gtggagattg 540
tggctagcag tgactctagc atttcaagca aggcccgggg aagcaacaag gtgaaaattc 600
agcctgtcgc caagtatgac tgggaacaga agtactacta tggcaacctg attgctgtgt 660
ctaactcctt cttggcctat gccattcggg ctgccaacaa tggctctgcc atggtgcggg 720
tgatcagcgt cagcacttcg gagcggacct tgctcaaggg cttcacaggc agtgtggctg 780
atctggcttt cgcgcacctc aactctccac agctggcctg cctggatgag gcaggcaacc 840
tgttcgtgtg gcgcttggct ctggttaatg gcaaaattca agaagagatc ttggtccata 900
ttcggcagcc agagggcacg ccactgaacc actttcgcag gatcatctgg tgccccttca 960
tccctgagga gagcgaagac tgctgtgagg agagcagccc aacagtggcc ctgctgcatg 1020
aagaccgggc tgaggtgtgg gacctggaca tgctccgctc cagccacagt acctggcctg 1080
tggatgttag ccagatcaag cagggcttca ttgtggtaaa aggtcatagc acgtgcctca 1140
gtgaaggagc cctctctcct gatgggactg tgctggctac tgcgagccac gatggctatg 1200
tcaagttctg gcagatctac attgaggggc aagatgagcc aaggtgtctg cacgagtgga 1260
aacctcatga tgggcggccc ctctcctgcc tcctgttctg tgacaaccat aagaaacaag 1320
accctgatgt ccctttctgg aggttcctta ttactggtgc tgaccagaac cgagagttaa 1380
agatgtggtg tacagtatcc tggacctgcc tgcagactat tcgcttctcc ccagatatct 1440
tcagctcagt gagtgtgccc cctagcctca aggtttgctt ggacctctca gcagaatacc 1500
tgattctcag cgatgtgcaa cggaaggtcc tctatgtgat ggagctgctg caaaaccagg 1560
aggagggcca cgcctgcttc agctccatct cggagttcct gctcacccac cctgtgctga 1620
gctttggtat ccaggttgtg agtcgctgcc ggctacggca cactgaggtg ctgcctgccg 1680
aagaggaaaa tgacagcctg ggtgctgatg gtacccatgg agccggtgcc atggagtctg 1740
cggccggtgt gctcatcaag ctcttttgtg tgcatactaa ggcactgcaa gatgtgcaga 1800
tccgcttcca gccacagctg aaccctgatg tggtggcccc actgcccacc cacactgccc 1860
acgaggactt cacatttgga gagtctcggc ccgaactggg ctctgagggc ctggggtcag 1920
[0012] ccgctcacgg ctcccagcct gacctccgac gaatcgtgga gctgcctgca cctgccgact 1980
tcctcagtct gagcagtgag accaagccca agttgatgac acctgacgcc ttcatgacac 2040
ctagcgcctc cttgcagcag atcactgcct ctcccagcag cagcagcagc ggtagcagca 2100
gcagcagcag cagtagcagc agctccctta cagctgtgtc tgccatgagc agcacctcag 2160
ctgtggaccc ctccttgacc aggccacctg aggagctgac cttgagcccc aagctgcagc 2220
tggatggcag cctgacaatg agcagcagtg gcagccttca ggcaagcccg cgtggcctcc 2280
tgcctggcct gctcccagcc ccagctgaca aactgactcc caaggggccg ggccaggtgc 2340
ctactgccac ctctgcactg tccctggagc tgcaggaagt ggagcccctg gggctacccc 2400
aagcctcccc tagccgcact cgttcccctg atgtcatctc ctcagcttcc actgccctgt 2460
cccaggacat ccctgagatt gcatctgagg ccctgtcccg tggttttggc tcctctgcac 2520
cagagggcct tgagccagac agtatggctt cagccgcctc ggcactgcac ctgctgtccc 2580
cacggccccg gccagggccc gagctcggcc cccagctcgg gcttgatgga ggccctgggg 2640
atggagatcg gcataatacc ccctccctcc tggaggcagc cttgacccag gaggcctcga 2700
ctcctgacag tcaggtttgg cccacagcac ctgacattac tcgtgagacc tgcagcaccc 2760
tggcagaaag ccccaggaat ggccttcagg aaaagcacaa gagcctggcc ttccaccgac 2820
caccatatca cctgctgcag caacgtgaca gccaggatgc cagtgctgag caaagtgacc 2880
atgatgatga ggtggccagc cttgcctctg cttcaggagg ctttggcacc aaagttcctg 2940
ctccacggct gcctgccaag gactggaaga ccaagggatc ccctcgaacc tcacccaagc 3000
tcaagaggaa aagcaagaag gatgatgggg atgcagccat gggatcccgg ctcacagagc 3060
accaggtggc agagcccccc gaggactggc cagcactaat ttggcaacag cagagagagc 3120
tggcagagct gcggcacagc caggaagagc tgctgcagcg tctgtgtacc caactcgaag 3180
gcctgcagag cacagtcaca ggccacgtag aacgtgccct tgagactcgg cacgagcagg 3240
aacagcggcg gctggagcga gcactggctg aggggcagca gcggggaggg cagctgcagg 3300
agcagctgac acaacagttg tcccaagcac tgtcgtcagc tgtagctggg cggctagagc 3360
gcagcatacg ggatgagatc aagaagacag tccctccatg tgtctcaagg agtctggagc 3420
ctatggcagg ccaactgagc aactcagtgg ctaccaagct cacagctgtg gagggcagca 3480

tgaaagagaa catctccaag ctgctcaagt ccaagaactt gactgatgcc atcgcccgag 3540
cagctgcaga cacattacaa gggccgatgc aggctgccta ccgggaagcc ttccagagtg 3600
tggtgctgcc ggcctttgag aagagctgcc aggccatgtt ccagcaaatc aatgatagct 3660
tccggctggg gacacaggaa tacttgcagc agctagaaag ccacatgaag agccggaagg 3720
cacgggaaca ggaggccagg gagcctgtgc tagcccagct gcggggcctg gtcagcacac 3780
tgcagagtgc cactgagcag atggcagcca ccgtggccgg cagtgttcgt gctgaggtgc 3840
agcaccagct gcatgtggct gtgggcagcc tgcaggagtc cattttagca caggtacagc 3900
gcatcgttaa gggtgaggtg agtgtggcgc tcaaggagca gcaggccgcc gtcacctcca 3960
gcatcatgca ggccatgcgc tcagctgctg gcacacctgt cccctctgcc caccttgact 4020
gccaggccca gcaagcccat atcctgcagc tgctgcagca gggccacctc aatcaggcct 4080
tccagcaggc gctgacagct gctgacctga acctggtgct gtatgtgtgt gaaactgtgg 4140
acccagccca ggtttttggg cagccaccct gcccgctctc ccagcctgtg ctcctttccc 4200
tcatccagca gctggcatct gaccttggca ctcgaactga cctcaagctc agctacctgg 4260
aagaggccgt gatgcacctg gaccacagtg accccatcac tcgggaccac atgggctccg 4320
ttatggccca ggtgcgccaa aagctttttc agttcctgca ggctgagcca cacaactcac 4380
ttggcaaagc agctcggcgt ctcagcctca tgctgcatgg cctcgtgacc cccagcctcc 4440
cttagctgct aagcctgcct tgcccagggg tgggatggca ctgaaggcca gcagacaggc 4500
ctaggctggg gcagggtcac ggctggcctt tacctgctca ggccccccatc tctggggtgt 4560
ttgggggtca gggagcaggg agcactggcc gtggtctaca gcgtgtggta gtcagaaggt 4620
ttagctgggc ccagggcagg tattgcgcct gcttgggttc tgccatgcct ggagcatgac 4680
cctgagatcg tgacaccact tgagtggaat tttccatgtt ccttttttacc tctaatttgg 4740
atctttttgt ttttgaaaaa cattgagaaa ttcaattaaa tgcttttgga ataaaatgga 4800
gtatgtgtgt g 4811

<210> 9
<211> 4654
[0013] <212> DNA
<213> 智人
<400> 9

ggcggcggct ggaggagagc gcggtggaga gccgagcggg cgggcggcgg gtgcggagcg 60
ggcgagggag cgcgcgcggc cgccacaaag ctcgggcgcc gcgggggctgc atgcggcgta 120
cctggcccgg cgcggcgact gctctccggg ctggcggggg ccggccgcga gccccgggggg 180
ccccgaggcc gcagcttgcc tgcgcgctct gagccttcgc aactcgcgag caaagtttgg 240
tggaggcaac gccaagcctg agtcctttct tcctctcgtt ccccaaatcc gagggcagcc 300
cgcgggcgtc atgcccgcgc tcctccgcag cctggggtac gcgtgaagcc cgggaggctt 360
ggcgccggcg aagacccaag gaccactctt ctgcgtttgg agttgctccc cgcaaccccg 420
ggctcgtcgc tttctccatc ccgacccacg cggggcgcgg ggacaacaca ggtcgcggag 480
gagcgttgcc attcaagtga ctgcagcagc agcggcagcg cctcggttcc tgagcccacc 540
gcaggctgaa ggcattgcgc gtagtccatg cccgtagagg aagtgtgcag atgggattaa 600
cgtccacatg gagatatgga agaggaccgg ggattggtac cgtaaccatg gtcagctggg 660
gtcgtttcat ctgcctggtc gtggtcacca tggcaacctt gtccctggcc cggccctcct 720
tcagtttagt tgaggatacc acattagagc cagaagagcc accaaccaaa taccaaatct 780
ctcaaccaga agtgtacgtg gctgcgccag gggagtcgct agaggtgcgc tgcctgttga 840
aagatgccgc cgtgatcagt tggactaagg atggggtgca cttggggccc aacaatagga 900
cagtgcttat tggggagtac ttgcagataa agggcgccac gcctagagac tccggcctct 960
atgcttgtac tgccagtagg actgtagaca gtgaaacttg gtacttcatg gtgaatgtca 1020
cagatgccat ctcatccgga gatgatgagg atgacaccga tggtgcggaa gattttgtca 1080
gtgagaacag taacaacaag agagcaccat actggaccaa cacagaaaag atggaaaagc 1140
ggctccatgc tgtgcctgcg gccaacactg tcaagtttcg ctgcccagcc gggggggaacc 1200
caatgccaac catgcggtgg ctgaaaaacg ggaaggagtt taagcaggag catcgcattg 1260
gaggctacaa ggtacgaaac cagcactgga gcctcattat ggaaagtgtg gtcccatctg 1320
acaagggaaa ttatacctgt gtagtggaga atgaatacgg gtccatcaat cacacgtacc 1380

acctggatgt tgtggagcga tcgcctcacc ggcccatcct ccaagccgga ctgccggcaa 1440
atgcctccac agtggtcgga ggagacgtag agtttgtctg caaggtttac agtgatgccc 1500
agccccacat ccagtggatc aagcacgtgg aaaagaacgg cagtaaatac gggcccgacg 1560
ggctgcccta cctcaaggtt ctcaaggccg ccggtgttaa caccacggac aaagagattg 1620
aggttctcta tattcggaat gtaacttttg aggacgctgg ggaatatacg tgcttggcgg 1680
gtaattctat tgggatatcc tttcactctg catggttgac agttctgcca gcgcctggaa 1740
gagaaaagga gattacagct tccccagact acctggagat agccatttac tgcatagggg 1800
tcttcttaat cgcctgtatg gtggtaacag tcatcctgtg ccgaatgaag aacacgacca 1860
agaagccaga cttcagcagc cagccggctg tgcacaagct gaccaaacgt atccccctgc 1920
ggagacaggt aacagtttcg gctgagtcca gctcctccat gaactccaac accccgctgg 1980
tgaggataac aacacgcctc tcttcaacgg cagacacccc catgctggca ggggtctccg 2040
agtatgaact tccagaggac ccaaaatggg agtttccaag agataagctg acactgggca 2100
agcccctggg agaaggttgc tttgggcaag tggtcatggc ggaagcagtg ggaattgaca 2160
aagacaagcc caaggaggcg gtcaccgtgg ccgtgaagat gttgaaagat gatgccacag 2220
agaaagacct ttctgatctg gtgtcagaga tggagatgat gaagatgatt gggaaacaca 2280
agaatatcat aaatcttctt ggagcctgca cacaggatgg gcctctctat gtcatagttg 2340
agtatgcctc taaaggcaac ctccgagaat acctccgagc ccggaggcca cccgggatgg 2400
agtactccta tgacattaac cgtgttcctg aggagcagat gaccttcaag gacttggtgt 2460
catgcaccta ccagctggcc agaggcatgg agtacttggc ttcccaaaaa tgtattcatc 2520
gagatttagc agccagaaat gttttggtaa cagaaaacaa tgtgatgaaa atagcagact 2580
ttggactcgc cagagatatc aacaatatag actattacaa aaagaccacc aatgggcggc 2640
ttccagtcaa gtggatggct ccagaagccc tgtttgatag agtatacact catcagagtg 2700
atgtctggtc cttcggggtg ttaatgtggg agatcttcac tttaggggggc tcgccctacc 2760
cagggattcc cgtggaggaa ctttttaagc tgctgaagga aggacacaga atggataagc 2820
cagccaactg caccaacgaa ctgtacatga tgatgaggga ctgttggcat gcagtgccct 2880
[0014] cccagagacc aacgttcaag cagttggtag aagacttgga tcgaattctc actctcacaa 2940
ccaatgagga atacttggac ctcagccaac ctctcgaaca gtattcacct agttaccctg 3000
acacaagaag ttcttgttct tcaggagatg attctgtttt ttctccagac cccatgcctt 3060
acgaaccatg ccttcctcag tatccacaca taaacggcag tgttaaaaca tgaatgactg 3120
tgtctgcctg tccccaaaca ggacagcact gggaacctag ctacactgag cagggagacc 3180
atgcctccca gagcttgttg tctccacttg tatatatgga tcagaggagt aaataattgg 3240
aaaagtaatc agcatatgtg taaagattta tacagttgaa aacttgtaat cttccccagg 3300
aggagaagaa ggtttctgga gcagtggact gccacaagcc accatgtaac ccctctcacc 3360
tgccgtgcgt actggctgtg gaccagtagg actcaaggtg gacgtgcgtt ctgccttcct 3420
tgttaatttt gtaataattg gagaagattt atgtcagcac acacttacag agcacaaatg 3480
cagtatatag gtgctggatg tatgtaaata tattcaaatt atgtataaat atatattata 3540
tatttacaag gagttatttt ttgtattgat tttaaatgga tgtcccaatg cacctagaaa 3600
attggtctct ctttttttaa tagctatttg ctaaatgctg ttcttacaca taatttctta 3660
attttcaccg agcagaggtg gaaaaatact tttgctttca gggaaaatgg tataacgtta 3720
atttattaat aaattggtaa tatacaaaac aattaatcat ttatagtttt ttttgtaatt 3780
taagtggcat ttctatgcag gcagcacagc agactagtta atctattgct tggacttaac 3840
tagttatcag atcctttgaa aagagaatat ttacaatata tgactaattt ggggaaaatg 3900
aagttttgat ttatttgtgt ttaaatgctg ctgtcagacg attgttctta gacctcctaa 3960
atgccccata ttaaaagaac tcattcatag gaaggtgttt cattttggtg tgcaaccctg 4020
tcattacgtc aacgcaacgt ctaactggac ttcccaagat aaatggtacc agcgtcctct 4080
taaaagatgc cttaatccat tccttgagga cagaccttag ttgaaatgat agcagaatgt 4140
gcttctctct ggcagctggc cttctgcttc tgagttgcac attaatcaga ttagcctgta 4200
ttctcttcag tgaattttga taatggcttc cagactcttt ggcgttggag acgcctgtta 4260
ggatcttcaa gtcccatcat agaaaattga aacacagagt tgttctgctg atagttttgg 4320
ggatacgtcc atctttttaa gggattgctt tcatctaatt ctggcaggac ctcaccaaaa 4380
gatccagcct catacctaca tcagacaaaa tatcgccgtt gttccttctg tactaaagta 4440

ttgtgttttg ctttggaaac acccactcac tttgcaatag ccgtgcaaga tgaatgcaga 4500
ttacactgat cttatgtgtt acaaaattgg agaaagtatt taataaaacc tgttaatttt 4560
tatactgaca ataaaaatgt ttctacagat attaatgtta acaagacaaa ataaatgtca 4620
cgcaacttat ttttttaata aaaaaaaaaa aaaa 4654

<210> 10
<211> 713
<212> DNA
<213> 智人
<400> 10

ccccacatcg gtccgtcctg cttccagctg ctgcagcgcg ccttcgccgc caaagcatcc 60
agcagccccc tgctccggcc cagcatggcg accccgaccc agacccccac aaaggctcct 120
gaggaacctg acccatttta ctatgactac aacacggtgc agactgtggg catgactctg 180
gcaaccatct tgttcctgct gggtatcctc atcgtcatca gcaagaaggt gaagtgcagg 240
aaggcggact ccaggtctga gagcccaacc tgcaaatcct gtaagtctga gcttccctct 300
tcagcccctg gtggcggcgg cgtgtaacac cttcccgagg aaactccgct gccgaccctg 360
cctgagcgcg ggagcctgag gaccgggtgg aggcggtggg gacccagccg cgcgccggga 420
gcgctccccg gaatgagccg ccccacccac cccaaggctg gagccgctgc accctgctgt 480
ccctctccag gccttggcaa tgacgatccc ccaaagagcc cgtctgcacc ccagacccag 540
ggcctcaggc ctccagctcc tgggatccgg gagtccatcc cggcccagca cccccagcat 600
ccccgtgtat ggcccccctg cacctccttg tctcatcccc gaagatccgt ccccctggcc 660
cctcagtgtc catgtcttga gcttaataaa tgtgcatttg gttttttcct ctg 713

<210> 11
<211> 8518
<212> DNA
<213> 智人

[0015] <400> 11

accctcttgg tgtgcgcgtc atggccgtca gcaccgcgtt cccgtcctct tccgcttggc 60
cccagaaagt ttcggttctg cccggcggtg gacccacgag cgcgtgccac catggagtct 120
gaccactgct gagcagacag ccaccgaggg ccgaaattct gagccttcct ctggacccag 180
gcaggagaca tacagacaag aaaggcaaac tcaccatggc ctccaccaat gcagagagcc 240
agctccagag aatcatccga gacttgcaag atgctgtgac agaactaagc aaagaatttc 300
aggaagcagg ggaacccatc acggatgaca gcaccagctt gcataaattt tcttataaac 360
ttgagtatct cctgcaattt gatcagaaag agaaggccac cctcctgggc aacaagaagg 420
actactggga ttacttctgt gcctgcctgg ccaaggtgaa aggagccaat gatgggatcc 480
gctttgtcaa gtctatctca gagctccgaa catccttggg gaaaggaaga gcatttattc 540
gctactcctt ggtgcaccag aggttggcag acaccttaca gcagtgcttc atgaacacca 600
aagtgaccag tgactggtac tatgcaagaa gccccttttct gcagccaaag ctgagctcgg 660
acattgtggg ccaactctat gagctgactg aggttcagtt tgacctggcg tcgaggggct 720
ttgacttgga tgctgcctgg ccaacatttg ccaggaggac gctgaccact ggctcttctg 780
cttacctgtg gaaacccccct agccgcagct ccagcatgag cagcttggtg agcagctacc 840
tgcagactca agagatggtg tccaactttg acctgaacag ccccctaaac aacgaggcat 900
tggagggctt tgatgagatg cgactagagc tggaccagtt ggaggtgcgg gagaagcagc 960
tacgggagcg catgcagcag ctggacagag agaaccagga gctgagggca gctgtcagcc 1020
agcaagggga gcaactgcag acagagaggg agagggggcg cactgcagcg gaggacaacg 1080
ttcgcctcac ttgcttggta gctgagctcc agaagcagtg ggaggtcacc caggccaccc 1140
agaacactgt gaaggagctg cagacatgcc tgcagggcct ggagctagga gcagcagaga 1200
aggaggagga ctaccacaca gccctgcggc ggctggagtc catgctgcag cccttggcac 1260
aggagcttga ggccacacgg gactcactgg acaagaaaaa ccagcattta gccagcttcc 1320
caggctggct agccatggct cagcagaagg cagatacggc atcagacaca aagggccggc 1380
aagaacctat tcccagtgat gcggcccagg agatgcagga gctaggggag aagcttcaag 1440
ccctagaaag ggagagaacc aaggtcgagg aggtcaacag acagcagagt gcccaactgg 1500

aacagctggt caaggagctt cagctgaaag aggatgcccg ggccagcctg gagcgcctgg 1560
tgaaggagat ggccccactc caggaggagt tgtctgggaa gggacaggag gcagaccagc 1620
tctggcgacg gctgcaggag ttgctggccc acacgagctc ctgggaggag gagctagcag 1680
agttgaggcg ggagaaaaaa cagcaacagg aggagaagga gctgctggag caggaggtca 1740
ggtctctgac ccggcagctg cagttcctgg agacccagct ggcacaggtg agccaacatg 1800
tgagtgacct ggaggagcag aagaagcagc tcattcagga caaagaccac ctcagccagc 1860
aggtgggtat gctcgagcgg cttgctgggc cgcctggccc agaactgcca gtggcaggtg 1920
agaagaatga ggccctggtc cctgtgaact ccagtctgca agaggcctgg gggaagccag 1980
aggaggagca gaggggcctg caggaggcac agttagacga taccaaggtg caagagggca 2040
gccaggagga agagctccgg caggccaaca gggagctgga gaaggagcta cagaatgtgg 2100
tcgggcgtaa ccagctcctg gagggcaagc tgcaagccct gcaggccgat taccaggctt 2160
tgcagcagcg ggaatcagcc atccagggct ccttggcctc cctggaggcc gagcaggcca 2220
gcatccggca cttgggtgac cagatggagg cgagcttgct ggctgtaagg aaggccaagg 2280
aggccatgaa agcccagatg gcagagaagg aggccattct acagagcaag gagggcgagt 2340
gtcagcagct gcgggaggag gtggagcagt gccagcaact ggcagaagcc cggcacagag 2400
agcttagggc tctcgagagc cagtgccagc agcagaccca gctgattgag gtcctcacag 2460
cagagaaagg ccaacaggga gttggcccac ccactgacaa tgaagcccgt gagctggctg 2520
cccagctagc cctgtctcag gcgcagctgg aagtccatca gggggaggtc caacggctgc 2580
aggctcaggt ggtggacctc caggccaaga tgcgggcagc cctggatgac caggacaagg 2640
tgcagagcca gctaagcatg gctgaggccg tcctgaggga gcacaaaacc cttgtgcagc 2700
agctgaagga gcagaatgaa gcccttaaca gagcccatgt ccaggagctg ctgcaatgct 2760
cggagcgtga aggggcactg caggaggaga gggccgatga ggcccagcag agggaggagg 2820
agctgcgggc cctgcaggag gagctgtccc aggccaaatg cagctccgag gaagcacagc 2880
tggagcacgc tgagctgcaa gagcagctgc accgggccaa cacagacaca gctgagctgg 2940
gcatccaggt ttgcgcactg accgtggaaa aggagcgagt ggaggaggca ctggcctgtg 3000
[0016] ctgtccagga gctccaggac gccaaagagg cagcctcaag ggagcgagag ggcctggagc 3060
gccaagtagc tgggctgcag caagagaagg agagcttgca ggagaagctg aaggcggcca 3120
aggcagcagc cggctcactg cctggcctgc aggcccagct cgcccaggca gagcagcggg 3180
cccagagcct ccaagaggct gcacaccagg agctcaacac cctcaagttc cagctgagtg 3240
ctgaaatcat ggactaccag agcagactta agaatgctgg tgaagagtgc aagagcctca 3300
ggggccagct tgaggagcaa ggccggcagc tgcaggctgc tgaggaagct gtggagaagc 3360
tgaaggccac ccaagcagac atgggagaga agctgagctg cactagcaac catcttgcag 3420
agtgccaggc ggccatgctg aggaaggaca aggagggggc tgccctgcgt gaagacctag 3480
aaaggaccca gaaggaactc gaaaaagcca caacaaaaat ccaagagtat tacaacaaac 3540
tctgccagga ggtgacaaat cgtgagagga atgaccagaa gatgcttgct gacctggatg 3600
acctcaacag aaccaagaag tatctcgagg agcggctgat agagctgctc agggacaagg 3660
atgctctctg gcagaagtca gatgccctgg aattccagca gaagctcagt gctgaggaga 3720
gatggctcgg agacacagag gcaaaccact gcctcgactg taagcgggag ttcagctgga 3780
tggtgcggcg gcaccactgc aggatatgtg gccgcatctt ctgttactac tgctgcaaca 3840
actacgtcct gagcaagcac ggtggcaaaa aggagcgctg ctgccgagcc tgtttccaga 3900
agctcagtga aggccctggc tcccctgata gcagtggctc aggcactagc cagggagagc 3960
ccagccctgc actgtcacca gcctcacctg ggccccaggc cacaggaggc caaggagcaa 4020
atacagacta caggccaccg gacgacgctg tgtttgatat catcacagat gaggaattgt 4080
gccagataca ggagtccggc tcctctttgc ctgaaacacc cactgaaact gattctctcg 4140
acccaaatgc ggctgaacag gatactacat caacctcgct aacgcctgag gacactgaag 4200
acatgcccgt ggggcaggat tcggaaatct gcctgctgaa gtctggagaa ctgatgatca 4260
aagtacccct cacagtggat gagatcgcca gcttcgggga gggtagcagg gagctgtttg 4320
tgaggtccag cacctacagc ctgatcccca tcactgtggc cgaggcaggc ctcaccatca 4380
gctgggtctt ctcctctgac cccaagagca tctccttcag tgtggtcttc caggaggccg 4440
aggacacacc gctggatcag tgtaaggtcc tcattcccac gacccgatgc aactcccaca 4500
aggagaacat ccagggccag ctcaaggttc gcacacccgg catctacatg ctcatcttcg 4560

acaatacctt ctcaaggttt gtctctaaaa aggtatttta tcacttgacg gttgatcggc 4620
ctgtgatcta cgatggaagt gatttcctgt agcttcagca cctcagtaac ttcacttcat 4680
ccacaggaaa cactgctctt cctcacctgt cacataaagc atttttttaa aaagtcagct 4740
gctccaaaat catcaactca gcccctgggc tgcccctcag aggcggtgtc tggggaggac 4800
tttgtgctca gcactctgca ccggccactc ttagcccccg aggcgttgaa gggctcaggc 4860
aatgtttcca ttaagtagag actcagctgt tgtcacaccc aaagggatgc tctgccaaag 4920
gtttaaacac ccaggagacc atcagcctct cctgggagca cagttggcta caggcctctt 4980
gtggagagtt tcacgggcag gggtgattcc aacttctgcc tgtggagaga ttttctgccc 5040
tgccccacca gggccctgca tgttggagac tgagctgggt gcactggcca tgccctgtga 5100
atcctcaggc tgtgacgccc tcaggtactc ctgggaaaag gaggtacaca gccatcatgc 5160
gagtcggtgc caggggaccc cccggagatc ctgaccagct cctccagtca tgctcttgtc 5220
cctcactgcc ccagtaagct ggaggctgct ccagaactca gcagtgttgg aggggcctct 5280
aagctgcact ctctttctgg ccctttgtc tgggtgattc tgtcctcaaa taaagccctt 5340
cactcagcca gacctctcca cagctcaaag cattgcccta agaatcagaa gtaaagataa 5400
tccaagagca aaacccactg tacttggggc ctgcaatggc tgtgtgtaca ctacatctaa 5460
tgcccaaatg ccagccagtg tggatgttgt gaccacagag caggattgtg cattggcttt 5520
agagctactc ctcagctgat ggcccacttt tgtttatata aataagagct tctgccccac 5580
ctgcagacat gtttactaat gatcatagcc aggattagaa ccactttcaa acattggggc 5640
cttcttaaca aaagtctttg ataacttaag aaccaaagta acagagtaaa cagaggcatg 5700
atggatccct gggccccact cccctcctga caggttcccc aacagcccat ttgcccactt 5760
cccactgctc agcccacacc agacctccag gagacatccc cccttgaggc agagagatcc 5820
tgttccctat tcccagacaa gaattattta atcttccctg ttctctgtgg tccttttctt 5880
ccccaacaac agatagctca ccttggacag ctcttcgtcc cttgttcatg gaaccagctg 5940
cctgcagtca ggccccaggt tcttccatgg gtgaacagag catctgacaa aaggtcccag 6000
tttggccagg ggtgagggag agagcaccag acaggctatc cgagaatctg agagctgggc 6060
[0017] ccggcagttc ctccagctac ccttgtgacc taagtccagt cacacatttc ccaaagtttc 6120
tctttgtcat aaccctggtc tggctggttt tgagggcttg agaatgggtc agggactcca 6180
ggccaagtcc aacagagacc ccaaacccac cacacaccag cagccacaac ctcaccacca 6240
acaaagagga cttttgtggg gccacaagta agaggtcatt tctggaatgg actcagacct 6300
ttaaacagga gagttgagca cttccagtca gtttttaagc aaggcatggg gaacagggaa 6360
tagaaccttt caaagaggtt gcccagagaa aagctgggcc tcttgcattc ggcttccttg 6420
gagcagcctc ttctggcaga aagccatcag gtgctcaatc atcttctcct ggccaaggct 6480
ctgaccatgc ttagtactgg aatagaggtg gccaggcccc cagcgactct tcttggcctg 6540
atgtttgtcc tcacaggcat gccacgtggc ctgagatgat tcagaacaaa tcatgctaac 6600
tttgaatcca tccagccact tgcaaatgat aatcagaagt cagcttgttc actgttagaa 6660
agaaactaac aaaagagaac ccagagcaat ctagaatctt tgagtgcttg gctttccaag 6720
gatactgcgg agactctggc caagctgatg accttctgaa gtgtcactgg caccatatgc 6780
aacaagaacc accattcact gagtagctaa tgggtttggg gcctgggaca ttccatctga 6840
ggtccttcct gaacatgtca ctccacagca gaggaccggt tgcagcttac ccagaaccac 6900
tcctccagga gagctggatg ttttgcgtgc aacaccttga gcactgactg ctattgttca 6960
aaaaaagcct ttgctgcatt cggaggactg ccccgtgccc tgaggtgact tcctaactat 7020
gtggtttcat tagcgaattt atttttgtg ctgggtggac atttgtattt tgttaggttg 7080
ctgtttaagc tcaagtttgc tgtgctctct gcagctacaa aacatcttgg catatttaag 7140
agtggctttt ataaatagct ttattctgat attaatcaga ttcccaactt tactgagaat 7200
taaggactgg ggtactttaa agaaatgcaa atagcaattg aagaaccact gctgcaggtg 7260
gtagccctgg ctagactgaa ttacactaga aatcagccag aaggaagcgt ccttgggatc 7320
ccagatcact ctttttttt ttttttaaaa ggggcagccc cttgatggct catctctctg 7380
aataacagtt acgtcttcat atcgatacca gatgccttct tcatcatgcc actgaagcca 7440
ctcaccacct tcaagaacat gccaacctct gtcagattca cttacccaca aacaaggagg 7500
cacgtttggc acaaagtgtt gtcctccagg tccaagtgga ctctacagag tgcttgacct 7560
caacacactg gattccaggt ggactggacc aagagcaggc aaagacacgg gaactgaaaa 7620

actccacagg gtttggagaa tagaaatgaa aagccacgtc atataactca agaataaatg 7680
gtgttttgga aattttaaaa ttatcatcga aggtggtgaa actatttcag gcccaaatga 7740
aaggaaatcg ccagttgggg atgaaatcac agagcctgtg ttttatgata tggttggatg 7800
tccactgatg aaattttaaa ggagtttcag ttttaaaagt gcgcatgatt ctacatatga 7860
gaattcttta ggccaagaaa ctgtccttgg ctcagaggtg ttgggaatta aagcagagag 7920
aagccattcg tgatgcttag aaccaaggat ggtcatgtac acaaagacca tcgagacggc 7980
cattcttgtt tacaaaacac ttaccaagaa agcactttgt aggggaactt tagtaagttc 8040
ttctcatttc attatgtttc ttccaaggaa acaggagaga ctgaattaat aattctctct 8100
ttcctcttaa gcacttttaa aataataaag tacatcttga aatttgggga ggcatctctg 8160
atttaaaaaa agaaaaaggc tgcttgatgt atgttatgca gagacactct gcctctggtg 8220
gctgcagagc aatacccaag cctcatttgg aaggctcaac atttggaatt gcactttaat 8280
tgattaatcc tcaattcatg tggccttacg ggatggtggg tctgggaccc caattcattc 8340
ttatctgcca aagaattatc tagaagcaca tcaaatacca gcaccccacc tgctcaatgg 8400
gggtggaaaa cttttgtatc cctaagcata ttattttata gtgtctgcca tgccatgtgg 8460
aaatacttta tttttaacct caggatttaa ataaagtaaa cactatgaca tttagaca 8518

<210> 12
<211> 6789
<212> DNA
<213> 智人
<400> 12

ctcgcgccag gcgagtctcc gcgtctccct cgcgaactcg gtgaaaggaa ttggcgccgt 60
tcgacaccag gcggatccgc tctgcagcac gaacccatct ccagccgcag ccgcagccgc 120
cgcccgggcc gaggagcagc cgcagcagcc gccaccagtg gccgagtgag cggagccgag 180
tttgaggcag cgcctagcgg tgaatcgggg ccctcaccat gagttcctcg cctgttaatg 240
taaaaaagct gaaggtgtcg gagctgaaag aggagctcaa gaagcgacgc ctttctgaca 300
[0018] agggtctcaa ggccgagctc atggagcgac tccaggctgc gctggacgac gaggaggccg 360
ggggccgccc cgccatggag cccgggaacg gcagcctaga cctgggcggg gattccgctg 420
ggcgctcggg agcaggcctc gagcaggagg ccgcggccgg cggcgatgaa gaggaggagg 480
aagaggaaga ggaggaggaa ggaatctccg ctctggacgg cgaccagatg gagctaggag 540
aggagaacgg ggccgcgggg gcggccgact cgggcccgat ggaggaggag gaggccgcct 600
cggaagacga gaacggcgac gatcagggtt tccaggaagg ggaagatgag ctcggggacg 660
aagaggaagg cgcgggcgac gagaacgggc acggggagca gcagcctcaa ccgccggcga 720
cgcagcagca acagccccaa cagcagcgcg gggccgccaa ggaggccgcg gggaagagca 780
gcggccccac ctcgctgttc gcggtgacgg tggcgccgcc cggggcgagg cagggccagc 840
agcaggcggg aggggacggc aaaacagaac agaaaggcgg agataaaaag aggggtgtta 900
aaagaccacg agaagatcat ggccgtggat attttgagta cattgaagag aacaagtata 960
gcagagccaa atctcctcag ccacctgttg aagaagaaga tgaacacttc gatgacacag 1020
tggtttgtct tgatacttat aattgtgatc tacattttaa aatatcaaga gatcgtctca 1080
gtgcttcttc ccttacaatg gagagttttg cttttctttg ggctggagga agagcatcct 1140
atggtgtgtc aaaaggcaaa gtgtgttttg agatgaaggt tacagagaag atcccagtaa 1200
ggcatttata tacaaaagat attgacatac atgaagttcg tattggctgg tcactaacta 1260
caagtggaat gttacttggt gaagaagaat tttcttatgg gtattctcta aaaggaataa 1320
aaacatgcaa ctgtgagact gaagattatg gagaaaagtt tgatgaaaat gatgtgatta 1380
catgttttgc taactttgaa agtgatgaag tagaactctc gtatgctaag aatggacaag 1440
atcttggcgt tgccttcaaa atcagtaagg aagttcttgc tggacggcca ctgttcccgc 1500
atgttctctg ccacaactgt gcagttgaat ttaattttgg tcagaaggaa aagccatatt 1560
ttccaatacc tgaagagtat actttcatcc agaacgtccc cttagaggat cgagttagag 1620
gaccaaaggg gcctgaagag aagaaagatt gtgaagttgt gatgatgatt ggcttgccag 1680
gagctggaaa aactacctgg gttactaaac atgcagcaga aaatccaggg aaatataaca 1740
ttcttggcac aaatactatt atggataaga tgatggtggc aggttttaag aagcaaatgg 1800
cagatactgg aaaactgaac acactgttgc agagagcccc ccagtgtctt gggaaattta 1860

ttgagattgc tgcccgaaag aagcgaaatt ttattctgga tcagacaaat gtgtctgctg 1920
ctgcccagag gagaaaaatg tgcctgtttg caggcttcca gcgaaaagct gttgtagttt 1980
gcccaaaaga tgaagactat aagcaaagaa cacagaagaa agcagaagta gaggggaaag 2040
acctaccaga acatgcggtc ctcaaaatga aaggaaactt taccctccca gaggtagctg 2100
agtgctttga tgaaataacc tatgttgaac ttcagaagga agaagcccaa aaactcttgg 2160
agcaatataa ggaagaaagc aaaaaggctc ttccaccaga aaagaaacag aacactggct 2220
caaagaaaag caataaaaat aagagtggca agaaccagtt taacagaggt ggtggccata 2280
gaggacgtgg aggattcaat atgcgtggtg gaaatttcag aggaggagcc cctgggaatc 2340
gtggcggata taataggagg ggcaacatgc cacagagagg tggtggcggt ggaggaagtg 2400
gtggaatcgg ctatccatac cctcgtgccc ctgtttttcc tggccgtggt agttactcaa 2460
acagagggaa ctacaacaga ggtggaatgc ccaacagagg gaactacaac cagaacttca 2520
gaggacgagg aaacaatcgt ggctacaaaa atcaatctca gggctacaac cagtggcagc 2580
agggtcaatt ctggggtcag aagccatgga gtcagcatta tcaccaagga tattattgaa 2640
tacccaaata aaacgaactg atacatattt ctccaaaacc ttcacaagaa gtcgactgtt 2700
ttctttagta ggctaacttt ttaaacattc cacaagagga agtgcctgcg ggttccttct 2760
ttagaagctt tgtgggttga ttttttttct tttctttttt gtacattttt aattgcagtt 2820
taaaagtgaa tcgtaagaga acctcagcat tgtgcacgat aagagaatgt gtcagtattt 2880
cagggttcta cattttatct gtaaaatgtg actttttttt ttttttatca caacagaagt 2940
aaaatgttgc tttgtacctg gtgtctttta ttaagaattt actcccccca tttctcacag 3000
agaataacag tcgggagtca ttgtcacaat ataatagaaa tgttagcaac cagattcatg 3060
taaggactaa gtggtcctca tgaattgcat taagactctg tactgctcat attacactcc 3120
atcctctctg tagtttgctg ggtagtggag ggggtaagct aaatcatagt ttctgacaat 3180
aactgggaag gtttttttctt aaaataacaa tggaattggt ataattggga ttgaaaacta 3240
aaacttggaa ctaagataga gaagatggag tgtatgtaga agggctgtta aaaatgtaaa 3300
acttggttgc attatttgtg gaggctcaaa cttgtgaagg ttaataccat aatttttcca 3360
[0019] tttgttctgc attttgattc tgaaaagaaa gctggctttg cccatttctt attaaaaaaa 3420
cttgttgtaa atccagttgt ctaatgggat ctatatgaag ttagccatgt ctgtatgccc 3480
ttctcccaca aaatactgta taactagtgt gcttgtagta gttaactcca ccatctttgt 3540
aagctaatga aattgtgagt cacccattta tatcttaatt tttaatcatg tcagttcttg 3600
aatgggtatc tccttagcct gctgatttct ttttctttct aaagaaagtg ggtggagaaa 3660
ttaatttaga cgtttgtttg caataaaaag aattcatttt actcttgttt tgggattctc 3720
gccatcaagg ttcaaaatcc ctttatataa ctcccaagag gagaaattta ttaagtgtgt 3780
gctttctgga cagcttattc tttactctgc atagaacatt taggttttaa aaacttaaat 3840
gtatactgac aattgataca taattatgaa gtaaagttga attcttccct tcccctcccc 3900
cccagacaac ttttaacata tttaatgagg ggaaaaggta ctggctggga gaagttaaca 3960
ctgagtttat catctttaca gaatgctaat gctgtcctca actgattatt ttatatacat 4020
atatatgata catgaaactc tgggatcaga tgcttttaga agccatcatg caagccagtc 4080
attgatgtca ctgctacaca acactgctaa cttgactgta gctatgtaat aacattagat 4140
cccctaattg taattatatt gggtttgcac agaacacttt aatcttcccc tcaccaatgt 4200
gaagtgagga atcaggagtc aaactgtaga actaaaattt gacttcagtc tagcgtttcc 4260
ttggtgtttt taggttgctt tggtaagttt aggtttgcta tatttctgat tgcttagaat 4320
tttgttttag ccctttaaaa tcagatcata aatatgaatt catacttcta aggaattttc 4380
ttgctataag ctggagttta ggtgatgtat aggttcagtt gagacatttt tggaacaggc 4440
aaatccttag ttaacataag atatttaaca gttgaagata gtgtcatgga tttttatctt 4500
ttttagcaag taatgctaag aaccactggc ctgagctact actcttcagt atacattatt 4560
aggattgcat agacttacta gaggaacagt ttcaggtttt gatgctaatc agtgttgtgt 4620
cctaaagttg tcctttgtgc ctttaaaaag ttttggatat atcttctagt ttaaaattgc 4680
ttattaagga attcatttta taattgcagt gggaaagtaa tggtcaagta acactaggta 4740
gactatcatg cctgtttagc ccagagaatt tgggggggaga gagaatagat aaaaatggca 4800
cccagaaaaa tgttaaaatc tttagtcaag actagaatta atacaattgt ctacacttgt 4860
atggcagaaa taaccttata aagtgtttaa ggaattcaga gaagggaatg taccaaataa 4920

gcaacaggga gaaaattagg taagaagtaa gatacgaacg agaaacctga tttattgctc 4980
atccttccct tgcctcccta atggcaagca aaactctgaa catctgaaaa ggatgtagtt 5040
ctggacaaat cctgactacc cagaggaaac tcactgtgag attgctgttg atttgaaggg 5100
tgctttcact aaggttatat tttaaagtag aataacacat gctgagtgta aactggcttt 5160
ggattggtca gctgcagtag tacaaaaaca gcatagaatt tgagaaaact aaaactgcta 5220
tgagatagct atgagaaaac taaaactgct atgagataga aatgatgtaa aattatgtgg 5280
aaagttttcc ctcatatact cacatacagc ctttgaaggg ctctggctct gaccggttga 5340
tggccttgag cgagatgaaa tcatgaaatt gagtcaaatc aatttgacat tgaaatgaca 5400
agaggaaact cttaaataca taaaaacaag ctctcatttg cctaggatag atactgtctt 5460
aaaaataaag actgaaccta gatgttctga gcactagcaa caaggtattt taacaagttt 5520
aaaggaattc tctgaaaaag ttataaaatt attctaggaa acataaccat aatagtgttt 5580
taagggactt tcacctgggg attttatatt catgaacaga gtgtattctg tatttaaaat 5640
gtctcatttg tgggaattgg atgacatgtt ttttgataaa tttattcaca atataaattg 5700
acttttttatt ctaggaccat gtgaataatg ggttccattg cacaaataca aatattttaa 5760
tagcttctta ggcagtggtg tagacatctt ggatataaat aattgtagat cttgtatatt 5820
tgatttttaa aaaactagaa taaacagaga ggcataaaca tatcttagag tccaagtggt 5880
agtgtttagc attggatata ataaatggat gttttacaaa gtgtttccat aattctcttc 5940
ctatacataa atgtcttgtt ttcaaaagtg gatggaactt ggctgggtgt ggtggctcac 6000
gcctgtaatc ctagcacttt gggaggccaa ggcgggagga tcacttgagc tcaggagttt 6060
gagaccatcc tgggcaacat agtgagacct ggtctcttga aaaaaaaaaa gtggatggaa 6120
cttgtagcag agaattttat ctacttctca acctgcttca gaatacccat ttgagatgtt 6180
cccctggaaa gatgaacaca atactgcatc tgaagccatt tcttcccacc taacattctt 6240
aaaatgatta gagtctaaac tttgtcattc attcctaatt ctggagctct gaggttgagg 6300
tgttcagagt ttggtgaata attgggttta agttttaaca ttttagtaat aataaaagca 6360
aacacataca tgttaaggcc tgacaatagg ttgcaatacc catgcattgg gactcatacc 6420
[0020] cagcataaat ggtgagggac tgaacattag tgctttgagc aagaattggt taactacctg 6480
agatctctaa aacagtaatt tgaattacta atacataaac cacaagtctc ttcgaattgt 6540
taattgccta aatttaccct aaaacttagt taacgctgca gtgcctttat taaagctttt 6600
ttttgggggg gggtgtgggc acagctactc cataacttta aattttaaag catgaaggtg 6660
atctagctag tgttagtgct tgagttggta gttacatagg ctgctcttga atcgtcctgt 6720
tttctttgcc tagtattagc accacaggta catatttgta aaataagcat taaaagtact 6780
ttgtccagc 6789

<210> 13
<211> 1809
<212> DNA
<213> 智人
<400> 13

tcgagcccgc tttccaggga ccctacctga gggcccacag gtgaggcagc ctggcctagc 60
aggccccacg ccaccgcctc tgcctccagg ccgcccgctg ctgcggggcc accatgctcc 120
tgcccaggcc tggagactga cccgaccccg gcactacctc gaggctccgc ccccacctgc 180
tggaccccag ggtcccaccc tggcccagga ggtcagccag ggaatcatta acaagaggca 240
gtgacatggc gcagaaggag ggtggccgga ctgtgccatg ctgctccaga cccaaggtgg 300
cagctctcac tgcggggacc ctgctacttc tgacagccat cggggcggca tcctgggcca 360
ttgtggctgt tctcctcagg agtgaccagg agccgctgta cccagtgcag gtcagctctg 420
cggacgctcg gctcatggtc tttgacaaga cggaagggac gtggcggctg ctgtgctcct 480
cgcgctccaa cgccagggta gccggactca gctgcgagga gatgggcttc ctcagggcac 540
tgacccactc cgagctggac gtgcgaacgg cgggcgccaa tggcacgtcg ggcttcttct 600
gtgtggacga ggggaggctg ccccacaccc agaggctgct ggaggtcatc tccgtgtgtg 660
attgccccag aggccgtttc ttggccgcca tctgccaaga ctgtggccgc aggaagctgc 720
ccgtggaccg catcgtggga ggccgggaca ccagcttggg ccggtggccg tggcaagtca 780
gccttcgcta tgatggagca cacctctgtg ggggatccct gctctccggg gactgggtgc 840

tgacagccgc ccactgcttc ccggagcgga accgggtcct gtcccgatgg cgagtgtttg 900
ccggtgccgt ggcccaggcc tctccccacg gtctgcagct gggggtgcag gctgtggtct 960
accacggggg ctatcttccc tttcgggacc ccaacagcga ggagaacagc aacgatattg 1020
ccctggtcca cctctccagt cccctgcccc tcacagaata catccagcct gtgtgcctcc 1080
cagctgccgg ccaggccctg gtggatggca agatctgtac cgtgacgggc tggggcaaca 1140
cgcagtacta tggccaacag gccggggtac tccaggaggc tcgagtcccc ataatcagca 1200
atgatgtctg caatggcgct gacttctatg gaaaccagat caagcccaag atgttctgtg 1260
ctggctaccc cgagggtggc attgatgcct gccagggcga cagcggtggt ccctttgtgt 1320
gtgaggacag catctctcgg acgccacgtt ggcggctgtg tggcattgtg agttggggca 1380
ctggctgtgc cctggcccag aagccaggcg tctacaccaa agtcagtgac ttccgggagt 1440
ggatcttcca ggccataaag actcactccg aagccagcgg catggtgacc cagctctgac 1500
cggtggcttc tcgctgcgca gcctccaggg cccgaggtga tcccggtggt gggatccacg 1560
ctgggcctag gatgggacgt ttttcttctt gggcccggtc cacaggtcca aggacaccct 1620
ccctccaggg tcctctcttc cacagtggcg ggcccactca gccccgagac cacccaacct 1680
caccctcctg acccccatgt aaatattgtt ctgctgtctg ggactcctgt ctaggtgccc 1740
ctgatgacgg gatgctcttt aaataataaa gatggttttg attaaaaaaa aaaaaaaaaa 1800
aaaaaaaaa 1809

<210> 14
<211> 1861
<212> DNA
<213> 智人
<400> 14

cactcaaggt gtgcaggcag ctgtgtttgt caggaaggca gaaggagttg gctttgcttt 60
aggggaggag acgaggtccc acaacaccct ctgaagggta tataaggagc cccagcgtgc 120
agcctggcct ggtacctcct gccagcatct cttgggtttg ctgagaactc acgggctcca 180
[0021] gctacctggc catgaccacc acatttctgc aaacttcttc ctccaccttt gggggtggct 240
caacccgagg gggttccctc ctggctgggg gaggtggctt tggtgggggg agtctctctg 300
ggggaggtgg aagccgaagt atctcagctt cttctgctag gtttgtctct tcagggtcag 360
gaggaggata tgggggtggc atgagggtct gtggctttgg tggaggggct ggtagtgttt 420
tcggtggagg ctttggaggg ggcgttggtg ggggttttgg tggtggcttt ggtggtggcg 480
atggtggtct cctctctggc aatgagaaaa ttaccatgca gaacctcaat gaccgcctgg 540
cctcctacct ggacaaggta cgtgccctgg aggaggccaa tgctgacctg gaggtgaaga 600
tccatgactg gtaccagaag cagaccccaa ccagcccaga atgcgactac agccaatact 660
tcaagaccat tgaagagctc cgggacaaga tcatggccac caccatcgac aactcccggg 720
tcatcctgga gatcgacaat gccaggctgg ctgcggacga cttcaggctc aagtatgaga 780
atgagctggc cctgcgccag ggcgttgagg ctgacatcaa cggcttgcgc cgagtcctgg 840
atgagctgac cctggccagg actgacctgg agatgcagat cgagggcctg aatgaggagc 900
tagcctacct gaagaagaac cacgaagagg agatgaagga gttcagcagc cagctggccg 960
gccaggtcaa tgtggagatg gacgcagcac cgggtgtgga cctgacccgt gtgctggcag 1020
agatgaggga gcagtacgag gccatggcgg agaagaaccg ccgggatgtc gaggcctggt 1080
tcttcagcaa gactgaggag ctgaacaaag aggtggcctc caacacagaa atgatccaga 1140
ccagcaagac ggagatcaca gacctgagac gcacgatgca ggagctggag atcgagctgc 1200
agtcccagct cagcatgaaa gctgggctgg agaactcact ggccgagaca gagtgccgct 1260
atgccacgca gctgcagcag atccaggggc tcattggtgg cctggaggcc cagctgagtg 1320
agctccgatg cgagatggag gctcagaacc aggagtacaa gatgctgctt gacataaaga 1380
cacggctgga gcaggagatc gctacttacc gcagcctgct cgagggccag gatgccaaga 1440
tggctggcat tggcatcagg gaagcctctt caggaggtgg tggtagcagc agcaatttcc 1500
acatcaatgt agaagagtca gtggatggac aggtggtttc ttcccacaag agagaaatct 1560
aagtgtctat tgcaggagaa acgtcccttg ccactcccca ctctcatcag gccaagtgga 1620
ggactggcca gagggcctgc acatgcaaac tccagtccct gccttcagag agctgaaaag 1680
ggtccctcgg tcttttattt cagggctttg catgcgctct attccccctc tgcctctccc 1740

cacctttctt ggagcaagga gatgcagctg tattgtgtaa caagctcatt tgtacagtgt 1800
ctgttcatgt aataaagaat actttttcct tttgcaaata aaaaaaaaaa aaaaaaaaaa 1860
a 1861

<210> 15
<211> 1700
<212> DNA
<213> 智人
<400> 15

aactagcacg tggctcccgc ccccagactg cttctttatt cattcctaac ctttaccttg 60
gcagatgaaa tataagattc atcaaccaca tttgacagcc catggcaggt ttcctgtttt 120
ccatcgtccc tctgcaggtc acagacacac agagcccagc cgtggcaggc tcagccgggg 180
tccggggctg ctaacaacgg ctacattcct cccccagggc caagggaaat cctgagcgca 240
ggccagggtt gtttggtttt gaggtgtgct gggatgaaag gcaccctgga agtggaaggt 300
tcggtcattc attaattaat tacatctata attgagggtt tgttcttaag agcgagtcct 360
ttgaaagtac tttccttcaa acagtgactg ccacaaaggc atcagatatt caccaccttc 420
tcggctgcct cagcacagca agctttattc tgggacctga gatcctgttc tgagctggct 480
ttcccttctc caggctcgct caccctccct ttagagatag tggatggtaa gatgaccaat 540
gctcagatta ttcttctcat tgacaatgcc aggatggcag tggatgactt caacctcaag 600
tatgaaaatg aacactcctt taagaaagac ttggaaattg aagtcgaggg cctccgaagg 660
accttagaca acctgaccat tgtcacaaca gacctagaac aggaggtgga aggaatgagg 720
aaagagctca ttctcatgaa gaagcaccat gagcaggaaa tggagaagca tcatgtgcca 780
agtgacttca atgtcaatgt gaaggtggat acaggtccca gggaagatct gattaaggtc 840
ctggaggata tgagacaaga atatgagctt ataataaaga agaagcatcg agacttggac 900
acttggtata aagaacagtc tgcagccatg tcccaggagg cagccagtcc agccactgtg 960
cagagcagac aaggtgacat ccacgaactg aagcgcacat tccaggccct ggagattgac 1020
[0022] ctgcagacac agtacagcac gaaatctgct ttggaaaaca tgttatccga gacccagtct 1080
cggtactcct gcaagctcca ggacatgcaa gagatcatct cccactatga ggaggaactg 1140
acgcagctac gccatgaact ggagcggcag aacaatgaat accaagtgct gctgggcatc 1200
aaaacccacc tggagaagga aatcaccacg taccgacggc tcctggaggg agagagtgaa 1260
gggacacggg aagaatcaaa gtcgagcatg aaagtgtctg caactccaaa gatcaaggcc 1320
ataacccagg agaccatcaa cggaagatta gttctttgtc aagtgaatga aatccaaaag 1380
cacgcatgag accaatgaaa gtttccgcct gttgtaaaat ctattttccc ccaaggaaag 1440
tccttgcaca gacaccagtg agtgagttct aaaagatacc cttggaatta tcagactcag 1500
aaacttttat ttttttttc tgtaacagtc tcaccagact tctcataatg ctcttaatat 1560
attgcacttt tctaatcaaa gtgcgagttt atgagggtaa agctctactt tcctactgca 1620
gccttcagat tctcatcatt ttgcatctat tttgtagcca ataaaactcc gcactagctg 1680
caaaaaaaaa aaaaaaaaaa 1700

<210> 16
<211> 4048
<212> DNA
<213> 智人
<400> 16

ggaagtgggc ctggcacctt cccggcctgc cgcagggatg gggcagctgt gctggctgcc 60
gctgctggca ccgctcctgt tgctgcgacc gccaggggtc cagtccgccg gccccatccg 120
ggccttcgtg gtgccccaca gccacatgga cgtgggctgg gtctacactg tgcaggaaag 180
catgcgggcg tacgccgcca atgtctacac ctcagtggtg gaagagctgg cccgcggcca 240
gcagcgccgg ttcatcgctg tggagcagga gtttttccgg ctgtggtggg atggcgtcgc 300
ctcggaccag cagaaatacc aggtccgcca gctcctggag gaaggacgcc tggaatttgt 360
catcggaggc caggtcatgc atgacgaggc tgtgacgcac cttgatgacc agatcctgca 420
gctcacagaa ggacacgggt ttctctatga aacatttggg atccggccac agttctcctg 480
gcacgttgac ccgtttggcg cctctgccac gacgcccacc ctatttgcgc tggcgggctt 540

caatgcccac ctcggctccc ggatcgacta cgacctgaag gcagccatgc aggaggcccg 600
ggggctgcag ttcgtgtggc gagggtcccc atccctctca gagcggcagg aaatcttcac 660
gcacatcatg gaccagtaca gctactgcac cccgtcccac atccctttct ccaacaggtc 720
aggattttac tggaatggcg tggctgtctt ccccaagcct ccccaagatg gggtgtaccc 780
caacatgagt gagcctgtca ccccagccaa catcaacctc tatgccgagc tcggtgtctc 840
ggtgcagtat gccacgctgg gcgactactt ccgtgccctg cacgctctca atgtcacctg 900
gcgtgtccgc gaccaccacg acttcctgcc ctattccaca gaaccattcc aggcctggac 960
gggcttctac acgtcccgca gctcactgaa ggggctggcc cggcgagcca gcgccttgtt 1020
gtatgccggg gagtccatgt tcacacgcta cctgtggccg gccccccgtg ggcatctgga 1080
ccccacctgg gccctgcagc agctccagca gcttcgctgg gccgtctccg aggtccagca 1140
ccatgatgcc atcactggga ctgagtcccc caaggtgaga gacatgtacg caacgcacct 1200
ggcctcgggg atgctgggca tgcgcaagct gatggcctcc atcgtcctag atgagctcca 1260
gccccaggca cccatggcgg ccagctccga tgcaggacct gcaggacatt ttgcctcggt 1320
ctacaacccg ctggcctgga cggtcaccac catcgtcacc ctgactgttg gtttccctgg 1380
agtccgcgtc acagatgagg cgggccaccc agtgccctcg cagatccaga actcaacaga 1440
gaccccatct gcgtatgacc tgcttattct gaccacaatc ccaggcctca gttaccggca 1500
ctacaacatc agacccactg caggggccca agagggcacc caggagccgg ctgccactgt 1560
ggcgagcacc cttcaatttg gccgcaggct gaggagacgc accagccatg cgggcaggta 1620
cttggtgcct gtggcaaacg actgctacat tgtgctgctc gaccaggata ccaacctgat 1680
gcacagcatc tgggagagac agagtaaccg aacggtgcgc gtgacccagg aattcctgga 1740
gtaccacgtc aacggggatg tgaaacaggg ccccatttcc gataactacc tgttcacacc 1800
gggcaaggcc gcggtgcctg cgtgggaagc tgtggaaatg gagattgtgg cgggacagct 1860
tgtgactgag atccggcagt acttctacag gaacatgaca gcacagaatt acacgtatgc 1920
aatccgctcc cggctcaccc atgtgccgca gggccatgac ggggagctgc tctgccaccg 1980
gatagagcag gagtaccaag ccggcccccc ggagctgaac cgtgaggctg tcctgaggac 2040
[0023] cagcaccaac ctaaacagcc agcaggtcat ctactcagac aacaacggct accagatgca 2100
gcggaggccc tacgtttcct atgtgaacaa cagcatcgcc cggaattact accccatggt 2160
tcagtcggcc ttcatggagg atggcaaaag caggcttgtg ttgctgtcgg agcgggcaca 2220
tggcatctcc agccaaggga atgggcaggt ggaggtcatg ctccaccggc ggctgtggaa 2280
caacttcgac tgggacctgg gctacaacct cacgctgaac gacacctcag tcgtccaccc 2340
agtgctctgg cttctgctgg gatcctggtc cctcaccact gccctgcgcc agaggagcgc 2400
actggcgctg cagcacaggc ccgtggtgct gttcggagac ctcgctggga ctgcgccgaa 2460
gctcccagga ccccagcagc aagaggccgt gacgctgccc ccgaatcttc acctgcagat 2520
cctgagcatc cctggctggc gctacagctc caaccacacg gagcactctc agaatctccg 2580
gaaaggccat cgaggggaag cccaggctga cctccgccgt gtcctgctgc ggctctacca 2640
cctgtatgaa gtgggcgagg acccagtcct gtctcagcca gtgacagtga atctggaggc 2700
tgtgctgcag gcgctggggt ccgtggtggc agtggaggag cgctcgctca cagggacctg 2760
ggatttgagc atgctgcacc gctggagctg gaggacgggg cctggccgcc acagaggtga 2820
caccacctct ccctcgaggc caccaggagg ccccatcatc accgtccacc caaaggaaat 2880
ccggacgttc tttattcact ttcaacagca gtgagccctg ggcagatgcc ccggccccag 2940
ggcttccccc aggaactcca tgtaacagaa cagacccagg acagggaaaa gcagtgcgga 3000
gggatgggac tggggagtca gctgctcatc tgcaggctaa tggcaggaaa tggtcatatt 3060
tggggttttt ccctaatttt tttaaacaaa aattacatta caagatccag gttcttcccc 3120
cccacactca atcaagccag ccctctcctc ttctgtcacg taaaggatat ttggcacact 3180
catgcgtcat tcattcacaa aacacaaacc caggactttc tgcctaaggc agagcacaag 3240
actcacagca gcaccgaagc gcatctgccg tccgggccct gccaggcttg ccaggctgcc 3300
agtggtaact gtggacctac tgcgtgccac gtgttttcat agactcatcc catgctggca 3360
acagccctgc aaggggcttg gctctgccac agggcaggag aggaagttgt agcgcctagc 3420
gagagttcca gccccagacg cccacctgtg cctcagggca ccgcctgccg agcagagaag 3480
gcacagcagc cgtcagagtc catgagaggt gaaaccacac agcagggatg tccaatatca 3540
gaactattaa tatcaataaa agtataacct tcccaggtct atgcccaaga gaattgaaaa 3600

catccatcca cacaatacct gtgctcccgc gttcatagca gcattactca aaagtcaaac 3660
ggtagcaaca acccaaatgt ccatccacag atgaattaag acatgaagtg tgttctgtcc 3720
atacaatgga atattatttg gccataaaaa ggaaggaaat tctgacgcat gccacagcct 3780
gagtgaatcc tacaaatatt acgctaagtg aaagaagcca atcacgagtt tatgtgaaat 3840
gtccagaata ggcaaatctg tgtatcagag acaaagcaca ttggtggttg ccaggtactg 3900
gaggaagaga gaagaggcat gacagctaac agggacgggc tttctttgga agatgatgaa 3960
attgtggaat gatggttgca caactttgtg aatatactag aaaccaatga attaaaaact 4020
ttggaagatg aaaaaaaaaa aaaaaaaa 4048

<210> 17
<211> 2141
<212> DNA
<213> 智人
<400> 17

tgcgtgccgc cgttgatccg gtgctgcagt gaggaggtgg ttcttgcccg tgttgtgtgt 60
gtgtgtgagt gagagagcga gtgagtgagt gagtgagtgt gtgtgtgggg gggactcggc 120
ttgttgttgt cggtgacttc cccctcccct tcacccccttc ccctccccgc cgccgctgca 180
gtggccgctc cctgggccgt aggaaatgag cgataacgat gacatcgagg tggagagcga 240
cgaagagcaa ccgaggtttc aatctgcggc tgacaaacgg gctcatcata atgcactgga 300
acgaaaacgt agggaccaca tcaaagacag ctttcacagt ttgcgggact cagtcccatc 360
actccaagga gagaaggcat cccgggccca aatcctagac aaagccacag aatatatcca 420
gtatatgcga aggaaaaacc acacacacca gcaagatatt gacgacctca agcggcagaa 480
tgctcttctg gagcagcaag gggaaagcga gagctgatca agttctttgt tcctggggaa 540
ttcacttctc ttcctccctc atggaagatg caagtaaaag gaaattccgt gcactggaga 600
aggcgaggtc aagtgcccaa ctgcagacca actacccctc ctcagacaac agcctctaca 660
ccaacgccaa gggcagcacc atctctgcct tcgatggggg ctcggactcc agctcggagt 720
[0024] ctgagcctga agagccccaa agcaggaaga agctccggat ggaggccagc taagccactc 780
ggggcaggcc agcaataaaa actgtctgtc tccatcgtct catcctcctt tcagttcgtt 840
ggtagagccc tcagaaccat ttaagagact ctttatttttt ctctttctcc ctttttttttt 900
taaattttta tttttacgta gaagctcttg gacaacagct ctcgttctcc ttccccattt 960
ccactgtata ttttttaatg tattcccttc agggattccc tgtccccaac aggaattttt 1020
aaaccaaaac accccaactt ggcagctttt tctgtggagg acagacggcc ggccggacct 1080
ctgagcacat agtgtcctgc ccaccctacc agctcctcca gccctgccgg gcacatgccc 1140
gggggacgcc tgccctgccc aggtggcctc ctggcccgcc ctcacctctg atagactttg 1200
tgaatctgaa ctgctctact ttgagaagat gaccggtttg gagtaatcag aatgaaccct 1260
cctccttttt aagggttttt tttttttcct ttttctaaaa agctatgtat cgctcctatt 1320
gaaagaccag atccttagag aagtttgtgg tataaaaagg aagtggggac agattcgcag 1380
cacagagtcg ctggcatgtt tcactcctgc ttctctcagc cagctgttta agcctgcggc 1440
gccagcctca cggagggccg tgtgacactc tcgtggtatg tatgggagat ggcagcagtg 1500
aagcagcagc caccagggag tggccatttg gggttgggac agggagggtg ttttgggtgg 1560
catagaggtt ttgtattgag ggccagtgat gatgttttga tatttatttc ctgctactta 1620
aatttgaatc tgagtgaatt gtacctattt ctgatgatgt cggtcttgca aagcgacaga 1680
ttcataaagt aatgatgaaa tctttctttc ttcccgtgtg tatttctaag aaatagagcc 1740
aactgatttt gtatgtaaat accaagagca atttacctgg tactaaaccc gcaccccagt 1800
gcggaccctt cccagccctc atcccacttc ctttcctact gtcctggaac ctgtctccat 1860
tgtgtgatcc agccctggtt ctggctgtgg tcagcagatg ccagtgaagg gttttgtgtg 1920
tttaggcctc atttctttgt ctttttccta ctccgttcct ggcatttgct gatttctagt 1980
gtatactctg tagtctcagt tcgtgtttga ttccattcca tggaaataaa aagtatgttg 2040
tacatactgc cgaagaattg tcttgcaagt taaggcttcc ccctttacta taagactata 2100
aataaaaact tattttatcc ttcttaaaaa aaaaaaaaaa a 2141

<210> 18
<211> 4602

<212> DNA
<213> 智人
<400> 18

gaagcgtctc ctgtgcgtct gcgcgggaag tggaacctgg ctctggggag aagccgcgtg 60
agatccgcgc gggtgctagc tagtcctttc tcgtcgctgc tcggctcgcg gcccgtgggg 120
tcggccccgc caccgttgcc gccatgccca tgaagggccg cttccccatc cgccgcaccc 180
tgcaatatct gagccagggg aacgtggtgt tcaaggactc cgtgaaggtc atgacagtga 240
attacaacac gcatggggag ctgggcgagg gcgccaggaa gtttgtgttt ttcaacatac 300
ctcagattca atacaaaaac ccttgggtgc agatcatgat gtttaagaac atgacgccgt 360
caccccttcct gcgattctac ttagattctg gggagcaggt cctggtggat gtggagacca 420
agagcaataa ggagatcatg gagcacatca gaaaaatctt ggggaagaat gaggaaaccc 480
tcagggaaga ggaggaggag aaaaagcagc tttctcaccc agccaacttc ggccctcgaa 540
agtactgcct gcgggagtgc atctgtgaag tggaagggca ggtgccctgc cccagcctgg 600
tgccattacc caaggagatg agggggaagt acaaagccgc tctgaaagcc gatgcccagg 660
actaaggccc acggtcactg tgggctgggg tgatggtgtc tgaccagtgg ggagattgga 720
atgggattac tttggcccag ggaagcccct ggttctgtcc ctggagactc tggaaatcct 780
tttgcattaa aaggacttta cacacctgtg taaaaggatg tgggagagga gggtctgaag 840
ctgagctgct aaatgaatat ccctgctctg ctggtcaata aaacgcttcc taatagcagc 900
ttggcgtgta tctggtccta gtgaagagga aggcctgtgt agcagaaagg ctttgggcct 960
gagaggttaa ggccacagcc tgttgacacc tgttttggtc ctgcgaccct ttactggtct 1020
ccgctggctt tgaatcttcc tctgggctct actctggaga acataagggc tgctgtggtt 1080
gagtctggct agcactgtct gtggttggca gtgtgtacac ccctccgttc agttccttgg 1140
gggtattttt cagaaatcca aaggcaaccc ttcgtgcagt gctcactttt ttaagtacag 1200
ttgattaccc ttgcctgctg gggggcctag ccatgggcca gagatggagg agccccagtg 1260
gctgacaggc cagcctcact caggcacgta cctgctgacc agtcagccac tgccaaccca 1320
[0025] tggcccagcc actgtgtgca ttagcaggga ggtttgtagg ccatggagga aatgaggaga 1380
caccacctag tggagacatt ggggccctgc tgggggatg gtgtctatag ctggctctgc 1440
tggctccctc aggccctgct taccaagctc tggaggaggg agtgctgcat tactgagcac 1500
cttccttgtt ctttcctcat aggacactga tgttactgtc actttagtta tgctaaagtg 1560
gaggtttcag cctccagaag acagcagagc cttctagggt caccttaaga ataggtttag 1620
ctaggctggg tgtggtggct catgcctgta atcccagcac tttgggaggc tgatgtgggc 1680
ggatagttga gcccaggagt tcgagaccag cctgggcaac atggcaagac cttgtctcta 1740
caaaaagtac aaaaattaga tgggtgtggt gtttcgcgtc tgtagtccca gctatttggg 1800
aagctgaggt gggaggatct cgagcctgcg agatcaaggc tgcagtgaat catgatcgtg 1860
cgctactgca ctccagcctg ggccacagag caagactgtc tcaagaaaaa aaatttttta 1920
aataagttta attataaagt gaaggaccag ttggaccacg gacccctaga aactcagcca 1980
aggagacctg actttatctg agacaggaag gcagtggtta aaagaattaa aaaaggacag 2040
tggtgcttga cagagcagga ctgaagtttt cattcctcta cctgctgggg ccttggtcaa 2100
gtcctaaaag ctttccaggt ctgtaactgg ttttgtctgt aaaatgggga aaaggttacc 2160
ttttctgcca catgaagtag ctggctggtg aaatgatgtc atactacgat gtgtttcatt 2220
aactgttgga gattatcaca ttaaattgag cagatttgga tcttttacat ttgatgctca 2280
agtttgattc tgtaccagat ctgggtttgg ggtgatggct tgtcgggggt gggaggggaa 2340
ggtgggcaga gactgatgta taatggacag gtgttccttg agtgacagac ttacaaaggg 2400
agtgtttaat tgaaatctag catcttgtct ctctgctatc agcattttgg ctgggtggaa 2460
aaagctctcc tccacagaga gccctcccat gtctgctggt ttcagttccc cacccaactg 2520
actgaagtct tgaccttgat accacctgcc tgggcgttct acttggctgc aagggctctt 2580
cagaaagcac ctagttcctt ttggctttca tctgcagtgt aggtctccat agctagtgac 2640
acacaaagcc ttatgagagt attccttccc tctagggccc aaagaggctg ctaaccagca 2700
ggaatgtcct gaaccaaaag gagtggtgac cattctctag acagaataaa tgtctggtcc 2760
ctaatgggac agataactag ggtttgagtt caggcttgac acaggagcaa tgggcagtga 2820
ggtggacagc ccagaccctg aaaggacgtg tggagacagc agcagtcctg tggtgcagtt 2880

actgcctgtg tggccagctt cacaggcagc agataatttg tggaaataaa cattattttc 2940
ttttttttgtt ccctgtaggc tacttgatcc tggatagttt ctctttaaac ctttgtcttt 3000
ccctattttg tttagtagtg atgaaagatg ggtttaaaat atacagaaat gggagaaaat 3060
taattagaga aaatgtgagg attttataat tgataacatg ttcttaattt tacttgcaca 3120
agcagtgttc acagccttat tctgaagtga ccacttttct tctctttgag gcactacctg 3180
gcagcaccat ctaaacctgt atcatctgct gtggtcccag ttactcagga ggctgaggca 3240
ggaggatcac ttgagcccag gaggttgagg ctggagtgag ccatgactgt accactgcat 3300
tccagcctgg gtgacggagt gaggccctat ctgcctgcca gtgagttctg tcatgcatca 3360
gactttggac ctcagaattt tcacctggaa catgagaggt cagatgacat aatgaatatg 3420
ttctaacttc tgaaactttt ggagcttgtt tttgcccttg atagcacgta tccttagaga 3480
ataagcttgc caatttaagg cctgtctgta atggcatctg aatgttccag cagcctaact 3540
gtgctctgct ccagaaacat gtgtgtggct tccctacctc cacaccaagg agctgccttg 3600
ctgggtggat gtaaagactg tcctgccagg gtttcccact aaaggtatta ataagtccag 3660
tggaccacag agggcccaat ccctcttggc cgctaaggct aaggtaggag ccagagagct 3720
gtagagacag gaccaccagg atgcttcatg tccataacac aagagagcgc tgcattgttt 3780
gggggccagg cattactact atcatgaaga aaaatgaaga gcaggatgca tgttagtctt 3840
taattcactt ttaatagtat aaacctcatt taggtagtag tattaagcca caacaataat 3900
gccacattga aacagcattt aataaaatgc ataaagctaa ttcatgcact gcaatactct 3960
atatacaaac acaacaatgc aaattcttct tcaagactga agacattgat tagatataaa 4020
attcagttta aaaagaacat gctatttttt aaatgccatc acataaacaa agtgatttca 4080
cagggagaag aaagctgtat aaagctgcag ctttcaacag gttttaaacc tggcattaaa 4140
atgtaatggc aaaaccaata ttttctatat tgtgaagggc aaaggttaca gaaacggtcc 4200
caagaaaatc taacacccaa attttccttt gatagataga tgcctttaaa agggctggta 4260
atgcagttac attctaacag agaagtccaa actacaggta aaaactacgg cttgtactgt 4320
gaaaaatgtg cagcttttca gttataaaac tagttgaaca ctggtttaca agataatccg 4380
[0026] tagaacagag agactgtaga aaaatattcc agcacttgag ttgtgtgtgg cagcagcatt 4440
tgagtccatg aatgctatgg tcattaaaat aattgattat actttcctaa agaaaagcca 4500
ttttttaatg caaagtctac tacttccaaa tgttattcca aacattaaat tttaacagtc 4560
tatcaatcaa taaatgttga acatttttt tctaaaaaaa aa 4602

<210> 19
<211> 2082
<212> DNA
<213> 智人
<400> 19

aaaagccagc caggagctgt gggaggaaac gccctcagta aagatgaccg cggtcactgt 60
tatctaaacg caagtgaagc cgagtcacag gacccggatg ttgtcagttc gacggtaaac 120
gaccctgcca gcttccaaga gggcggcttc actgtgcgaa taggtgagaa gccaagaagg 180
aggcgcgctg gagttacttc cgcccggttc tccttcccgc agtctgcagc cggagtaaga 240
tggcggcgct gagggctttg tgcggcttcc ggggcgtcgc ggcccaggtg ctgcggcctg 300
gggctggagt ccgattgccg attcagccca gcagaggtgt tcggcagtgg cagccagatg 360
tggaatgggc acagcagttt gggggagctg ttatgtaccc aagcaaagaa acagcccact 420
ggaagcctcc accttggaat gatgtggacc ctccaaagga cacaattgtg aagaacatta 480
ccctgaactt tgggccccaa cacccagcag cgcatggtgt cctgcgacta gtgatggaat 540
tgagtgggga gatggtgcgg aagtgtgatc ctcacatcgg gctcctgcac cgaggcactg 600
agaagctcat tgaatacaag acctatcttc aggcccttcc atactttgac cggctagact 660
atgtgtccat gatgtgtaac gaacaggcct attctctagc tgtggagaag ttgctaaaca 720
tccggcctcc tcctcgggca cagtggatcc gagtgctgtt tggagaaatc acacgtttgt 780
tgaaccacat catggctgtg accacacatg ccctggacct tggggccatg acccctttct 840
tctggctgtt tgaagaaagg gagaagatgt ttgagttcta cgagcgagtg tctggagccc 900
gaatgcatgc tgcttatatc cggccaggag gagtgcacca ggacctaccc cttgggctta 960
tggatgacat ttatcagttt tctaagaact tctctcttcg gcttgatgag ttggaggagt 1020

tgctgaccaa caataggatc tggcgaaatc ggacaattga cattggggtt gtaacagcag 1080
aagaagcact taactatggt tttagtggag tgatgcttcg gggctcaggc atccagtggg 1140
acctgcggaa gacccagccc tatgatgttt acgaccaggt tgagtttgat gttcctgttg 1200
gttctcgagg ggactgctat gataggtacc tgtgccgggt ggaggagatg cgccagtccc 1260
tgagaattat cgcacagtgt ctaaacaaga tgcctcctgg ggagatcaag gttgatgatg 1320
ccaaagtgtc tccacctaag cgagcagaga tgaagacttc catggagtca ctgattcatc 1380
actttaagtt gtatactgag ggctaccaag ttcctccagg agccacatat actgccattg 1440
aggctcccaa gggagagttt ggggtgtacc tggtgtctga tggcagcagc cgcccttatc 1500
gatgcaagat caaggctcct ggttttgccc atctggctgg tttggacaag atgtctaagg 1560
gacacatgtt ggcagatgtc gttgccatca taggtacgag gcctattgtg tagtagaggt 1620
atcctagaca aaggagttcg ggacgcccac tggggacaga aggagaacac ttcctgttca 1680
ccataggcca tggcatggac tcgggtcctc aatcttttga gcacagtaat gggttctgga 1740
tcttgggtaa caccactttt tttgtttgtt ttgcctcaca acaggaagat aagtaacatc 1800
actttttttcc tccatcctct cacctaggta cccaagatat tgtatttgga gaagtagatc 1860
ggtgagcagg ggagcagcgt ttgatccccc ctgcctatca gcttcttctg tggagcctgt 1920
tcctcactgg aaattggcct ctgtgtgtgt gtgtgtgtgt gtgtgtgtgt gtatgttcat 1980
gtacacttgg ctgtcaggct ttctgtgcat gtactaaaaa aggagaaatt ataataaatt 2040
agccgtcttg cggcccctag gcctaaaaaa aaaaaaaaaa aa 2082

<210> 20
<211> 6318
<212> DNA
<213> 智人
<400> 20

tagtaagaca ggtgccttca gttcactctc agtaaggggc tggttgcctg catgagtgtg 60
tgctctgtgt cactgtggat tggagttgaa aaagcttgac tggcgtcatt caggagctgg 120
[0027] atggcgtggg acatgtgcaa ccaggactct gagtctgtat ggagtgacat cgagtgtgct 180
gctctggttg gtgaagacca gcctctttgc ccagatcttc ctgaacttga tctttctgaa 240
ctagatgtga acgacttgga tacagacagc tttctgggtg gactcaagtg gtgcagtgac 300
caatcagaaa taatatccaa tcagtacaac aatgagcctt caaacatatt tgagaagata 360
gatgaagaga atgaggcaaa cttgctagca gtcctcacag agacactaga cagtctccct 420
gtggatgaag acggattgcc ctcatttgat gcgctgacag atggagacgt gaccactgac 480
aatgaggcta gtccttcctc catgcctgac ggcacccctc caccccagga ggcagaagag 540
ccgtctctac ttaagaagct cttactggca ccagccaaca ctcagctaag ttataatgaa 600
tgcagtggtc tcagtaccca gaaccatgca aatcacaatc acaggatcag aacaaaccct 660
gcaattgtta agactgagaa ttcatggagc aataaagcga agagtatttg tcaacagcaa 720
aagccacaaa gacgtccctg ctcggagctt ctcaaatatc tgaccacaaa cgatgaccct 780
cctcacacca aacccacaga gaacagaaac agcagcagag acaaatgcac ctccaaaaag 840
aagtcccaca cacagtcgca gtcacaacac ttacaagcca aaccaacaac tttatctctt 900
cctctgaccc cagagtcacc aaatgacccc aagggttccc catttgagaa caagactatt 960
gaacgcacct taagtgtgga actctctgga actgcaggcc taactccacc caccactcct 1020
cctcataaag ccaaccaaga taacccttt agggcttctc caaagctgaa gtcctcttgc 1080
aagactgtgg tgccaccacc atcaaagaag cccaggtaca gtgagtcttc tggtacacaa 1140
ggcaataact ccaccaagaa agggccggag caatccgagt tgtatgcaca actcagcaag 1200
tcctcagtcc tcactggtgg acacgaggaa aggaagacca agcggcccag tctgcggctg 1260
tttggtgacc atgactattg ccagtcaatt aattccaaaa cagaaatact cattaatata 1320
tcacaggagc tccaagactc tagacaacta gaaaataaag atgtctcctc tgattggcag 1380
gggcagattt gttcttccac agattcagac cagtgctacc tgagagagac tttggaggca 1440
agcaagcagg tctctccttg cagcacaaga aaacagctcc aagaccagga aatccgagcc 1500
gagctgaaca agcacttcgg tcatcccagt caagctgttt ttgacgacga agcagacaag 1560
accggtgaac tgagggacag tgatttcagt aatgaacaat tctccaaact acctatgttt 1620
ataaattcag gactagccat ggatggcctg tttgatgaca gcgaagatga aagtgataaa 1680

ctgagctacc cttgggatgg cacgcaatcc tattcattgt tcaatgtgtc tccttcttgt 1740
tcttctttta actctccatg tagagattct gtgtcaccac ccaaatcctt attttctcaa 1800
agaccccaaa ggatgcgctc tcgttcaagg tccttttctc gacacaggtc gtgttcccga 1860
tcaccatatt ccaggtcaag atcaaggtct ccaggcagta gatcctcttc aagatcctgc 1920
tattactatg agtcaagcca ctacagacac cgcacgcacc gaaattctcc cttgtatgtg 1980
agatcacgtt caagatcgcc ctacagccgt cggcccaggt atgacagcta cgaggaatat 2040
cagcacgaga ggctgaagag ggaagaatat cgcagagagt atgagaagcg agagtctgag 2100
agggccaagc aaagggagag gcagaggcag aaggcaattg aagagcgccg tgtgatttat 2160
gtcggtaaaa tcagacctga cacaacacgg acagaactga gggaccgttt tgaagttttt 2220
ggtgaaattg aggagtgcac agtaaatctg cgggatgatg gagacagcta tggtttcatt 2280
acctaccgtt atacctgtga tgcttttgct gctcttgaaa atggatacac tttgcgcagg 2340
tcaaacgaaa ctgactttga gctgtacttt tgtggacgca agcaattttt caagtctaac 2400
tatgcagacc tagattcaaa ctcagatgac tttgaccctg cttccaccaa gagcaagtat 2460
gactctctgg attttgatag tttactgaaa gaagctcaga gaagcttgcg caggtaacat 2520
gttccctagc tgaggatgac agagggatgg cgaatacctc atgggacagc gcgtccttcc 2580
ctaaagacta ttgcaagtca tacttaggaa tttctcctac tttacactct ctgtacaaaa 2640
acaaaacaaa acaacaacaa tacaacaaga acaacaacaa caataacaac aatggtttac 2700
atgaacacag ctgctgaaga ggcaagagac agaatgatat ccagtaagca catgtttatt 2760
catgggtgtc agctttgctt ttcctggagt ctcttggtga tggagtgtgc gtgtgtgcat 2820
gtatgtgtgt gtgtatgtat gtgtgtggtg tgtgtgcttg gtttagggga agtatgtgtg 2880
ggtacatgtg aggactgggg gcacctgacc agaatgcgca agggcaaacc atttcaaatg 2940
gcagcagttc catgaagaca cgcttaaaac ctagaacttc aaaatgttcg tattctattc 3000
aaaaggaaat atatatatat atatatatat atatatatat atatataaat taaaaaggaa 3060
agaaaactaa caaccaacca accaaccaac caaccacaaa ccaccctaaa atgacagccg 3120
ctgatgtctg ggcatcagcc tttgtactct gtttttttaa gaaagtgcag aatcaacttg 3180
[0028] aagcaagctt tctctcataa cgtaatgatt atatgacaat cctgaagaaa ccacaggttc 3240
catagaacta atatcctgtc tctctctctc tctctctctc tctcttttt ttttcttttt 3300
ccttttgcca tggaatctgg gtgggagagg atactgcggg caccagaatg ctaaagtttc 3360
ctaacatttt gaagtttctg tagttcatcc ttaatcctga cacccatgta aatgtccaaa 3420
atgttgatct tccactgcaa atttcaaaag ccttgtcaat ggtcaagcgt gcagcttgtt 3480
cagcggttct ttctgaggag cggacaccgg gttacattac taatgagagt tgggtagaac 3540
tctctgagat gtgttcagat agtgtaattg ctacattctc tgatgtagtt aagtatttac 3600
agatgttaaa tggagtattt ttattttatg tatatactat acaacaatgt tctttttgt 3660
tacagctatg cactgtaaat gcagccttct tttcaaaact gctaaatttt tcttaatcaa 3720
gaatattcaa atgtaattat gaggtgaaac aattattgta cactaacata tttagaagct 3780
gaacttactg cttatatata tttgattgta aaaacaaaaa gacagtgtgt gtgtctgttg 3840
agtgcaacaa gagcaaaatg atgctttccg cacatccatc ccttaggtga gcttcaatct 3900
aagcatcttg tcaagaaata tcctagtccc ctaaaggtat taaccacttc tgcgatattt 3960
ttccacattt tcttgtcgct tgtttttctt tgaagtttta tacactggat ttgttagggg 4020
aatgaaattt tctcatctaa aatttttcta gaagatatca tgattttatg taaagtctct 4080
caatgggtaa ccattaagaa atgttttat tttctctatc aacagtagtt ttgaaactag 4140
aagtcaaaaa tctttttaaa atgctgtttt gttttaattt ttgtgatttt aatttgatac 4200
aaaatgctga ggtaataatt atagtatgat ttttacaata attaatgtgt gtctgaagac 4260
tatctttgaa gccagtattt ctttcccttg gcagagtatg acgatggtat ttatctgtat 4320
tttttacagt tatgcatcct gtataaatac tgatatttca ttcctttgtt tactaaagag 4380
acatatttat cagttgcaga tagcctattt attataaatt atgagatgat gaaaataata 4440
aagccagtgg aaattttcta cctaggatgc atgacaattg tcaggttgga gtgtaagtgc 4500
ttcatttggg aaattcagct tttgcagaag cagtgtttct acttgcacta gcatggcctc 4560
tgacgtgacc atggtgttgt tcttgatgac attgcttctg ctaaatttaa taaaaacttc 4620
agaaaaacct ccattttgat catcaggatt tcatctgagt gtggagtccc tggaatggaa 4680
ttcagtaaca tttggagtgt gtattcaagt ttctaaattg agattcgatt actgtttggc 4740

tgacatgact tttctggaag acatgataca cctactactc aattgttctt ttcctttctc 4800
tcgcccaaca cgatcttgta agatggattt caccccccagg ccaatgcagc taattttgat 4860
agctgcattc atttatcacc agcatattgt gttctgagtg aatccactgt ttgtcctgtc 4920
ggatgcttgc ttgatttttt ggcttcttat ttctaagtag atagaaagca ataaaaatac 4980
tatgaaatga aagaacttgt tcacaggttc tgcgttacaa cagtaacaca tctttaatcc 5040
gcctaattct tgttgttctg taggttaaat gcaggtattt taactgtgtg aacgccaaac 5100
taaagtttac agtctttctt tctgaatttt gagtatcttc tgttgtagaa taataataaa 5160
aagactatta agagcaataa attatttta agaaatcgag atttagtaaa tcctattatg 5220
tgttcaagga ccacatgtgt tctctatttt gcctttaaat ttttgtgaac caattttaaa 5280
tacattctcc tttttgccct ggattgttga catgagtgga atacttggtt tcttttctta 5340
cttatcaaaa gacagcacta cagatatcat attgaggatt aatttatccc ccctaccccc 5400
agcctgacaa atattgttac catgaagata gttttcctca atggacttca aattgcatct 5460
agaattagtg gagcttttgt atcttctgca gacactgtgg gtagcccatc aaaatgtaag 5520
ctgtgctcct ctcatttta tttttatttt tttgggagag aatatttcaa atgaacacgt 5580
gcaccccatc atcactggag gcaaatttca gcatagatct gtaggatttt tagaagaccg 5640
tgggccattg ccttcatgcc gtggtaagta ccacatctac aattttggta accgaactgg 5700
tgctttagta atgtggattt ttttcttttt taaaagagat gtagcagaat aattcttcca 5760
gtgcaacaaa atcaattttt tgctaaacga ctccgagaac aacagttggg ctgtcaacat 5820
tcaaagcagc agagagggaa ctttgcacta ttggggtatg atgtttgggt cagttgataa 5880
aaggaaacct tttcatgcct ttagatgtga gcttccagta ggtaatgatt atgtgtcctt 5940
tcttgatggc tgtaatgaga acttcaatca ctgtagtcta agacctgatc tatagatgac 6000
ctagaatagc catgtactat aatgtgatga ttctaaattt gtacctatgt gacagacatt 6060
ttcaataatg tgaactgctg atttgatgga gctactttaa gatttgtagg tgaaagtgta 6120
atactgttgg ttgaactatg ctgaagaggg aaagtgagcg attagttgag cccttgccgg 6180
gccttttttc cacctgccaa ttctacatgt attgttgtgg ttttattcat tgtatgaaaa 6240
[0029] ttcctgtgat ttttttaaa tgtgcagtac acatcagcct cactgagcta ataaagggaa 6300
acgaatgttt caaatcta 6318

<210> 21
<211> 4598
<212> DNA
<213> 智人
<400> 21

gtagttcctt tcccacaatc ggctgggcga ggcggcgcca gcgatcagag cagcgctggg 60
tgttcagggg ccaagatggc ggcgcgccgg ggacggagag acggagtcgc gccgcccccg 120
agtgggggcc ccggtccgga ccctggcggg ggagcccgcg gcagtggttg gggaagtcga 180
agccaagcgc cgtatgggac tttgggcgct gtgagcggcg gcgagcaggt gctgctgcat 240
gaggaggcgg gtgattctgg ctttgtcagt ctctctcggc tgggcccatc tctgagggac 300
aaggacctgg aaatggagga gctaatgctg caggatgaga cactgctggg gaccatgcag 360
agctacatgg atgcctccct tatctccctc attgaggatt ttgggagcct tggagagagc 420
aggttatctc tggaggacca gaatgaagtg tcgctgctca cggctctgac ggagatcttg 480
gacaatgcag attctgagaa cctttctcca tttgacagca ttcctgattc ggagctgctt 540
gtgtcacccc gggagggctc ctctctgcac aagctgctta ctctctctcg gacacccccа 600
gaacgtgacc tcatcacccc agttgaccca ctggggccca gtacaggcag cagtagaggg 660
agtggggttg aaatgtctct tccagatccc tcttgggact tctccccacc ctctttctta 720
gagacctctt cccccaagct tcctagctgg agacccccaa gatcaagacc acgctggggc 780
caatccccac ctccccagca gcgcagtgat ggagaagaag aggaggaggt ggccagcttc 840
agtggccaga ttcttgccgg ggagcttgac aactgtgtga gcagtatccc ggacttcccc 900
atgcatttgg cctgccctga ggaggaagat aaagcaacag cagcagagat ggcagtgcca 960
gcagctggtg atgagagcat ctcctccctg agtgagctgg tgcgggccat gcacccatac 1020
tgcctgccca acctcaccca cctggcatca cttgaggatg agcttcagga gcagccagat 1080
gatttgacac tgcctgaggg ctgcgtagtg ctggagattg tggggcaggc agccacagct 1140

ggcgatgacc tggagatccc agttgtggtg cgacaggtct ctcctggacc ccggcctgtg 1200
ctcctggatg actcgctaga gactagttct gccttgcagc tgcttatgcc tacactggag 1260
tcagagacag aggctgctgt gcccaaggta accctctgct ctgagaaaga ggggttgtca 1320
ttgaactcag aggagaagct ggactcagcc tgcttattga agcccaggga ggtcgtggag 1380
ccggtggtgc ccaaggagcc tcagaaccca cctgccaatg cagcaccagg ttcccagaga 1440
gctcgaaagg gcaggaagaa gaagagcaag gagcagccag cagcctgtgt ggaaggctat 1500
gccaggaggc tgaggtcatc ttctcgcggg cagtctactg taggtacaga agtgacctct 1560
caggtagaca acttgcagaa acagcctcag gaagaacttc aaaaagagtc tgggcctctc 1620
cagggtaagg ggaagccccg ggcttgggct cgggcctggg cagctgcctt ggagaattct 1680
agccctaaga acttggagag aagtgctgga caaagtagtc ctgctaaaga aggccctcta 1740
gacctctacc caaagctggc tgacactatc caaaccaatc ctataccaac ccatctctca 1800
ttggtcgact ctgcccaagc cagccccatg ccagttgact ctgttgaagc tgatcccact 1860
gcagttggcc ctgttctagc tggccctgta cctgttgacc ctgggttggt tgaccttgct 1920
tcaaccagct cagaactggt tgagcctctc ccggctgagc cagtgctgat caacccagtc 1980
ctggctgact cagcagcagt tgaccctgca gtggttccca tctcagataa cttgccacca 2040
gttgatgctg tcccgtctgg cccagcacca gttgatctag cactggttga ccctgttcct 2100
aatgacctga ctccagttga cccagtgcta gttaagtcca gaccaactga tcccagacgt 2160
ggtgcagtgt catcagccct ggggggttca gcaccccagc tcctcgtgga gtcagagtcc 2220
ttggacccac caaagaccat catccctgaa gtcaaagagg ttgtggattc tctgaaaatt 2280
gaaagtggta ccagtgctac aacccatgaa gccagacctc ggcctctcag cttatctgag 2340
taccggcgac gaaggcagca acgccaagca gaaacagaag agagaagtcc acagcccccа 2400
actgggaagt ggcctagcct tccagagact cccacagggc tggcagacat cccttgtctt 2460
gtcatcccac cagccccagc caagaagaca gctctgcaga gaagccctga aacacccctt 2520
gagatttgcc ttgtgcctgt aggtcccagc cctgcttctc ctagtcctga gccacctgta 2580
agcaaacctg tggcctcatc tcccactgag caggtgccat cccaggagat gccactgttg 2640
[0030] gcgagacctt cccctcctgt gcagtctgtg tcccctgctg tgcccacacc tccctcgatg 2700
tctgctgccc tgcctttccc tgcaggtggg cttggcatgc cccccagtct gcccccacct 2760
cccttgcagc ctcctagtct tccattgtct atggggccag tactacctga tccgtttact 2820
cactatgccc ccttgccatc ctggccttgt tatcctcatg tgtccccttc tggctatcct 2880
tgcctgcccc ccccaccaac ggtgccccta gtgtctggta ctcctggtgc ctatgccgtg 2940
cctcccactt gcagtgtgcc ttgggcaccc cctcctgccc cagtctcacc ttacagttcc 3000
acatgtacct atgggccctt gggatggggc ccagggcctc aacatgctcc attctggtct 3060
actgttcccc cacctccttt gcctccagcc tccattggga gagctgttcc ccaacctaaa 3120
atggagtcta ggggcactcc agctggccct cctgaaaatg tacttccctt gtcgatggct 3180
cctcccctca gtcttgggct acctggccat ggagctcctc agacagagcc taccaaggtg 3240
gaggtcaagc cagtgcctgc atctccccat ccgaaacaca aggtgtctgc cctggtgcaa 3300
agtccccaga tgaaggctct agcatgtgtg tctgctgaag gtgtgactgt tgaggagcct 3360
gcatcagaga ggctaaagcc tgagacccaa gagaccaggc ccagggagaa gccccccttg 3420
cctgctacca aggctgttcc cacaccaagg cagagcactg tccccaagct gcctgctgtc 3480
cacccagccc gtctaaggaa gctgtccttc ctgcctaccc cacgtactca gggttctgaa 3540
gatgtggtac aggctttcat cagtgagatt ggaattgagg catcggacct gtccagtctg 3600
ctggagcagt ttgagaaatc agaagccaaa aaggagtgtc ctcctccggc tcctgctgac 3660
agcttggctg taggaaactc agggtccagc tgtagttcct ctggacgttc tcgaagatgc 3720
tcttcctctt cttcgtcatc atcttcctct tcgtcttcct catcctcatc atccagttct 3780
cgaagccgct cacgatcccc atccccccgc cggagaagtg acaggaggcg gcggtacagc 3840
tcttatcgtt cacatgacca ttaccaaagg caaagagtgc tacaaaagga gcgtgcaata 3900
gaagaaagaa gggtggtctt cattggaaag atacctggcc gcatgactcg atcagagctg 3960
aaacagaggt tctccgtttt tggagagatt gaggagtgca ccatccactt ccgtgtccaa 4020
ggggacaact acggcttcgt cacttatcgc tatgctgagg aggcatttgc agccattgag 4080
agtggccaca agctgcggca ggcagatgag cagccctttg atctctgctt tgggggccga 4140
aggcagttct gcaagaggag ctattctgat cttgactcca accgggaaga ctttgaccca 4200

gcacctgtaa agagcaaatt tgattctctt gactttgaca cattgttgaa acaggcccag 4260
aagaacctca ggaggtaacc ttgggccctt ccctgctatc ctttttctcc tttggaggtg 4320
cccaacctcc tccacccccc tcccctactc taggggagag agctgctagt gagatgactg 4380
ttttataaag aaatggaaaa aagtgaaata aaaaatatgt tgaatcagat tttttaaaag 4440
gggtatttgt ttttttataa caggtattga aacaagttaa cttgcattcc tatgtaagat 4500
aggaggggct gaggggatcc ccagtgtttg gaacataagt cactatgcag actaataaac 4560
atcaactaga gagaactccc aaaaaaaaaa aaaaaaaa 4598

<210> 22
<211> 1818
<212> DNA
<213> 智人
<400> 22

ggtggtcagc gcgcgcattg cctgccccgg aagtggtcgg cgcgcggcgc ggcgcgcctg 60
ggcgctaaga tggcggcggc gtgagttgca tgttgtgtga ggatcccggg gccgccgcgt 120
cgctcgggcc ccgccatggc cgtcaccatc acgctcaaaa cgctgcagca gcagaccttc 180
aagatccgca tggagcctga cgagacggtg aaggtgctaa aggagaagat agaagctgag 240
aagggtcgtg atgccttccc cgtggctgga cagaaactca tctatgccgg caagatcttg 300
agtgacgatg tccctatcag ggactatcgc atcgatgaga agaactttgt ggtcgtcatg 360
gtgaccaaga ccaaagccgg ccagggtacc tcagcacccc cagaggcctc acccacagct 420
gccccagagt cctctacatc cttcccgcct gcccccacct caggcatgtc ccatccccca 480
cctgccgcca gagaggacaa gagcccatca gaggaatccg cccccacgac gtccccagag 540
tctgtgtcag gctctgttcc ctcttcaggt agcagcgggc gagaggaaga cgcggcctcc 600
acgctagtga cgggctctga gtatgagacg atgctgacgg agatcatgtc catgggctat 660
gagcgagagc gggtcgtggc cgccctgaga gccagctaca acaaccccca ccgagccgtg 720
gagtatctgc tcacgggaat tcctgggagc cccgagccgg aacacggttc tgtccaggag 780
[0031] agccaggtat cggagcagcc ggccacggaa gcaggagaga acccccctgga gttcctgcgg 840
gaccagcccc agttccagaa catgcggcag gtgattcagc agaaccctgc gctgctgccc 900
gccctgctcc agcagctggg ccaggagaac cctcagcttt tacagcaaat cagccggcac 960
caggagcagt tcatccagat gctgaacgag ccccctgggg agctggcgga catctcagat 1020
gtggaggggg aggtgggcgc cataggagag gaggccccgc agatgaacta catccaggtg 1080
acgccgcagg agaaagaagc tatagagagg ttgaaggccc tgggcttccc agagagcctg 1140
gtcatccagg cctatttcgc gtgtgaaaaa aatgagaact tggctgccaa cttcctcctg 1200
agtcagaact ttgatgacga gtgatgccag gaagccaggc caccgaagcc cccaccctac 1260
ccttattcca tgaaagtttt ataaaagaaa aaatatatat atattcatgt ttatttaaga 1320
aatggaaaaa aaaatcaaaa atcttaaaaa aacaagcaaa cagtccagct tcctgtcctc 1380
ctaaagtggc ccctgttccc atctcccggg ccagacagct gtccccccgt cctcctcccc 1440
agcccagcct gctcagagaa gctggcagga ctgggaggcg acagatgggc ccctcttggc 1500
ctctgtccca gctctctgca gccagacgga aaggcggctg cttgcctctc catcctccga 1560
aaaaccccctg aggacccccc cccatcctct tctaggatga ggggaagctg gagccccaac 1620
tttgatcctc cattggagtg gcccaaatct ttccatctag ggcaagtcct gaaaggccca 1680
aggccccctc cccagtctgg ccttggcctc cagcctggag aagggctaac atcagctcat 1740
tgtcaaggcc acccccaccc cagaacagaa ccgtgtctct gataaaggtt ttgaagtgaa 1800
taaagtttta aaaactag 1818

<210> 23
<211> 3310
<212> DNA
<213> 智人
<400> 23

cccggcgggg ggaggttggg gacgggcctg gcagttgtga actcgaacct gccgctgtcg 60
ccgcggcggg gcggggagcg agagtgggcc gcggaggccg gccttcgggc tccatggacg 120
ggcgccgcgt ccctgcacag cccgccgcag aggtaaggct ggcctctctg cagtcagagg 180

tctgagctct gccatgggga taggggtgtc tttattactg cagttttctc taacacctgg 240
gggctaccgg agtgtgggcc gaagcaggcg ctgcagccgc ggaagtatcc ccaggaacat 300
ccccaagagg agctggaaaa agcctcatcc ccagctctgc agtctccagg ggagctcagt 360
gtctgtttgt ccagcttctc agagttgctg tgcagctcgg atgtggcata ggaaacagca 420
gacacaggga gagggcagca taaggcactg tagggagcag tggccacatt ttctgcagag 480
gaagaaccga tgctggaacg tcgttgcagg ggccccctgg ccatgggcct ggcccagccc 540
cgactccttt ctgggccctc ccaggagtca ccccagaccc tggggaagga gtcccgcggg 600
ctgaggcaac aaggcacgtc agtggcccag tctggtgccc aagccccagg cagggcccat 660
cgctgtgccc actgtcgaag gcacttccct ggctgggtgg ctctgtggct tcacacccgc 720
cggtgccagg cccggctgcc cttgccctgc cctgagtgtg gccgtcgctt tcgccatgcc 780
cccttcttag cactgcaccg ccaggtccat gctgctgcca ccccagacct gggctttgcc 840
tgccacctct gtgggcagag cttccgaggc tgggtggccc tggttctgca tctgcgggcc 900
cattcagctg caaagcggcc catcgcttgt cccaaatgcg agagacgctt ctggcgacga 960
aagcagcttc gagctcatct gcggcggtgc caccctcccg ccccggaggc ccggcccttc 1020
atatgcggca actgtggccg gagctttgcc cagtgggacc agctagttgc ccacaagcgg 1080
gtgcacgtag ctgaggccct ggaggaggcc gcagccaagg ctctggggcc ccggcccagg 1140
ggccgccccg cggtgaccgc cccccggccc ggtggagatg ccgtcgaccg ccccttccag 1200
tgtgcctgtt gtggcaagcg cttccggcac aagcccaact tgatcgctca ccgccgcgtg 1260
cacacgggcg agcggcccca ccagtgcccc gagtgcggga agcgctttac caataagccc 1320
tatctgactt cgcaccggcg catccacacc ggcgagaagc cctacccgtg caaagagtgc 1380
ggccgccgct tccggcacaa acccaacctg ctgtctcaca gcaagattca caagcgatcc 1440
gaggggtcgg cccaggccgc ccccggcccg gggagccccc agctgccagc cggcccccag 1500
gagtccgcgg ccgagcccac cccggcggta cctctgaaac cggcccagga gccgccgcca 1560
ggggccccgc cagagcaccc gcaggacccg atcgaagccc ccccctccct ctacagctgc 1620
gacgactgcg gcaggagctt ccggctggag cgcttcctgc gggcccacca gcggcagcac 1680
[0032] accggggagc ggcccttcac ctgcgccgag tgcgggaaga acttcggcaa gaagacgcac 1740
ctggtggcgc actcgcgcgt gcactccggc gagcggccct tcgcctgcga ggagtgcggc 1800
cgccgcttct cccagggcag ccatctggcg gcgcatcggc gcgaccacgc ccccgatcgg 1860
cccttcgtgt gtcccgactg cggcaaggcc ttccgccaca aaccctacct ggcggcgcac 1920
cggcgcatcc acaccggcga gaagccctac gtctgccccg actgcggcaa agccttcagc 1980
cagaagtcca acctggtgtc gcaccggcgc atccacacgg gcgagcggcc ctacgcctgt 2040
cccgactgcg accgcagctt cagccagaag tccaacctca tcacccaccg caagagccac 2100
atccgggacg gcgccttctg ctgtgccatc tgtggccaga ccttcgacga cgaggagaga 2160
ctcctggccc accagaagaa gcacgatgtc tgagacggtg ggcggggccg tgttggctga 2220
gagagggctg gggtccttcg tggtgggagt cgcagtgggc tgggggtgcc tgcctagtgc 2280
tggagtaggg gacaatggga atcctagagg ggatggaaga cgcggggagt gagctgggtg 2340
ggccctgcta gcgagagagg tcaaccccgg tggccaggga acccacttcc aagcgcaggg 2400
acgccggcct ccagctggtg tgtgctaagg ctccgtcctg actgccctgt gccctggaaa 2460
agcagcaata gcatccgccc cttagagccc tctggctaga ggagccacca gtggaaagga 2520
agaccctcca tcctctggta ttaacgcctt aatgcccctg tcttttactg taagttactt 2580
aagatcattt ttggaagcag gcgtggtaga gtcctgtaaa tgaatgctct gggctagata 2640
cagcttggag aacctgctgg ccttgttaga cagcacttgg gcctttgcca gcagcaagag 2700
gtgaagcgaa gccactctta cctctccctt cccctcccac ctgccccctg cgtaggcacc 2760
cagacttgga gagacccgtc tgctgttaat acttccatcc tcttccttcc caaagagcag 2820
atcccaaggc atttactcct tggtctgtct cgctttatct gtcgcccctc ccagcgctga 2880
gagcctcccc tggctgtcag cagcactgtg tccaggctct tgtctgaaca ccgcagcccc 2940
tccttcgctc cttccagagc tcagcatgtc acggcaagga ctgccgcatt ggtgatggag 3000
ggccagctga ggggaagttg ctggtgagtt tccttttctc catttctagc atatggacac 3060
ctggcctctg cttgagcact taggtgacag gaacttccgc acctcctgag gccctggatg 3120
attctaattg ttagaaattc taattgttag aaatccttcc ttataatgaa tgaattctgc 3180
tttcctataa tttctaccta ttgggccttg ttctgttctc tggaactaaa cagaacaacc 3240

atttacccct ccttttcaaa ctagagaata aagatttggt tttagaactg gtaaaaaaaa 3300
aaaaaaaaaa 3310

<210> 24
<211> 1247
<212> DNA
<213> 智人
<400> 24

actttacgca ggcgcgttag gtcctagtcg ctatgcgtgt gcttgtgggt ggcgggacag 60
gcttcattgg gacagcccta acccagctgc tgaatgccag aggccacgaa gtgacgttgg 120
tctcccgaaa gcccgggccc ggccggatca cgtgggatga gctcgctgca tcggggctgc 180
cgagctgcga tgccgccgtc aacctggccg gagagaacat cctcaaccct ctccgaagat 240
ggaatgaaac cttccaaaaa gaggtaatcg gcagccgcct agagaccacc caattgctgg 300
ctaaagccat caccaaagcc ccacaacccc ccaaggcctg ggtcttagtc acaggtgtag 360
cttactacca gcccagtctg actgcggagt atgatgaaga cagcccagga ggggactttg 420
acttttctc caacctcgta accaaatggg aagctgcagc caggcttcct ggagattcta 480
cacgccaggt ggtggtgcgc tcaggggttg tgctgggccg tgggggtggt gccatgggcc 540
acatgctgct gcccttcgc ctgggcctgg ggggccccat cggctcaggc caccaattct 600
tcccctggat acacatcggg gacctggcag gaatcctgac ccatgccctt gaagcaaacc 660
acgtgcacgg ggtcctgaat ggagtggctc catcctccgc cactaatgct gagtttgccc 720
agaccttggg tgctgccctg ggccgccgag ccttcatccc tctccccagc gctgtggtgc 780
aagctgtctt tgggcgacag cgtgccatca tgctgctgga gggccagaag gtgatcccac 840
agcgaacact ggccactggc taccagtatt ccttcccaga gctaggggct gccttaaagg 900
aaattgtagc ctaagtaggt cgtggcaagg gcctgaggcc tgttcctcac aggcttccag 960
gttaggcact gtgaataggc tcagctcctc tagagagctg aagccatctg gttcttagat 1020
tcctctccca gtcctctttc ccattgttct gttgctccac cttattgtct caaggccgta 1080
[0033] atctcatcag gttgggacat taatcttttc aactccttgt aagatttccc agtttggttt 1140
ctctacatgt cctgcagctg ccccacttct cctttacgct gtgtagagaa tgctctgcag 1200
tttaggcaat aaaaataaat tgtctcacta aaaaaaaaaa aaaaaaa 1247

<210> 25
<211> 1804
<212> DNA
<213> 智人
<400> 25

aagcgcgggg ccggccgggg cgcccgccgc tcgccgccgc ctccgcgcgc ccgggggccc 60
cggcgccccc cgagctaggg cggccagctc gcggctcgcc gtttgacaga tgctcatcgc 120
catggagttg ccgcagcagc acctttgggg gctcgggcga gcgacgggag ccgggatctg 180
agcgagcgcc ggggccagcg gagccggagc cgccgggaca tggttgcaga tctgatctct 240
tctgaacacc tcatcgtgtc tccatccctg ggaatctgac cctagcaact ggaccacttt 300
gttcttggaa ttttgggtgt cctcttttct caccttccc ttttcccttt tcccttccc 360
cctcctgaga actccggaag actgtagaga ttgtcatgga gtccagggaa accttaagca 420
gctcccggca aagaggggcc gagtcagact tcctgccggt ctcctcagcc aagcccccag 480
ctgctcctgg ctgtgcagga gaacctttgc tctccactcc aggacctggg aaggggatcc 540
cggtgggcgg agagcgcatg gagccagagg aggaggatga actaggctca gggcgggatg 600
tggattccaa ctccaacgcg gacagtgaga aatgggtggc aggagatggt ttggaagagc 660
aggaattttc tatcaaggag gcaaacttca cagagggaag tctgaagcta aagattcaga 720
ccacaaagcg ggctaagaaa cccccaaaga atttggagaa ctatatatgt ccacctgaga 780
tcaagatcac catcaagcag tctggggacc agaaggtgtc ccgtgctgga aaaaatagca 840
aagccacgaa ggaggaagaa agaagccact ccaaaaagaa gctcctcaca gccagtgacc 900
ttgcagccag tgacctcaaa ggatttcagc cacagattaa agactccagt aaggaggaag 960
tctggaagag aagaggaggc caaggcatcc cattcaaaaa gcaattcctg tcccaggaac 1020
gtgccatgtg cttctcatgc ccccggaacc cattccccgc aaaacccggt tctctcactc 1080

ttccttttca cagtgaacct gcagtctggg cacaagaagt ataacttcgc atggattctg 1140
caaagcccac acctgtggtc attccctgtt ctttccattc aacaatggag acttgcccaa 1200
gattgtaaac tagtgagtga cagcatttgg gcttatgatc ttctctgcct gctagctaga 1260
cattctctct gggtctaaaa gataatccaa aaagatccag cttcacaatg ctgccctgaa 1320
gagataatgc attaggcggc cctgatgcag cattcactgt cttccagggc aggcttgatc 1380
ccatgagttt gcttgctcag acgatcactt aggaaacaca tgcctttact ctctaggcct 1440
tttttctagc ttgccttgta tcagctatgc catggatctt tgctctctta ccccatgcta 1500
tacagagtat gggctccaag ccacagctgg cctgtcaagt gtgtgtcgct ggtccaccat 1560
gggatacatt tagaaacttt tatagcaatt tgacattttt gtgatatcca agcatgtgat 1620
tgttttccta cggatttgtc ttatagtatt ttaccaaagt ttccacacaa aaagtatgga 1680
ttaaggacaa agtatctggt ccttcatcaa agatcgtttg ataagctctg ttctagttaa 1740
ccaacactga gctttcctag ttttaataaa agagtaggat ttggaaaaaa aaaaaaaaaa 1800
aaaa 1804

<210> 26
<211> 4129
<212> DNA
<213> 智人
<400> 26

acacagagca gagtggggct ctgagtatat aactgttagg tgcctccctc cagcaccatc 60
tcctgagaag cactctccct tgtcgtggag gtgggcaaat ctttatcagc cactgccttc 120
tgctgccagg aagccagcta gagtggtctt taaagaaaac tgggcatctc ctgctactta 180
aaatcaaaaa ctacctaaaa taaagattat aaaaaagtaa ggatgaatgg acggtctttg 240
attggcggcg ctggtgacgc ccgtcatggt cctgtttgga aggacccttt tggaactaaa 300
gctggtgacg cagcgcgcag aggcatcgcc cggctaagct tggccctggc agatgggtcg 360
caggaacagg agccagagga agagatagcc atggaggaca gccccactat ggttagagtg 420
[0034] gacagcccca ctatggttag gggtgaaaac caggtttcgc catgtcaagg gagaaggtgc 480
ttccccaaag ctcttggcta tgtcaccggt gacatgaaag aacttgccaa ccagcttaaa 540
gacaaacccg tggtgctcca gttcattgac tggattctcc ggggcatatc ccaagtggtg 600
ttcgtcaaca accccgtcag tggaatcctg attctggtag gacttcttgt tcagaacccc 660
tggtgggctc tcactggctg gctgggaaca gtggtctcca ctctgatggc cctcttgctc 720
agccaggaca ggtcattaat agcatctggg ctctatggct acaatgccac cctggtggga 780
gtactcatgg ctgtcttttc ggacaaggga gactatttct ggtggctgtt actccctgta 840
tgtgctatgt ccatgacttg cccaattttc tcaagtgcat tgaattccat gctcagcaaa 900
tgggacctcc ccgtcttcac cctccctttc aacatggcgt tgtcaatgta cctttcagcc 960
acaggacatt acaatccatt ctttccagcc aaactggtca tacctataac tacagctcca 1020
aatatctcct ggtctgacct cagtgccctg gagttgttga aatctatacc agtgggagtt 1080
ggtcagatct atggctgtga taatccatgg acaggggca ttttcctggg agccatccta 1140
ctctcctccc cactcatgtg cctgcatgct gccataggat cattgctggg catagcagcg 1200
ggactcagtc tttcagcccc atttgaggac atctactttg gactctgggg tttcaacagc 1260
tctctggcct gcattgcaat gggaggaatg ttcatggcgc tcacctggca aacccacctc 1320
ctggctcttg gctgtgccct gttcacggcc tatcttggag tcggcatggc aaactttatg 1380
gctgaggttg gattgccagc ttgtacctgg cccttctgtt tggccacgct attgttcctc 1440
atcatgacca caaaaaattc caacatctac aagatgcccc tcagtaaagt tacttatcct 1500
gaagaaaacc gcatcttcta cctgcaagcc aagaaaagaa tggtggaaag ccctttgtga 1560
gaacaagccc catttgcagc catggtcacg agtcatttct gcctgactgc tccagctaac 1620
ttccagggtc tcagcaaact gctgtttttc acgagtatca actttcatac tgacgcgtct 1680
gtaatctgtt cttatgctca ttttgtattt tcctttcaac tccaggaata tccttgagca 1740
tatgagagtc acatccaggt gatgtgctct ggtatggaat ttgaaacccc aatggggcct 1800
tggcactaag actggaatgt atataaagtc aaagtgctcc aacagaagga ggaagtgaaa 1860
acaaactatt agtatttatt gatattcttg gtgtttagct ggctcgatga tgttaacagt 1920
attaaaaatt aaaccccata aaccaactaa gccttatgga attcacagtc acaaaatcga 1980

agttaatcca gaattctgtg ataagcagct tggctttttt tttaaatcaa tgcaagttac 2040
acattatagc cagaatctgt atcacagagg tgcaagctga cagcagagct cagtccccac 2100
ttcctgcaaa caatggcctg caccctatcc cttgtgtgtg tgacattctc tcatgggaca 2160
atgttggggt ttttcagact gacaggactg caagagggag aaaggaattt tgtcaatcaa 2220
aattattctg tattgcaact tttctcagag attgcaaagg atttttagg tagagattat 2280
ttttccttat gaaaaatgat ctgttttaaa tgagataaaa taggagaagt tcctggctta 2340
acctgttctt acatattaaa gaaaagttac ttactgtatt tatgaaatac tcagcttagg 2400
catttttact ttaaccccta aattgatttt gtaaatgcca caaatgcata gaattgttac 2460
caacctccaa agggctcttt aaaatcatat tttttattca tttgaggatg tcttataaag 2520
actgaaggca aaggtcagat tgcttacggg tgttatttt ataagttgtt gaattcctta 2580
atttaaaaaa gctcattatt ttttgcacac tcacaatatt ctctctcaga aatcaatggc 2640
atttgaacca ccaaaaagaa ataaagggct gagtgcggtg gctcacgcct gtaatcccag 2700
cactttgggg agcccaggcg ggcagattgc ttgaacccag gagttcaaga ccagcctggg 2760
cagcatggtg aaaccctgta tctacaaaaa atacaaaaat tagccaggca tggtggtggg 2820
tgcctgtagt tccagctact tgggaggctg aggtgggaaa atgacttgag cccaggagga 2880
ggaggctgca gtgagctaag attgcaccac tgcactccaa cctgggcgac aagagtgaaa 2940
ctgtgtctct caaaaaaaaa aaaaaacaaa caaaaacaaa aacaaaacaa aacaaaacaa 3000
aacaaaacag gtaaggattc ccctgttttc ctctctttaa ttttaaagtt atcagttccg 3060
taaagtctct gtaaccaaac atactgaaga cagcaacaga agtcacgttc agggactggc 3120
tcacacctgt aatcccagca ctttgggaga tggaggtaaa aggatctctt gagcccagga 3180
gttcaagacc agcttgggca acatagcaag actccatctc ttaaaaaata aaaatagtaa 3240
cattagccag gtgtagcagc acacatctgc agcagctact caggaggctg aggtggaaag 3300
atcgcttgtg cacagaagtt cgaggctgca gtgagctata tgatcatgtc actgcactcc 3360
agcctgtgtg accgagcaag accctatctc aaaaaaatta attaattaat taattaatta 3420
atttaaaaag gaagtcatgt tcatttactt tccacttcag tgtgtatcgt gtagtatttt 3480
[0035] ggaggttgga aagtgaaacg taggaatcct gaagattttt tccacttcta gtttgcagtg 3540
ctcagtgcac aatatacatt ttgctgaatg aataaacaga aatagggaag taaacctaca 3600
aatattttag ggagaagctc acttcttcct tttctcagga aaccaagcaa gcaaacatat 3660
cgttccaatt ttaaaaccca gtgaccaaag cctttggaac tatgaatttg caactgtcat 3720
aggtttatgg atattgctgt ggagaagctc aattttcagt gtttgaactg aacccttttct 3780
tgttagggaa cgtgtgaaag aagaattgtg gggaaaaaaa agcaagcata accaaagatc 3840
atcagcagtg aagaatctag gctgtggctg agagaaccag aggcctctaa aatggacccg 3900
agtcgatctt cagaacaggg atctaccatg caggagcttc ttgtgctcac acaaatctgt 3960
aaatgggaac attgtacatt gtcgaattta aatgatatta attttctcaa gctatttttg 4020
ttactatttt cctaaaattg aatatttgca gggagcactt atacttttttc ctaatgtctg 4080
tataacaaat ttctatgcaa gtacatgaat aaattatgct cacagctca 4129

<210> 27
<211> 3885
<212> DNA
<213> 智人
<400> 27

agagccggac ggggtaaact gagcggcggc ggcggggcgc tggggcggag actgcgaccc 60
ggagccgccc ggactgacgg agcccactgc ggtgcgggcg ttggcgcggg cacggaggac 120
ccgggcaggc atcgcaagcg accccgagcg gagccccgga gccatggccc tgagcgagct 180
ggcgctggtc cgctggctgc aggagagccg ccgctcgcgg aagctcatcc tgttcatcgt 240
gttcctggcg ctgctgctgg acaacatgct gctcactgtc gtggtcccca tcatcccaag 300
ttatctgtac agcattaagc atgagaagaa tgctacagaa atccagacgg ccaggccagt 360
gcacactgcc tccatctcag acagcttcca gagcatcttc tcctattatg ataactcgac 420
tatggtcacc gggaatgcta ccagagacct gacacttcat cagaccgcca cacagcacat 480
ggtgaccaac gcgtccgctg ttccttccga ctgtcccagt gaagacaaag acctcctgaa 540
tgaaaacgtg caagttggtc tgttgtttgc ctcgaaagcc accgtccagc tcatcaccaa 600

ccctttcata ggactactga ccaacagaat tggctatcca attcccatat ttgcgggatt 660
ctgcatcatg tttgtctcaa caattatgtt tgccttctcc agcagctatg ccttcctgct 720
gattgccagg tcgctgcagg gcatcggctc gtcctgctcc tctgtggctg ggatgggcat 780
gcttgccagt gtctacacag atgatgaaga gagaggcaac gtcatgggaa tcgccttggg 840
aggcctggcc atgggggtct tagtgggccc ccccttcggg agtgtgctct atgagtttgt 900
ggggaagacg gctccgttcc tggtgctggc cgccctggta ctcttggatg gagctattca 960
gctctttgtg ctccagccgt cccgggtgca gccagagagt cagaagggga cacccctaac 1020
cacgctgctg aaggacccgt acatcctcat tgctgcaggc tccatctgct ttgcaaacat 1080
gggcatcgcc atgctggagc cagccctgcc catctggatg atggagacca tgtgttcccg 1140
aaagtggcag ctgggcgttg ccttcttgcc agctagtatc tcttatctca ttggaaccaa 1200
tatttttggg atacttgcac acaaaatggg gaggtggctt tgtgctcttc tgggaatgat 1260
aattgttgga gtcagcattt tatgtattcc atttgcaaaa aacatttatg gactcatagc 1320
tccgaacttt ggagttggtt ttgcaattgg aatggtggat tcgtcaatga tgcctatcat 1380
gggctacctc gtagacctgc ggcacgtgtc cgtctatggg agtgtgtacg ccattgcgga 1440
tgtggcattt tgtatggggt atgctatagg tccttctgct ggtggtgcta ttgcaaaggc 1500
aattggattt ccatggctca tgacaattat tgggataatt gatattcttt ttgcccctct 1560
ctgctttttt cttcgaagtc cacctgccaa agaagaaaaa atggctattc tcatggatca 1620
caactgccct attaaaacaa aaatgtacac tcagaataat atccagtcat atccgatagg 1680
tgaagatgaa gaatctgaaa gtgactgaga tgagatcctc aaaaatcatc aaagtgttta 1740
attgtataaa acagtgtttc cagtgacaca actcatccag aactgtctta gtcataccat 1800
ccatccctgg tgaaagagta aaaccaaagg ttattatttc ctttccatgg ttatggtcga 1860
ttgccaacag ccttataaag aaaaagaagc ttttctaggg gtttgtataa atagtgttga 1920
aactttattt tatgtattta attttattaa atatcataca atatattttg atgaaatagg 1980
tattgtgtaa atctataaat atttgaatcc aaaccaaata taatttttta acttacatta 2040
acaaacattt gggcaaaaat catattggta atgagtgttt aaaattaaag cacacattat 2100
[0036] ctctgagact cttccaacaa agagaaacta gaatgaagtc tgaaaaacag aatcaagtaa 2160
gacagcatgt tatatagtga cactgaatgt tatttaactt gtagttacta tcaatatatt 2220
tatgcgttaa acagctagtt ctctcaagtg tagaggacaa gaacttgtgt cagttatctt 2280
ttgaatccat aaatcttagc tggcattagt tttctatgta atcacctacc tagagagagt 2340
tgtaaattat atgttaacat gttatctggt tggcagcaaa cactaaagcc aataaaggaa 2400
aaacagtaaa tgttccgaaa gcagagaaaa gcaaccaaac atattgttat gaactaaaag 2460
ctttcccttt aagatgcata cttgtcttac tggatgaaga aaattgaggg tacatgtacc 2520
ttatactgtc aaggttgttt aaacatgata aggttaatcg ccatctactt caagttttag 2580
aaaaggaaac aagaagctga aaacagctgc tctgacttta atatctgact atatctttga 2640
tctgtttgca ggtcatccaa gtgttttcta ggaatatatt tattttaggt tgtctgaaac 2700
tactattttt tagactcctg aaagttgttc acatcaatgt gaagacaaat tttaaatgaa 2760
aatgaagaat gaaattatgt cttgaatcat atattaagaa gtaaaaataa tagtgatcag 2820
gcagaaaaga aaaatggaac atctaaaaat gtatgtgcta actatatcat ccagtgtgca 2880
gtgttgtgta tttttctaag catgacaaca ttgatgtgcc ttttcagtgt aacagcaaat 2940
actgttagtg aacattgtca atttatgtca ttttgttaag agatatgact ggagtgtgca 3000
gtgtggaatg tctctaatac tacttgtgaa tcctgcagtt ctataatcat aaacaaaaat 3060
tacttagttt cgttaagcta agattgtgtt tgtgttaact tcgacatcaa ggagcaaaga 3120
actttagaac agactcctca atcttgtgac tttcttattc tctaggaaag taacacttcg 3180
tttcatgaag cttttctgtg gggcttcgat tatttcaagt ctggtttcta agtgcagtgt 3240
gtttgaagca aacgaacttc caactcactt atttggcatt gggcaacttg gccaagtctg 3300
ccactttgga agatggctct ggaggaaact ctcatatggc taaaaaggca ggctagtttc 3360
ttacttctac aggggtagag ccttaaaaaa gaacgtgcta caaattggtt ctctttgagg 3420
gtttctggtt ctccctgccc ccaataccat atactttatt gcaattttat ttttgccttt 3480
acggctctgt gtctttctgc aagaaggcct ggcaaaggta tgcctgctgt tggtccctcg 3540
ggataagata aaatataaat aaaaccttca gaactgtttt ggagcaaaag atagcttgta 3600
cttggggaaa aaaattctaa gttcttttat atgactaata ttcttggtta gcaagactgg 3660

aaagaggtgt ttttttaaaa tgtacatacc agaacaaaga acatacagct ctctgaacat 3720
ttatttttg aacagaggtg gtttttatgt ttggacctgg taatacagat acaaaaactt 3780
taatgaggta gcaatgaata ttcaactgtt tgactgctaa gtgtatctgt ccatatttta 3840
gcaagtttac ttaataaatc ttctgaacca tgaaaaaaaa aaaaa 3885

<210> 28
<211> 5486
<212> DNA
<213> 智人
<400> 28

gccctcttct gaagaggcgt ttctggacca ctgagccccg cctcccactg tgagcggaac 60
cctaccgttt ttaaaaaaat ctttttcaaa acttgccagg ttgtctttcc aaatattttt 120
aataatagtg ctgctgctgt agaccacaga gaaaagaatc cctcgctctt ccttttcact 180
tagtagaaac ttctaccgcg taggtcccgc caggagttcg cgcatgcgca ggagcgacaa 240
taagatggcg gtgataatcg ccgcactttt tttcaaatta gtggatccca gaaatcattg 300
cgcgcatttg taacgaattt ccgttcgagt ttgtatttta ggcgccattt tcgagtgaag 360
gacccggagc cgaaacaccg gtaggagcgg ggaggtgggt actacacaac cgtctccagc 420
cttggtctga gtggactgtc ctgcagcgac catgccccgt aaaggcaccc agccctccac 480
tgcccggcgc agagaggaag ggccgccgcc gccgtcccct gacggcgcca gcagcgacgc 540
ggagcctgag ccgccgtccg gccgcacgga gagcccagcc accgccgcag agactgcaag 600
tgaggaactt gataatagaa gtttagaaga gattttgaac agcattcctc ctcccccgcc 660
tccagcaatg accaatgaag ctggagctcc tcggcttatg ataactcata ttgtaaacca 720
gaacttcaaa tcctatgctg gggagaaaat tctgggacct ttccataagc gcttttcctg 780
tattatcggg ccaaatggca gtggcaaatc caatgttatt gattctatgc tttttgtgtt 840
tggctatcga gcacaaaaaa taagatctaa aaaactctca gtattaatac ataattctga 900
tgaacacaag gacattcaga gttgtacagt agaagttcat tttcaaaaga taattgataa 960
[0037] ggaaggggat gattatgaag tcattcctaa cagtaatttc tatgtatcca gaacggcctg 1020
cagagataat acttctgtct atcacataag tggaaagaaa aagacattta aggatgttgg 1080
aaatcttctt cgaagccatg gaattgactt ggaccataat agatttttaa ttttacaggg 1140
tgaagttgaa caaattgcta tgatgaaacc aaaaggccag actgaacacg atgagggtat 1200
gcttgaatat ttagaagata taattggttg tggacggcta aatgaaccta ttaaagtctt 1260
gtgtcggaga gttgaaatat taaatgaaca cagaggagag aagttaaaca gggtaaagat 1320
ggtggaaaag gaaaaggatg ccttagaagg agagaaaaac atagctatcg aatttcttac 1380
cttggaaaat gaaatattta gaaaaaagaa tcatgtttgt caatattata tttatgagtt 1440
gcagaaacga attgctgaaa tggaaactca aaaggaaaaa attcatgaag ataccaaaga 1500
aattaatgag aagagcaata tactatcaaa tgaaatgaaa gctaagaata aagatgtaaa 1560
agatacagaa aagaaactga ataaaattac aaaatttatt gaggagaata aagaaaaatt 1620
tacacagcta gatttggaag atgttcaagt tagagaaaag ttaaaacatg ccacgagtaa 1680
agccaaaaaa ctggagaaac aacttcaaaa agataaagaa aaggttgaag aatttaaaag 1740
tatacctgcc aagagtaaca atatcattaa tgaaacaaca accagaaaca atgccctcga 1800
gaaggaaaaa gagaaagaag aaaaaaaatt aaaggaagtt atggatagcc ttaaacagga 1860
aacacaaggg cttcagaaag aaaaagaaag tcgagagaaa gaacttatgg gtttcagcaa 1920
atcggtaaat gaagcacgtt caaagatgga tgtagcccag tcagaacttg atatctatct 1980
cagtcgtcat aatactgcag tgtctcaatt aactaaggct aaggaagctc taattgcagc 2040
ttctgagact ctcaaagaaa ggaaagctgc aatcagagat atagaaggaa aactccctca 2100
aactgaacaa gaattaaagg agaaagaaaa agaacttcaa aaacttacac aagaagaaac 2160
aaactttaaa agtttggttc atgatctctt tcaaaaagtt gaagaagcaa agagctcatt 2220
agcaatgaat cgaagtaggg ggaaagtcct tgatgcaata attcaagaaa aaaaatctgg 2280
caggattcca ggaatatatg gaagattggg ggacttagga gccattgatg aaaaatacga 2340
cgtggctata tcatcctgtt gtcatgcact ggactacatt gttgttgatt ctattgatat 2400
agcccaagaa tgtgtaaact tccttaaaag acaaaatatt ggagttgcaa cctttatagg 2460
tttagataag atggctgtat gggcgaaaaa gatgaccgaa attcaaactc ctgaaaatac 2520

tcctcgttta tttgatttag taaaagtaaa agatgagaaa attcgccaag ctttttattt 2580
tgctttacga gataccttag tagctgacaa cttggatcaa gccacaagag tagcatatca 2640
aaaagataga agatggagag tggtaacttt acagggacaa atcatagaac agtcaggtac 2700
aatgactggt ggtggaagca aagtaatgaa aggaagaatg ggttcctcac ttgttattga 2760
aatctctgaa gaagaggtaa acaaaatgga atcacagttg caaaacgact ctaaaaaagc 2820
aatgcaaatc caagaacaga aagtacaact tgaagaaaga gtagttaagt tacggcatag 2880
tgaacgagaa atgaggaaca cactagaaaa atttactgca agcatccagc gtttaataga 2940
gcaagaagaa tatttgaatg tccaagttaa ggaacttgaa gctaatgtac ttgctacagc 3000
ccctgacaaa aaaaagcaga aattgctaga agaaaacgtt agtgctttca aaacagaata 3060
tgatgctgtg gctgagaaag ctggtaaagt agaagctgag gttaaacgct tacacaatac 3120
catcgtagaa atcaataatc ataaactcaa ggcccaacaa gacaaacttg ataaaataaa 3180
taagcaatta gatgaatgtg cttctgctat tactaaagcc caagtagcaa tcaagactgc 3240
tgacagaaac cttcaaaagg cacaagactc tgtcttgcgt acagagaaag aaataaaaga 3300
tactgagaaa gaggtggatg acctaacagc agagctgaaa agtcttgagg acaaagcagc 3360
agaggtcgta aagaatacaa atgctgcaga ggaatcctta ccagagatcc agaaagaaca 3420
tcgcaatctg cttcaagaat taaaagttat tcaagaaaat gaacatgctc ttcaaaaaga 3480
tgcacttagt attaagttga aacttgaaca aatagatggt cacattgctg aacataattc 3540
taaaataaaa tattggcaca aagagatttc aaaaatatca ctgcatccta tagaagataa 3600
tcctattgaa gagatttcgg ttctaagccc agaggatctt gaagcgatca agaatccaga 3660
ttctataaca aatcaaattg cacttttgga agcccggtgt catgaaatga aaccaaacct 3720
cggtgccatc gcagagtata aaaagaagga agaattgtat ttgcaacggg tagcagaatt 3780
ggacaaaatt acttatgaaa gagacagttt tagacaggca tatgaagatc ttcggaaaca 3840
aaggcttaat gaatttatgg caggttttta tataataaca aataaattaa aggaaaatta 3900
ccaaatgctt actttgggag gggacgccga actcgagctt gtagacagct tggatccttt 3960
ctctgaagga atcatgttca gtgttcgacc acctaagaaa agttggaaaa agatcttcaa 4020
[0038] cctttcggga ggagagaaaa cacttagttc attggcttta gtatttgctc ttcaccacta 4080
caagcccact ccccttact tcatggatga gattgatgca gcccttgatt ttaaaaatgt 4140
gtccattgtt gcattttata tatatgaaca aacaaaaaat gcacagttca taataatttc 4200
tcttcgaaat aatatgtttg agatttcgga tagacttatt ggaatttaca agacatacaa 4260
cataacaaaa agtgttgctg taaatccaaa agaaattgca tctaagggac tttgttgaac 4320
tttatgctga agattcttca agttgattca gtgtattact gatttttttc tatttgtaaa 4380
ggattatgag ttgtataaaa tacatactcc ctaaactaga tcatgaaact ggtttctgtt 4440
ttatgcagtt gtcatttgta aagtctaata aaatattctc tataattgct tctagattac 4500
aaaaatatga caatcttgta agtagcagac tatggagaaa aatgagttac ctggagggtc 4560
aggtaacttg ccaaactaaa aagtatgtta gttgaggcaa agtcctaagc aaggttgtgc 4620
tatcaaggct cagcatacct tcgtgggcct ttgatttacc aacactggaa atgcctgcca 4680
actaatcttg gatagattct ttaaggcatt ccacttagct tgccagttga gacaatcacc 4740
acagttatta cccaaatact atgaacatat ttttgtaaac cagtcattct gaattatagt 4800
gatgagaatt taaatatatg cttttctaga atttgatgtt tgaccattta tgacttaatt 4860
accagagagc cagtaaatta ggacagtgtt tcaacaagcc taggctatct cgtaagttga 4920
aaaatatccc actatagttg cttcatgagt atgaagtaag atggcctctg atttacactg 4980
gttcaattta caaattttca actttatgat aggtttatcc gggtactaaa tgcatttcaa 5040
cttgatagtt tcaacttatg ataggtttac caggatgtag tcccactgtt gaggagcatc 5100
tatttagggg ttaattactt tagtaataag tggaaagtaa gataccttga gtaatgtttg 5160
cctataaaat tgtcagcgta tttttacact attggctcaa gaatgttata atgctaaggg 5220
acataagttg gcaaccactt ggtttttgga aggactttcg gtattgtatt agaagtctgc 5280
cctagctgtt aaatttctgg gtatttatcc taaggaatta attaaagagt taattgttcc 5340
tttcttcagt gggccattgt tttagatatt taaaaaatcc aacagtttct atcataatgt 5400
aactgtaaaa atgtaaacac attattagca tggactttta aataaagatt taaagaaagc 5460
aagatcggaa aaaaaaaaaa aaaaaa 5486

<210> 29

<211> 3601
<212> DNA
<213> 智人
<400> 29

gggagaagga ggaggccggg ggaaggagga gacaggagga ggagggacca cggggtggag 60
gggagataga cccagcccag agctctgagt ggtttcctgt tgcctgtctc taaacccctc 120
cacattcccg cggtccttca gactgcccgg agagcgcgct ctgcctgccg cctgcctgcc 180
tgccactgag ggttcccagc accatgaggg cctggatctt ctttctcctt tgcctggccg 240
ggagggcctt ggcagcccct caagaagccc tgcctgatga gacagaggtg gtggaagaaa 300
ctgtggcaga ggtgactgag gtatctgtgg gagctaatcc tgtccaggtg gaagtaggag 360
aatttgatga tggtgcagag gaaaccgaag aggaggtggt ggcggaaaat ccctgccaga 420
accaccactg caaacacggc aaggtgtgcg agctggatga gaacaacacc cccatgtgcg 480
tgtgccagga ccccaccagc tgcccagccc ccattggcga gtttgagaag gtgtgcagca 540
atgacaacaa gaccttcgac tcttcctgcc acttctttgc cacaaagtgc accctggagg 600
gcaccaagaa gggccacaag ctccacctgg actacatcgg gccttgcaaa tacatccccc 660
cttgcctgga ctctgagctg accgaattcc ccctgcgcat gcgggactgg ctcaagaacg 720
tcctggtcac cctgtatgag agggatgagg acaacaacct tctgactgag aagcagaagc 780
tgcgggtgaa gaagatccat gagaatgaga agcgcctgga ggcaggagac caccccgtgg 840
agctgctggc ccgggacttc gagaagaact ataacatgta catcttccct gtacactggc 900
agttcggcca gctggaccag caccccattg acgggtacct ctcccacacc gagctggctc 960
cactgcgtgc tcccctcatc cccatggagc attgcaccac ccgctttttc gagacctgtg 1020
acctggacaa tgacaagtac atcgccctgg atgagtgggc cggctgcttc ggcatcaagc 1080
agaaggatat cgacaaggat cttgtgatct aaatccactc cttccacagt accggattct 1140
ctctttaacc ctccccttcg tgtttccccc aatgtttaaa atgtttggat ggtttgttgt 1200
tctgcctgga gacaaggtgc taacatagat ttaagtgaat acattaacgg tgctaaaaat 1260
[0039] gaaaattcta acccaagaca tgacattctt agctgtaact taactattaa ggccttttcc 1320
acacgcatta atagtcccat ttttctcttg ccatttgtag ctttgcccat tgtcttattg 1380
gcacatgggt ggacacggat ctgctgggct ctgccttaaa cacacattgc agcttcaact 1440
tttctcttta gtgttctgtt tgaaactaat acttaccgag tcagactttg tgttcatttc 1500
atttcagggt cttggctgcc tgtgggcttc cccaggtggc ctggaggtgg gcaaagggaa 1560
gtaacagaca cacgatgttg tcaaggatgg ttttgggact agaggctcag tggtgggaga 1620
gatccctgca gaacccacca accagaacgt ggtttgcctg aggctgtaac tgagagaaag 1680
attctggggc tgtgttatga aaatatagac attctcacat aagcccagtt catcaccatt 1740
tcctccttta cctttcagtg cagtttcttt tcacattagg ctgttggttc aaacttttgg 1800
gagcacggac tgtcagttct ctgggaagtg gtcagcgcat cctgcagggc ttctcctcct 1860
ctgtcttttg gagaaccagg gctcttctca ggggctctag ggactgccag gctgtttcag 1920
ccaggaaggc caaaatcaag agtgagatgt agaaagttgt aaaatagaaa aagtggagtt 1980
ggtgaatcgg ttgttctttc ctcacatttg gatgattgtc ataaggtttt tagcatgttc 2040
ctccttttct tcaccctccc ctttttttctt ctattaatca agagaaactt caaagttaat 2100
gggatggtcg gatctcacag gctgagaact cgttcacctc caagcatttc atgaaaaagc 2160
tgcttcttat taatcataca aactctcacc atgatgtgaa gagtttcaca aatccttcaa 2220
aataaaaagt aatgacttag aaactgcctt cctgggtgat ttgcatgtgt cttagtctta 2280
gtcaccttat tatcctgaca caaaaacaca tgagcataca tgtctacaca tgactacaca 2340
aatgcaaacc tttgcaaaca cattatgctt ttgcacacac acacctgtac acacacaccg 2400
gcatgtttat acacagggag tgtatggttc ctgtaagcac taagttagct gttttcattt 2460
aatgacctgt ggtttaaccc ttttgatcac taccaccatt atcagcacca gactgagcag 2520
ctatatcctt ttattaatca tggtcattca ttcattcatt cattcacaaa atatttatga 2580
tgtatttact ctgcaccagg tcccatgcca agcactgggg acacagttat ggcaaagtag 2640
acaaagcatt tgttcatttg gagcttagag tccaggagga atacattaga taatgacaca 2700
atcaaatata aattgcaaga tgtcacaggt gtgatgaagg gagagtagga gagaccatga 2760
gtatgtgtaa caggaggaca cagcattatt ctagtgctgt actgttccgt acggcagcca 2820

ctacccacat gtaacttttt aagatttaaa tttaaattag ttaacattca aaacgcagct 2880
ccccaatcac actagcaaca tttcaagtgc ttgagagcca tgcatgatta gtggttaccc 2940
tattgaatag gtcagaagta gaatcttttc atcatcacag aaagttctat tggacagtgc 3000
tcttctagat catcataaga ctacagagca cttttcaaag ctcatgcatg ttcatcatgt 3060
tagtgtcgta ttttgagctg gggttttgag actcccctta gagatagaga aacagaccca 3120
agaaatgtgc tcaattgcaa tgggccacat acctagatct ccagatgtca tttcccctct 3180
cttattttaa gttatgttaa gattactaaa acaataaaag ctcctaaaaa atcaaactgt 3240
attctggtgt tctcttctac acagtgggag ggcgagcagt aggagagatt ggcccatttg 3300
gtgctggcca tttgaggaat gcaagcccag cactagtctc ataatctcta ggaatctgta 3360
gagagaggaa ttgaagtaaa tttcagcatt ggctcattca gtcattcggc gacattcatc 3420
aggtacctgc aatgtgttag gggatcttat gagtaggcag cgtgcgtgat ccttgctccc 3480
ctggagcttt ctaacattct agcaggcaga ccacacataa atttgcaata ctgtttctga 3540
taaaaacgtg ctgtaaagga aataaagcag agaactatca tggaaaaaaa aaaaaaaaaa 3600
a 3601

<210> 30
<211> 2989
<212> DNA
<213> 智人
<400> 30

gtctgggccg agcccgccca gctggctgag acgcgtggag cctggcggcg agtgggggcg 60
tgcgacggtt actctggtta ctggggccgc gccgcgctgg cgagagccgc cgcccgcgag 120
ggatgctggt gaggaagccg tcgggagccg ccgccgccat ctgagggagg taccctggaa 180
accacctttt atcggtgggg aagtgcagtc gcggtgggcg gctctggggg ccagcgaaac 240
gggaggcctc taaatcttta ggttggggct gcattgccct ggagccgcac tcttgagtcc 300
gaggccatct tttgttggag aaggcgtcgg cgttggcgtt ttcccgaggt tgggctgtac 360
[0040] agtgtctccg tccgcggaaa aagaagcctc tgaacccgcg ccggcccgca gcccccgtgc 420
cttccggccg ctgctcgccg tcgccagagg ctaggccacg tttcccccag tgccgaggtg 480
tttctgtgac cctccctcca ctcccattcc cttctgaaag ggcacctgct cttggtgaga 540
aaagaaatta tagcacgaag agccagtatc agaagagtat ccatcacccg cagcaaccgc 600
tcagggaaca ccatcaaaaa agaaaaaaag ggaatatctg gatttcctgg gcgaggagga 660
gcgagtctgc tcgggagctg ttccagcagg cgatttttaa atactgcttt ctacgcccta 720
tacaacttgg cttcacatac ttttacacta actttatatg atttttaaaa actggtctga 780
tcggacttct cgtcctggga cactgtttac tggagtctgg ccggctctcc gtgctcctct 840
tggtacctca ttttggggag aaccttaaac ccactcgagc agataatctc cgccttgacc 900
ggtgccacca aagaagcctt ggaaccatgt ggacttttct gggcattgcc actttcacct 960
atttttataa gaagttcggg gacttcatca ctttggccaa cagggaggtc ctgttgtgcg 1020
tgctggtgtt cctctcgctg ggcctggtgc tctcctaccg ctgtcgccac cgaaacgggg 1080
gtctcctcgg gcgccagcag agcggctccc agttcgccct cttctcggat attctctcag 1140
gcctgccttt cattggcttc ttctgggcca aatccccccc tgaatcagaa aataaggagc 1200
agctcgaggc caggaggcgc agaaaaggaa ccaatatttc agaaacaagc ttaataggaa 1260
cagctgcctg tacatcaaca tcttctcaga atgacccaga agttatcatc gtgggagctg 1320
gcgtgcttgg ctctgctttg gcagctgtgc tttccagaga tggaagaaag gtgacagtca 1380
ttgagagaga cttaaaagag cctgacagaa tagttggaga attcctgcag ccgggtggtt 1440
atcatgttct caaagacctt ggtcttggag atacagtgga aggtcttgat gcccaggttg 1500
taaatggtta catgattcat gatcaggaaa gcaaatcaga ggttcagatt ccttaccctc 1560
tgtcagaaaa caatcaagtg cagagtggaa gagctttcca tcacggaaga ttcatcatga 1620
gtctccggaa agcagctatg gcagagccca atgcaaagtt tattgaaggt gttgtgttac 1680
agttattaga ggaagatgat gttgtgatgg gagttcagta caaggataaa gagactggag 1740
atatcaagga actccatgct ccactgactg ttgttgcaga tgggcttttc tccaagttca 1800
ggaaaagcct ggtctccaat aaagtttctg tatcatctca ttttgttggc tttcttatga 1860
agaatgcacc acagtttaaa gcaaatcatg ctgaacttat tttagctaac ccgagtccag 1920

ttctcatcta ccagatttca tccagtgaaa ctcgagtact tgttgacatt agaggagaaa 1980
tgccaaggaa tttaagagaa tacatggttg aaaaaattta cccacaaata cctgatcacc 2040
tgaaagaacc attcttagaa gccactgaca attctcatct gaggtccatg ccagcaagct 2100
tccttcctcc ttcatcagtg aagaaacgag gtgttcttct tttgggagac gcatataata 2160
tgaggcatcc acttactggt ggaggaatga ctgttgcttt taaagatata aaactatgga 2220
gaaaactgct aaagggtatc cctgaccttt atgatgatgc agctattttc gaggccaaaa 2280
aatcatttta ctgggcaaga aaaacatctc attcctttgt cgtgaatatc cttgctcagg 2340
ctctttatga attattttct gccacagatg attccctgca tcaactaaga aaagcctgtt 2400
ttctttattt caaacttggt ggcgaatgtg ttgcgggtcc tgttgggctg ctttctgtat 2460
tgtctcctaa ccctctagtt ttaattggac acttctttgc tgttgcaatc tatgccgtgt 2520
atttttgctt taagtcagaa ccttggatta caaaacctcg agcccttctc agtagtggtg 2580
ctgtattgta caaagcgtgt tctgtaatat ttcctctaat ttactcagaa atgaagtata 2640
tggttcatta agcttaaagg ggaaccattt gtgaatgaat atttggaact taccaagtcc 2700
taagagactt ttggaagagg atatatatag catagtacca taccacttat aaagtggaaa 2760
ctcttggacc aagatttgga ttaatttgtt tttgaagttt tttgtatata aatatgtaaa 2820
tacatgcttt aatttgcaat ttaaaatgaa ggggttaaat aagttagaca tttaaaagaa 2880
atgattgtta ccataaatta gtgctaatgc tgaggagaac tacagttttt cttttgaatt 2940
tagtatttga gatgagttgt tgggacatgc aaataaaatg aagaatgaa 2989

<210> 31
<211> 3138
<212> DNA
<213> 智人
<400> 31

attttaccca gcccctgttc aagatggagt tgctgtggtt cacacatctc tgacaaaaat 60
acagggctat tcggagtcac cagacctgga gtttgagtat gctgacacag acaagtgggc 120
[0041] tgcagagctc tcggagcttt acagctacac ggaagggcca gaattcctga tgaatcgaaa 180
atgctttgag gaggacttcc ggatccatgt gacagacaag aagtggactg agctggatac 240
caaccagcac cggacccatg ccatgaggct cctggatggc ttggaagtca ctgccaggga 300
gaagagactc aaggtggctc gagcaattct ctatgttgct caaggcacgt ttggggagtg 360
cagctcggag gcagaggtgc agtcctggat gcgctacaac atctttctcc tcctggaggt 420
gggcacgttc aatgctttgg tggagcttct gaacatggaa atagacaaca gtgccgcctg 480
cagcagtgct gtgaggaagc ctgccatctc cctggctgac agcacagacc tcagggtcct 540
gctcaacatc atgtacctga tagtggagac cgttcatcag gagtgtgagg gtgacaaggc 600
tgagtggagg accatgcggc agaccttcag agccgagctg ggctccccgc tgtacaacaa 660
tgagccattt gccatcatgc tgtttgggat ggtgaccaaa ttttgcagtg gtcacgcccc 720
tcactttccc atgaagaaag ttctcttgct gctctggaag acagtattgt gcacgctagg 780
cggctttgag gagctgcaga gcatgaaggc tgagaagcgc agcatcctgg gcctcccccc 840
gcttcctgag gacagcatca aagtgattcg caacatgaga gcagcctctc caccagcatc 900
tgcttcagac ttgattgagc agcagcagaa acggggccgc cgagagcaca aggctctgat 960
aaagcaggac aacctagatg ccttcaacga gcgggatccc tacaaggctg atgactctcg 1020
agaagaggaa gaggagaatg atgatgacaa cagtctggag ggggagacgt ttcccctgga 1080
acgggatgaa gtgatgcctc ccccgctaca gcacccacag actgacaggc tgacttgccc 1140
caaagggctc ccgtgggctc ccaaggtcag agagaaagac attgagatgt tccttgagtc 1200
cagccgcagc aaatttatag gttacactct aggcagtgac acgaacacag tggtggggct 1260
gcccaggcca atccacgaaa gcatcaagac tctgaaacag cacaagtaca cgtcgattgc 1320
agaggtccag gcacagatgg aggaggaata cctccgctcc cctctctcag ggggagaaga 1380
agaagttgag caagtccctg cagaaaccct ctaccaaggc ttgctcccca gcctgcctca 1440
gtatatgatt gccctcctga agatcctgtt ggctgcagca cccacctcaa aagccaaaac 1500
agactcaatc aacatcctag cggacgtctt gcctgaggag atgcccacca cagtgttgca 1560
gagcatgaag ctgggggtgg atgtaaaccg ccacaaagag gtcattgtta aggccatttc 1620
tgctgtcctg ctgctgctgc tcaagcactt taagttgaac catgtctacc agtttgaata 1680

catggcccag cacctggtgt ttgccaactg cattcctttg atcctaaagt tcttcaatca 1740
aaacatcatg tcctacatca ctgccaagaa cagcatttct gtcctggatt accctcactg 1800
cgtggtgcat gagctgccag agctgacggc ggagagtttg gaagcaggtg acagtaacca 1860
attttgctgg aggaacctct tttcttgtat caatctgctt cggatcttga acaagctgac 1920
aaagtggaag cattcaagga caatgatgct ggtggtgttc aagtcagccc ccatcttgaa 1980
gcgggcccta aaggtgaaac aagccatgat gcagctctat gtgctgaagc tgctcaaggt 2040
acagaccaaa tacttggggc ggcagtggcg aaagagcaac atgaagacca tgtctgccat 2100
ctaccagaag gtgcggcatc ggctgaacga cgactgggca tacggcaatg atcttgatgc 2160
ccggccttgg gacttccagg cagaggagtg tgcccttcgt gccaacattg aacgcttcaa 2220
cgcccggcgc tatgaccggg cccacagcaa ccctgacttc ctgccagtgg acaactgcct 2280
gcagagtgtc ctgggccaac gggtggacct ccctgaggac tttcagatga actatgacct 2340
ctggttagaa agggaggtct tctccaagcc catttcctgg gaagagctgc tgcagtgagg 2400
ctgttggtta ggggactgaa atggagagaa aagatgatct gaaggtacct gtgggactgt 2460
cctagttcat tgctgcagtg ctcccatccc ccaccaggtg gcagcacagc cccactgtgt 2520
cttccgcagt ctgtcctggg cttgggtgag cccagcttga cctccccttg gttcccaggg 2580
tcctgctccg aagcagtcat ctctgcctga gatccattct tcctttactt cccccaccct 2640
cctctcttgg atatggttgg ttttggctca tttcacaatc agcccaaggc tgggaaagct 2700
ggaatgggat gggaacccct ccgccgtgca tctgaatttc aggggtcatg ctgatgcctc 2760
tcgagacata caaatccttg ctttgtcagc ttgcaaagga ggagagttta ggattagggc 2820
cagggccaga aagtcggtat cttggttgtg ctctggggtg ggggtggggt gtttctgatg 2880
ttattccagc ctcctgctac attatatcca gaagtaattg cggaggctcc ttcagctgcc 2940
tcagcacttt gattttggac agggacaagg taggaagaga agcttccctt aaccagaggg 3000
gccatttttc cttttggctt tcgagggcct gtaaatatct atatataatt ctgtgtgtat 3060
tctgtgtcat gttggggttt ttaatgtgat tgtgtattct gtttacatta aaaagaagca 3120
aaaataaaaa aaaaaaaa 3138

[0042] <210> 32
<211> 3098
<212> DNA
<213> 智人
<400> 32
gcacgcagcc ttagctcctt ccccgccctt gctcttccca gtttctccgt cagcctgcgg 60
gtcccggctg gcggctgctt ccggtaggag agcggtgtag agcgagcagg tctcagctcc 120
tcgtcatgtc atacggtccc ttagacatgt accggaaccc ggggccctcg gggccccagc 180
tccgggactt cagcagcatc atccagacgt gcagcggcaa catccagcgg atcagccaag 240
ccactgctca gataaagaat ttgatgagcc agctaggaac taagcaggac tcaagcaagc 300
tacaggaaaa tctgcaacag ttacaacact ccacaaatca gctcgccaag gaaacaaatg 360
aattgctgaa agaattaggg tccttgcccc ttcccttatc tacttcagaa cagcgccagc 420
agagacttca gaaggaacgc ctcatgaatg acttctctgc agccttaaac aatttccagg 480
ctgtgcagag aagggtatct gaaaaggaaa aggagagtat tgccagagca agagctggat 540
ctcgtctttc tgcagaagag aggcaaagag aggagcagct ggtctcattt gacagccatg 600
aggagtggaa ccagatgcag agccaggagg atgaggtggc catcactgag caggatttgg 660
aacttattaa agaaagagaa acggcaattc ggcagctgga ggctgacatt ttggatgtca 720
atcagatatt taaagatttg gccatgatga tccatgacca gggtgatctg attgatagca 780
tagaagccaa tgtggaaagc tcagaggtgc acgtcgaaag agccactgaa cagttacagc 840
gagctgctta ctatcagaaa aaatctcgca agaagatgtg tatcctggtg cttgtcctgt 900
cagtgattat tctaatcttg ggacttatta tctggctagt ttataaaacg aagtgattgc 960
ctccgatcgt tctcccgctg agctgttttc aagggcaagt gcttgttgaa gtcttgccag 1020
aacaaactga tcacaagaag acagcatata tcagaacgtc ctgtaatcat ttagttagaa 1080
actaactact aactagtctt tggaattcgt gacctatgga gacagtaatt atcaatttat 1140
tgattctatt gatttctcaa attaggaatt aacttatgtg gattttgctt cctcttgtat 1200
tctgattgcc cttcatccca agtgtttact gaaaattcca ttctagatat tcttgttttg 1260

acaaatgaca ctacagtctc gtaatattgt cttttatgta tatacaaaat ttacctttt 1320
actagcatct gagatagagt tactttctgg tacccagtat attggagtct gtcagaaact 1380
ctataatagg ccaccagttt ttattattta acatttttat ttgaatttct aagaagccta 1440
ttctctatct attttgaaag attttggcac tatatttaat tggaaggtaa aatattgtac 1500
atgtgatcca gagtaaatga gaagtctcta tctgagctgg tcagttactg gagtacatgt 1560
tactaatctg ggtttaaagt ttacttcatt atctgctagt gtcatccaca gcagttcatc 1620
ctcatccaca ctaagccatc ctgttagctt ttaaaggaag ttaatttaat taacattaat 1680
atactctatg ggctccctct cccacctgtc tgcatagaaa ggcagaatta gacatagcat 1740
gctttggaaa agcaaatagg aattgttggg aatgatttaa tcttgttgtt gttgttgttg 1800
ttgttcactt gtggttctac attcctggtg aatgatgaat gttgctgtca aagggctgcc 1860
ccctacctta taagggttgc tgggcatttg aaggcaggaa gatttttaaa gatagattga 1920
ggttggttta aaattattcc tgtaaaccaa caataaagca aagaagaggt tcatttttgt 1980
aaataacact ggtttcaaat agtgatgtta gacttaacct aatttataaa caagagatta 2040
atatctccat gcatagtttt agacaaaaaa agatgtttca ataaaattac tgtcttgtaa 2100
tataaatgtt gtccacttcc cttttccaca ggcctagaac agttaaaggg aacataattt 2160
gtttaggctc ccacataaat gtgaatctgg ccaacaactt tggttcatcc tttagtgaat 2220
tagaggattt ggctaccctg agtatattta tattcatttc ttctgttctc cttctgttat 2280
tatacttaat cttctaaact aaactaatgt gaacagtagg gaagcaaggg cccaaatgca 2340
taagtttctt tgcactgttg cacttactta atacaaataa atgtttttta aagcttttgt 2400
agtatgtttt tatgagttaa catcctaatg tggtaggtat taggtaatgt gctgtcatga 2460
gaaaaattga gacttccaag aaaactggac accaggtgag ggttggtttg gagacggaat 2520
aggtgtagct gcctttcctt gaaaaacagt gtgtagagat ggctgagtgc aatggctcac 2580
acttgtaatc ccaacacttt ggaaggctga ggcgggagga tcagtatatc ggtacgtctg 2640
agcccaagag ttcaagatca gcctgggcag tatagcaaga ccccatctcc attttttttt 2700
taatgatttt ttaattaaaa aaaagaacaa caggatagag ctgttggggt ggcacagtgg 2760
[0043] cccaaagagc agcttcagag ataattcctt ggttctatga tccctgttta actccaaatt 2820
acagtcggac ttggatacat catttgtaac attgtaggaa agaaaaaagt cttggttgtg 2880
aaaaacgatt tgcatttggg taaaataaag tgaccatgct tttgttctgt aatactgtgt 2940
gacctgtggt tgttgtaatg gtgatcatgg agagcaaata tgaacttggc ctggatttta 3000
aatggcctag aatttgtggt agttgccaaa gaggttctcc taggtggtct taataaacct 3060
attcacagaa ttctccttaa aaaaaaaaaa aaaaaaaa 3098

<210> 33
<211> 293
<212> DNA
<213> 智人
<400> 33

taggcgcgag ctaagcagga ggcggaggcg gaggcggagg gcgaggggcg gggagcgccg 60
cctggagcgc ggcaggaagc cttatcagtt gtgagtgagg accagtcgtt gtttgagtgt 120
gcctacggaa cgccacacct ggctaagaca gagatgaccg cgtcctcctc cagcgactat 180
ggacagactt ccaagatgag cccacgcgtc cctcagcagg attggctgtc tcaaccccca 240
gccagggtca ccatcaaaat ggaatgtaac cctagccagg tgaatggctc aag 293

<210> 34
<211> 3112
<212> DNA
<213> 智人
<400> 34

gggaacaaaa gctggagctc caccgcggtg gcggccgctc tagccctcaa ggaactctcc 60
tgatgaatgc agtgtggcca aaggcgggaa gatggtgggc agcccagaca ccgttgggat 120
gaactacggc agctacatgg aggagaagca catgccaccc ccaaacatga ccacgaacga 180
gcgcagagtt atcgtgccag cagatcctac gctatggagt acagaccatg tgcggcagtg 240
gctggagtgg gcggtgaaag aatatggcct tccagacgtc aacatcttgt tattccagaa 300

catcgatggg aaggaactgt gcaagatgac caaggacgac ttccagaggc tcacccccag 360
ctacaacgcc gacatccttc tctcacatct ccactacctc agagagactc ctcttccaca 420
tttgacttca gatgatgttg ataaagcctt acaaaactct ccacggttaa tgcatgctag 480
aaacacaggg ggtgcagctt ttattttccc aaatacttca gtatatcctg aagctacgca 540
aagaattaca actaggccag atttaccata tgagcccccc aggagatcag cctggaccgg 600
tcacggccac cccacgcccc agtcgaaagc tgctcaacca tctccttcca cagtgcccaa 660
aactgaagac cagcgtcctc agttagaacc ttatcagatt cttggaccaa caagtagccg 720
ccttgcaaat ccaggcagtg gccagatcca gctttggcag ttcctcctgg agctcctgtc 780
ggacagctcc aactccagct gcatcacctg ggaaggcacc aacggggagt tcaagatgac 840
ggatcccgac gaggtggccc ggcgctgggg agagcggaag agcaaaccca acatgaacta 900
cgataagctc agccgcgccc tccgttacta ctatgacaag aacatcatga ccaaggtcca 960
tgggaagcgc tacgcctaca agttcgactt ccacgggatc gcccaggccc tccagcccca 1020
ccccccggag tcatctctgt acaagtaccc ctcagacctc ccgtacatgg gctcctatca 1080
cgcccaccca cagaagatga actttgtggc gccccaccct ccagccctcc ccgtgacatc 1140
ttccagtttt tttgctgccc caaacccata ctggaattca ccaactgggg gtatataccc 1200
caacactagg ctccccacca gccatatgcc ttctcatctg ggcacttact actaaagacc 1260
tggcggaggc ttttcccatc agcgtgcatt caccagccca tcgccacaaa ctctatcgga 1320
gaacatgaat caaaagtgcc tcaagaggaa tgaaaaaagc tttactgggg ctggggaagg 1380
aagccgggga agagatccaa agactcttgg gagggagtta ctgaagtctt actgaagtct 1440
tactacagaa atgaggagga tgctaaaaat gtcacgaata tggacatatc atctgtggac 1500
tgaccttgta aaagacagtg tatgtagaag catgaagtct taaggacaaa gtgccaaaga 1560
aagtggtctt aagaaatgta taaactttag agtagagttt gaatcccact aatgcaaact 1620
gggatgaaac taaagcaata gaaacaacac agttttgacc taacataccg tttataatgc 1680
cattttaagg aaaactacct gtatttaaaa atagaaacat atcaaaaaca agagaaaaga 1740
cacgagagag actgtggccc atcaacagac gttgatatgc aactgcatgg catgtgctgt 1800
[0044] tttggttgaa atcaaataca ttccgtttga tggacagctg tcagctttct caaactgtga 1860
agatgaccca aagtttccaa ctcctttaca gtattaccgg gactatgaac taaaaggtgg 1920
gactgaggat gtgtatagag tgagcgtgtg attgtagaca gaggggtgaa gaaggaggag 1980
gaagaggcag agaaggagga gaccagggct gggaaagaaa cttctcaagc aatgaagact 2040
ggactcagga catttgggga ctgtgtacaa tgagttatgg agactcgagg gttcatgcag 2100
tcagtgttat accaaaccca gtgttaggag aaaggacaca gcgtaatgga gaaaggggaa 2160
gtagtagaat tcagaaacaa aaatgcgcat ctctttcttt gtttgtcaaa tgaaaatttt 2220
aactggaatt gtctgatatt taagagaaac attcaggacc tcatcattat gtgggggctt 2280
tgttctccac agggtcaggt aagagatggc cttcttggct gccacaatca gaaatcacgc 2340
aggcattttg ggtaggcggc ctccagtttt cctttgagtc gcgaacgctg tgcgtttgtc 2400
agaatgaagt atacaagtca atgtttttcc ccctttttat ataataatta tataacttat 2460
gcatttatac actacgagtt gatctcggcc agccaaagac acacgacaaa agagacaatc 2520
gatataatgt ggccttgaat tttaactctg tatgcttaat gtttacaata tgaagttatt 2580
agttcttaga atgcagaatg tatgtaataa aataagcttg gcctagcatg gcaaatcaga 2640
tttatacagg agtctgcatt tgcacttttt ttagtgacta aagttgctta atgaaaacat 2700
gtgctgaatg ttgtggattt tgtgttataa tttactttgt ccaggaactt gtgcaaggga 2760
gagccaagga aataggatgt ttggcaccca aatggcgtca gcctctccag gtccttcttg 2820
cctcccctcc tgtcttttat ttctagcccc ttttggaaca gaaggacccc gggtttcaca 2880
ttggagcctc catatttatg cctggaatgg aaagaggcct atgaagctgg ggttgtcatt 2940
gagaaattct agttcagcac ctggtcacaa atcaccctta attcctgcta tgattaaaat 3000
acatttgttg aacagtgaac aagctaccac tcgtaaggca aactgtatta ttactggcgg 3060
gcggatcccc cgggctgcag gaattcgata tcaagcttat cgataccgtc ga 3112

<210> 35
<211> 3037
<212> DNA
<213> 智人

<400> 35

ctcctcacag gtgtgtctct agtcctcgtg gttgcctgcc ccactccctg ccgagacgcc 60
tgccagaaag gtcacctatc ctgaacccca gcaagcctga aacagctcag ccaagcaccc 120
tgcgatggaa gctgcagatg cctccaggag caacgggtcg agcccagaag ccagggatgc 180
ccggagcccg tcgggcccca gtggcagcct ggagaatggc accaaggctg acggcaagga 240
tgccaagacc accaacgggc acggcgggga ggcagctgag ggcaagagcc tgggcagcgc 300
cctgaagcca ggggaaggta ggagcgccct gttcgcgggc aatgagtggc ggcgacccat 360
catccagttt gtcgagtccg gggacgacaa gaactccaac tacttcagca tggactctat 420
ggaaggcaag aggtcgccgt acgcagggct ccagctgggg gctgccaaga agccacccgt 480
tacctttgcc gaaaagggcg agctgcgcaa gtccattttc tcggagtccc ggaagcccac 540
ggtgtccatc atggagcccg gggagacccg gcggaacagc tacccccggg ccgacacggg 600
ccttttttca cggtccaagt ccggctccga ggaggtgctg tgcgactcct gcatcggcaa 660
caagcagaag gcggtcaagt cctgcctggt gtgccaggcc tccttctgcg agctgcatct 720
caagccccac ctggagggcg ccgccttccg agaccaccag ctgctcgagc ccatccggga 780
ctttgaggcc cgcaagtgtc ccgtgcatgg caagacgatg gagctcttct gccagaccga 840
ccagacctgc atctgctacc tttgcatgtt ccaggagcac aagaatcata gcaccgtgac 900
agtggaggag gccaaggccg agaaggagac ggagctgtca ttgcaaaagg agcagctgca 960
gctcaagatc attgagattg aggatgaagc tgagaagtgg cagaaggaga aggaccgcat 1020
caagagcttc accaccaatg agaaggccat cctggagcag aacttccggg acctggtgcg 1080
ggacctggag aagcaaaagg aggaagtgag ggctgcgctg gagcagcggg agcaggatgc 1140
tgtggaccaa gtgaaggtga tcatggatgc tctggatgag agagccaagg tgctgcatga 1200
ggacaagcag acccgggagc agctgcatag catcagcgac tctgtgttgt ttctgcagga 1260
atttggtgca ttgatgagca attactctct ccccccaccc ctgcccacct atcatgtcct 1320
gctggagggg gagggcctgg gacagtcact aggcaacttc aaggacgacc tgctcaatgt 1380
atgcatgcgc cacgttgaga agatgtgcaa ggcggacctg agccgtaact tcattgagag 1440
[0045] gaaccacatg gagaacggtg gtgaccatcg ctatgtgaac aactacacga acagcttcgg 1500
gggtgagtgg agtgcaccgg acaccatgaa gagatactcc atgtacctga cacccaaagg 1560
tggggtccgg acatcatacc agccctcgtc tcctggccgc ttcaccaagg agaccaccca 1620
gaagaatttc aacaatctct atggcaccaa aggtaactac acctcccggg tctgggagta 1680
ctcctccagc attcagaact ctgacaatga cctgcccgtc gtccaaggca gctcctcctt 1740
ctccctgaaa ggctatccct ccctcatgcg gagccaaagc cccaaggccc agccccagac 1800
ttggaaatct ggcaagcaga ctatgctgtc tcactaccgg ccattctacg tcaacaaagg 1860
caacgggatt gggtccaacg aagccccatg agctcctggc ggaaggaacg aggcgccaca 1920
cccctgctct tcctcctgac cctgctgctc ttgccttcta agctactgtg cttgtctggg 1980
tgggagggag cctggtcctg cacctgccct ctgcagccct ctgccagcct cttgggggca 2040
gttccggcct ctccgacttc cccactggcc acactccatt cagactcctt tcctgccttg 2100
tgacctcaga tggtcaccat cattcctgtg ctcagaggcc aacccatcac aggggtgaga 2160
taggttgggg cctgccctaa cccgccagcc tcctcctctc gggctggatc tgggggctag 2220
cagtgagtac ccgcatggta tcagcctgcc tctcccgccc acgccctgct gtctccaggc 2280
ctatagacgt ttctctccaa ggccctatcc cccaatgttg tcagcagatg cctggacagc 2340
acagccaccc atctcccatt cacatggccc acctcctgct tcccagagga ctggccctac 2400
gtgctctctc tcgtcctacc tatcaatgcc cagcatggca gaacctgcag cccttggcca 2460
ctgcagatgg aaacctctca gtgtcttgac atcaccctac ccaggcggtg ggtctccacc 2520
acagccactt tgagtctgtg gtccctggag ggtggcttct cctgactggc aggatgacct 2580
tagccaagat attcctctgt tccctctgct gagataaaga attcccttaa catgatataa 2640
tccacccatg caaatagcta ctggcccagc taccatttac catttgccta cagaatttca 2700
ttcagtctac actttggcat tctctctggc gatggagtgt ggctgggctg accgcaaaag 2760
gtgccttaca cactgccccc accctcagcc gttgccccat cagaggctgc ctcctccttc 2820
tgattacccc ccatgttgca tatcagggtg ctcaaggatt ggagaggaga caaaaccagg 2880
agcagcacag tggggacatc tcccgtctca acagccccag gcctatgggg gctctggaag 2940
gatgggccag cttgcagggg ttggggaggg agacatccag cttgggcttt ccccttgga 3000

ataaaccatt ggtctgtcaa aaaaaaaaaa aaaaaaa 3037

<210> 36

<211> 4035

<212> DNA

<213> 智人

<400> 36

acttaacaac cgaagtaacc cgcaatgcgg aagggcgagg ggattgcgag tcaccgagtt 60

tcccgcgcgg cttgagtcac ggcctagaaa gagagatgtt ggggttccca ggaccaggac 120

agaggtggta gtgaactctc atgggcatcc agagaaggtc aggccccttg ctgacaggcc 180

tatctgtggg gctactgctg ctcttcagct gggtgaccct tgtccagcca acctctctct 240

cagctctggt ccaccaccct cacttgtgcc agaccacccg ggatgtccat ggccgtcact 300

accctggttt cttttgccct cgtctgtctg attctccaga ggaagcctac tgctgccacc 360

tgcaggctgc agggggctcc tgctgcaccc gggctgaatt tgaggccctg taccaagtca 420

atctgtccgc tcttccgccc ccgcccatcc tcaggggccc aggcccgctc ctagtgctgg 480

gcctctacaa cctactggtt gtgaccctga tgaccgtaga cctcgtgcac ttctgctgcg 540

gtcggggccg gagtctgggc tggagccacc gcaggcctcc ctctgggtcc tccgccgcga 600

gctccctgca ggtctctgcg gggacagctt aggtgcgccc ggagcttgcc tgcacctgcg 660

atccagagcc aagcgccccg cccctgcccg ggcgcgctcc ctccttagcc ctgcccctct 720

ctgaccccac ctccgacgca agagtggggc ggggcagctg ccggtggcgt cccgaaccca 780

gactcgcccc gccccagaga ctgcgcctgc gcgggcacga gacaacctct ccgcgatgac 840

tgccagctca gtggagcagc tgcggaagga gggcaatgag ctgttcaaat gtggagacta 900

cgggggcgcc ctggcggcct acactcaggc cctgggtctg gacgcgacgc cccaggacca 960

ggccgttctg caccggaacc gggccgcctg ccacctcaag ctggaagatt acgacaaagc 1020

agaaacagag gcatccaaag ccattgaaaa ggatggtggg gatgtcaaag cactctaccg 1080

gcggagccaa gccctagaga agctgggccg cctggaccag gctgtccttg acctgcagag 1140

[0046] atgtgtgagc ttggagccca agaacaaagt tttccaggag gccttgcgga acatcggggg 1200

ccagattcag gagaaggtgc gatacatgtc ctcgacggat gccaaagtgg aacagatgtt 1260

tcagatactg ttggacccag aagagaaggg cactgagaaa aagcaaaagg cttctcagaa 1320

cctggtggtg ctggccaggg aggatgctgg agcggagaag atcttccgga gtaatggggt 1380

tcagctcttg caacgtttac tggacatggg agagactgac ctcatgctgg cggctctgcg 1440

tacgctggtt ggcatttgct ctgagcatca gtcacggaca gtggcaaccc tgagcatact 1500

gggaactcgg cgagtagtct ccatcctggg cgtggaaagc caggctgtgt ccctggctgc 1560

ctgccacctg ctgcaggtta tgtttgatgc cctcaaggaa ggtgtcaaaa aaggcttccg 1620

aggcaaagaa ggtgccatca ttgtggatcc tgcccgggag ctgaaggtcc tcatcagtaa 1680

cctcttagat ctgctgacag aggtgggggt ctctggccaa ggccgagaca atgccctgac 1740

cctcctgatt aaagcggtgc cccggaagtc tctcaaggac cccaacaaca gcctcaccct 1800

ctgggtcatc gaccaaggtc tgaaaaagat tttggaagtg gggggctctc tacaggaccc 1860

tcctggggag ctcgcagtga ccgcaaacag ccgcatgagc gcctctattc tcctcagcaa 1920

gctctttgat gacctcaagt gtgatgcgga gagggagaat ttccacagac tttgtgaaaa 1980

ctacatcaag agctggtttg agggccaagg gctggccggg aagctacggg ccatccagac 2040

ggtgtcctgc ctcctgcagg gcccatgtga cgctggcaac cgggccttgg agctgagcgg 2100

tgtcatggag agtgtgattg ctctgtgtgc ctctgagcag gaggaggagc agctggtggc 2160

cgtggaggct ctgatccatg cagccggcaa ggctaagcgg gcctcattca tcactgccaa 2220

tggtgtctcg ctgctgaagg acctatataa gtgcagcgag aaggacagca tccgcatccg 2280

ggcgctagtg ggactctgta agctcggttc ggctggaggg actgacttca gcatgaagca 2340

gtttgctgaa ggctccactc tcaaactggc taagcagtgt cgaaagtggc tgtgcaatga 2400

ccagatcgac gcaggcactc ggcgctgggc agtggagggc ctggcttacc tgacctttga 2460

tgccgacgtg aaggaagagt ttgtggagga tgcggctgct ctgaaagctc tgttccagct 2520

cagcaggttg gaggagaggt cagtgctctt tgcggtggcc tcagcgctgg tgaactgcac 2580

caacagctat gactacgagg agcccgaccc caagatggtg gagctggcca agtatgccaa 2640

gcagcatgtg cccgagcagc accccaagga caagccaagc ttcgtgcggg ctcgggtgaa 2700

gaagctgctg gcagcgggtg tggtgtcggc catggtgtgc atggtgaaga cggagagccc 2760
tgtgctgacc agttcctgca gagagctgct ctccagggtc ttcttggctt tagtggaaga 2820
ggtagaggac cgaggcactg tggttgccca gggaggcggc agggcgctga tcccgctggc 2880
cctggaaggc acggacgtgg ggcagacaaa ggcagcccag gcccttgcca agctcaccat 2940
cacctccaac ccggagatga ccttccctgg cgagcggatc tatgaggtgg tccggcccct 3000
cgtctccctg ttgcacctca actgctcagg cctgcagaac ttcgaggcgc tcatggccct 3060
aacaaacctg gctgggatca gcgagaggct ccggcagaag atcctgaagg agaaggctgt 3120
gcccatgata gaaggctaca tgtttgagga gcatgagatg atccgccggg cagccacgga 3180
gtgcatgtgt aacttggcca tgagcaagga ggtgcaggac ctcttcgaag cccagggcaa 3240
tgaccgactg aagctgctgg tgctgtacag tggagaggat gatgagctgc tacagcgggc 3300
agctgccggg ggcttggcca tgcttacctc catgcggccc acgctctgca gccgcattcc 3360
ccaagtgacc acacactggc tggagatcct gcaggccctg cttctgagct ccaaccagga 3420
gctgcagcac cggggtgctg tggtggtgct gaacatggtg gaggcctcga gggagattgc 3480
cagcaccctg atggagagtg agatgatgga gatcttgtca gtgctagcta agggtgacca 3540
cagccctgtc acaagggctg ctgcagcctg cctggacaaa gcagtggaat atgggcttat 3600
ccaacccaac caagatggag agtgaggggg ttgtccctgg gcccaaggct catgcacacg 3660
ctacctattg tggcacggag agtaaggacg gaagcagctt tggctggtgg tggctggcat 3720
gcccaatact cttgcccatc ctcgcttgct gccctaggat gtcctctgtt ctgagtcagc 3780
ggccacgttc agtcacacag ccctgcttgg ccagcactgc ctgcagcctc actcagaggg 3840
gccctttttc tgtactactg tagtcagctg ggaatgggga aggtgcatcc caacacagcc 3900
tgtggatcct ggggcatctg gaagggcgca cacatcagca gcctcaccag ctgtgagcct 3960
gctatcaggc ctgcccctcc aataaaagtg tgtagaactc caaaaaaaaa aaaaaaaaaa 4020
aaaaaaaaaa aaaaa 4035

<210> 37
<211> 3729
[0047] <212> DNA
<213> 智人
<400> 37

cgaaggggcg tggccaagcg caccgcctcg gggcggggcc ggcgttctag cgcatcgcgg 60
ccgggtgcgt cactcgcgaa gtggaatttg cccagacaag caacatggct cggaaacgcg 120
cggccggcgg ggagccgcgg ggacgcgaac tgcgcagcca gaaatccaag gccaagagca 180
aggcccggcg tgaggaggag gaggaggatg cctttgaaga tgagaaaccc ccaaagaaga 240
gccttctctc caaagtttca caaggaaaga ggaaaagagg ctgcagtcat cctgggggtt 300
cagcagatgg tccagcaaaa aagaaagtgg ccaaggtgac tgttaaatct gaaaacctca 360
aggttataaa ggatgaagcc ctcagcgatg gggatgacct cagggacttt ccaagtgacc 420
tcaagaaggc acaccatctg aagagagggg ctaccatgaa tgaagacagc aatgaagaag 480
aggaagaaag tgaaaatgat tgggaagagg ttgaagaact tagtgagcct gtgctgggtg 540
acgtgagaga aagtacagcc ttctctcgat ctcttctgcc tgtgaagcca gtggagatag 600
agattgaaac gccagagcag gcgaagacaa gagaaagaag tgaaaagata aaactggagt 660
ttgagacata tcttcggagg gcgatgaaac gtttcaataa aggggtccat gaggacacac 720
acaaggttca ccttctctgc ctgctagcaa atggcttcta tcgaaataac atctgcagcc 780
agccagatct gcatgctatt ggcctgtcca tcatcccagc ccgctttacc agagtgctgc 840
ctcgagatgt ggacacctac tacctctcaa acctggtgaa gtggttcatt ggaacattta 900
cagttaatgc agaactttca gccagtgaac aagataacct gcagactaca ttggaaagga 960
gatttgctat ttactctgct cgagatgatg aggaattggt ccatatattc ttactgattc 1020
tccgggctct gcagctcttg acccggctgg tattgtctct acagccaatt cctctgaagt 1080
cagcaacagc aaagggaaag aaaccttcca aggaaagatt gactgcggat ccaggaggct 1140
cctcagaaac ttccagccaa gttctagaaa accacaccaa accaaagacc agcaaaggaa 1200
ccaaacaaga ggaaaccttt gctaagggca cctgcaggcc aagtgccaaa gggaagagga 1260
acaagggagg cagaaagaaa cggagcaagc cctcctccag cgaggaagat gagggcccag 1320
gagacaagca ggagaaggca acccagcgac gtccgcatgg ccgggagcgg cgggtggcct 1380

ccagggtgtc ttataaagag gagagtggga gtgatgaggc tggcagcggc tctgattttg 1440
agctctccag tggagaagcc tctgatccct ctgatgagga ttccgaacct ggccctccaa 1500
agcagaggaa agcccccgct cctcagagga caaaggctgg gtccaagagt gcctccagga 1560
cccatcgtgg gagccatcgt aaggacccaa gcttgccagc ggcatcctca agctcttcaa 1620
gcagtaaaag aggcaagaaa atgtgcagcg atggtgagaa ggcagaaaaa agaagcatag 1680
ctggtataga ccagtggcta gaggtgttct gtgagcagga ggaaaagtgg gtatgtgtag 1740
actgtgtgca cggtgtggtg ggccagcctc tgacctgtta caagtacgcc accaagccca 1800
tgacctatgt ggtgggcatt gacagtgacg gctgggtccg agatgtcaca cagaggtacg 1860
acccagtctg gatgacagtg acccgcaagt gccgggttga tgctgagtgg tgggccgaga 1920
ccttgagacc ataccagagc ccatttatgg acagggagaa gaaagaagac ttggagtttc 1980
aggcaaaaca catggaccag cctttgccca ctgccattgg cttatataag aaccaccctc 2040
tgtatgccct gaagcggcat ctcctgaaat atgaggccat ctatcccgag acagctgcca 2100
tccttgggta ttgtcgtgga gaagcggtct actccaggga ttgtgtgcac actctgcatt 2160
ccagggacac gtggctgaag aaagcaagag tggtgaggct tggagaagta ccctacaaga 2220
tggtgaaagg cttttctaac cgtgctcgga aagcccgact tgctgagccc cagctgcggg 2280
aagaaaatga cctgggcctg tttggctact ggcagacaga ggagtatcag cccccagtgg 2340
ccgtggacgg gaaggtgccc cggaacgagt ttgggaatgt gtacctcttc ctgcccagca 2400
tgatgcctat tggctgtgtc cagctgaacc tgcccaatct acaccgcgtg gcccgcaagc 2460
tggacatcga ctgtgtccag gccatcactg gctttgattt ccatggcggc tactcccatc 2520
ccgtgactga tggatacatc gtctgcgagg aattcaaaga cgtgctcctg actgcctggg 2580
aaaatgagca ggcagtcatt gaaaggaagg agaaggagaa aaaggagaag cgggctctag 2640
ggaactggaa gttgctggcc aaaggtctgc tcatcaggga gaggctgaag cgtcgctacg 2700
ggcccaagag tgaggcagca gctccccaca cagatgcagg aggtggactc tcttctgatg 2760
aagaggaggg gaccagctct caagcagaag cggccaggat actggctgcc tcctggcctc 2820
aaaaccgaga agatgaagaa aagcagaagc tgaagggtgg gcccaagaag accaaaaggg 2880
[0048] aaaagaaagc agcagcttcc cacctgttcc catttgagca gctgtgagct gagcgcccac 2940
tagaggggca cccaccagtt gctgctgccc cactacaggc cccacacctg ccctgggcat 3000
gcccagcccc tggtggtggg ggcttctctg ctgagaaggc aaactgaggc agcatgcacg 3060
gaggcggggt caggggagac gaggccaagc tgaggaggtg ctgcaggtcc cgtctggctc 3120
cagcccttgt cagattcacc cagggtgaag ccttcaaagc tttttgctac caaagcccac 3180
tcacccttg agctacagaa cactttgcta ggagatactc ttctgcctcc tagacctgtt 3240
ctttccatct ttagaaacat cagtttttgt atggaagcca ccgggagatt tctggatggt 3300
ggtgcatccg tgaatgcgct gatcgtttct tccagttaga gtcttcatct gtccgacaag 3360
ttcactcgcc tcggttgcgg acctaggacc atttctctgc aggccactta ccttcccctg 3420
agtcaggctt actaatgctg ccctcactgc ctctttgcag taggggagag agcagagaag 3480
tacaggtcat ctgctgggat ctagttttcc aagtaacatt ttgtggtgac agaagcctaa 3540
aaaaagctaa aatcaggaaa gaaaaggaaa aatacgaatt gaaaattaag gaaatgttag 3600
taaaatagat gagtgttaaa ctagattgta ttcattacta gataaaatgt ataaagctct 3660
ctgtactaag gagaaatgac ttttataaca ttttgagaaa ataataaagc atttatctaa 3720
aaaaaaaaa 3729

<210> 38
<211> 6137
<212> DNA
<213> 智人
<400> 38

gtcttttgtc cctcggcgga caccgtttgc cagccaaagc tatgtctgcg cgctcaccga 60
cttcataggg tgccgaattc ttttttcccc aggcttgcca tggctagtcg aggggctcgg 120
cagcgcctga agggcagcgg ggccagcagt ggggatacgg ccccggctgc ggacaagctg 180
cgggagctgc tgggcagccg agaggcgggc ggcgcggagc accggaccga gttatctggg 240
aacaaagcag gacaagtctg ggcacctgaa ggatctactg ctttcaagtg tctgctttca 300
gcaaggttat gtgctgctct cctgagcaac atctctgact gtgatgaaac attcaactac 360

tgggagccaa cacactacct catctatggg gaagggtttc agacttggga atattcccca 420
gcatatgcca ttcgctccta tgcttacctg ttgcttcatg cctggccagc tgcatttcat 480
gcaagaattc tacaaactaa taagattctt gtgttttact ttttgcgatg tcttctggct 540
tttgtgagct gtatttgtga actttacttt tacaaggctg tgtgcaagaa gtttgggttg 600
cacgtgagtc gaatgatgct agccttcttg gttctcagca ctggcatgtt ttgctcatca 660
tcagcattcc ttcctagtag cttctgtatg tacactacgt tgatagccat gactggatgg 720
tatatggaca agacttccat tgctgtgctg ggagtagcag ctggggctat cttaggctgg 780
ccattcagtg cagctcttgg tttacccatt gcctttgatt tgctggtcat gaaacacagg 840
tggaagagtt tctttcattg gtcgctgatg gccctcatac tatttctggt gcctgtggtg 900
gtcattgaca gctactatta tgggaagttg gtgattgcac cactcaacat tgttttgtat 960
aatgtcttta ctcctcatgg acctgatctt tatggtacag aaccctggta tttctattta 1020
attaatggat ttctgaattt caatgtagcc tttgctttgg ctctcctagt cctaccactg 1080
acttctctta tggaatacct gctgcagaga tttcatgttc agaatttagg ccacccgtat 1140
tggcttacct tggctccaat gtatatttgg tttataattt tcttcatcca gcctcacaaa 1200
gaggagagat ttcttttccc tgtgtatcca cttatatgtc tctgtggcgc tgtggctctc 1260
tctgcacttc agaaatgtta ccactttgtg tttcaacgat atcgcctgga gcactatact 1320
gtgacatcga attggctggc attaggaact gtcttcctgt ttgggctctt gtcattttct 1380
cgctctgtgg cactgttcag aggatatcac gggccccttg atttgtatcc agaattttac 1440
cgaattgcta cagacccaac catccacact gtcccagaag gcagacctgt gaatgtctgt 1500
gtgggaaaag agtggtatcg atttcccagc agcttccttc ttcctgacaa ttggcagctt 1560
cagttcattc catcagagtt cagaggtcag ttaccaaaac cttttgcaga aggacctctg 1620
gccacccgga ttgttcctac tgacatgaat gaccagaatc tagaagagcc atccagatat 1680
attgatatca gtaaatgcca ttatttagtg gatttggaca ccatgagaga aacaccccgg 1740
gagccaaaat attcatccaa taaagaagaa tggatcagct tggcctatag accattcctt 1800
gatgcttcta gatcttcaaa gctgctgcgg gcattctatg tccccttcct gtcagatcag 1860
[0049] tatacagtgt acgtaaacta caccatcctc aaaccccgga aagcaaagca aatcaggaag 1920
aaaagtggag gttagcaaca cacctgtggc cccaaaggac aaccatcttg ttaactattg 1980
attccagtga cctgactccc tgcaagtcat cgcctgtaac atttgtaata aaggtcttct 2040
gacatgaata ctggaatctg ggtgctctgg gctagtcaaa gtctatttca aagtctaatc 2100
aaagtcacat ttgctccctg tgtgtgtctc tgttctgcat gtaaactttt tgcagctagg 2160
cagagaaagg ccctaaagca cagatagata tattgctcca catctcattg tttttcctct 2220
gttcaattat ttactagacc ggagaagagc agaaccaact tacaggaaga attgaaaatc 2280
ctggtactgg atggctgtga taagctgttc tccacactct ggcctggcat ctgagaacta 2340
gcaagcctct cttaggccat atgggcttct ccaccaaagc tgtttggcag ctcctagcag 2400
accttcttat tgaaatcctc atgctgaaaa tgaacacagc ctagttgcca acccacatgt 2460
ccttttcacc tccagcaaga ctaagcttct ttaaagcact tcacaggact aggaccctgt 2520
cctggagcta tctcaggaaa aaggtgacca tttgaggaac tgtgacctaa ttttattata 2580
atgatgcctc taattttcat ttcctttaca accaactgta actataaggt tgtattgctt 2640
ttttgttcag ttttagcatg ctatttttttg aattctagac tcctccatgt gaagatatca 2700
acagacaaaa ctacaactgt ataggacata tttggagaaa attctatcaa ttgatacatt 2760
tggatgacat cacattttta agtaatgtaa tctgaggcca ttgctgagga aattaagaat 2820
tttccttttt ttttaaccac ccccagtgaa aaggatcagt gtatatttat agcacctatt 2880
ttttagttct gtctgttgtg aggcacatcc tgcatggggc acttctagtc aaataggcaa 2940
tgataaggac ctaattaaaa tgtgataagt gtatactatt actttaaaag cctttacagt 3000
cagtacttca gtttacaagg cactttcaca gcatctcgtt tgatcctcac agtcacaaca 3060
tgtggtagac aaggcaggtg atttttatcc ccatttttaca gataaggaaa caggctgcgg 3120
gtggggagtg aggggaggta aagatagtta gttgcctaag gtcacacagc cagtaagtaa 3180
tagagctggg actggaaccc aggtttcctt actctcatct attgctcctc catattcctc 3240
actcaaccat gaaaacatta cttgaaagga ctgatgaggt taaccagaga cctaactgat 3300
attgtaactt tctattttaa ggaagaattg tgtctgtatt tgagttcttt ggagcctcca 3360
gtctgcctgt gtgttagacc agcacagcag tgctgtgtga tgcagcctga cctgtggcag 3420

gaaagtagtg cttctgtttg gaagtcatgt tcttttgcag ccacacagga tccaaatatc 3480
agtactattc ctgtagtcaa tctggggtca cattataggt gccttatttc cctaagggta 3540
actgatctga atatctgcaa ataggatgaa tctatttttc agaagttcca tctttcattt 3600
ttctttttttt ttttgagaca gagtctcatt ctgtcgccca tgctggagtg cagtggcgcg 3660
atctcggctc gctgcaacct ctgcctccca ggttgaagca attctcatgc ctcagccacc 3720
cgagtagctg ggattacagg catgcgccat catgcccagc taatttatgt atttttagta 3780
gagttggagt ttcaccatgt tggccaggct ggtcttggac tcctgacctc aggtcatcca 3840
cccgcctcag cctcccaaag tgctggtatt acaggcgtga gccaccgcac ccagccccat 3900
ctttcatttt caaagagaag ggcattctaa taggaactgg tgccaagaga gaagaaaaga 3960
agtgataaca gaagaaatgg ctagttacaa tattaaaaag ctcctctttg agatctcctc 4020
tgcaggaata tcagagacgg agttgaagcg ctggagaggt aataggtcta gacagtacag 4080
aacaataact ggggagtgtg tgaggataga ctgggctccc ccttgcttga aagatctctg 4140
gcatttaatt ctcaattctt gattactatt ttccagtgta aaactagcac atatgatctg 4200
actacaggac agagaatttt aagtgaaaca tttgccttac ttgcagtaat aatgtgctgt 4260
tcttcacagt agctaaggcc ctctatgttt cccagaggta aataagaatc caggaatgga 4320
ggtccatctg tgatgaatgg ctttttttcta atcaaagtag tataatgctg ttttatctgt 4380
tttgtcatct tgtttttttt ttttttaaa aaaacaaaac cttaattata atatagcgca 4440
aagaaaggcc aggactgatg cagggattcc ttggaaatat cagttcctat cacttttaaa 4500
acctgatttt ggatctctct gttctatgta tgtctttagt gagagcacaa tacatggcag 4560
aacgctgtgc caaatgttat aggtaaggaa tatagaaatg aatgtttttt gttgtgaagg 4620
tgttttcatg tgatatttta taaacacatt ttaaaaaatc tccatcactt tttagtatag 4680
gaaggatagc tttgcctggg aaaaacagtt tcaacacacc tgctcagagt agcagttctc 4740
cctcaaaaaa gcagtgttca gcctgcactg actgttctgc ttgccaaaag gaggaagcat 4800
gcaagatact tatttctcca tagattgtgg agtatagagg gatgtgggac tacagattat 4860
tatttttttt ccccgagaca gagtcttgct ctgtcgccca ggttggaaca caatggcacg 4920
[0050] acctcagctc actgcaacct ctgtctcccg ggttcaagca attctcctgc ttcagcctcc 4980
tgagtagctg ggattacagg cacacaccac caccgcactc agctaatttt tgtatttttа 5040
gtagaggtgg ggttttacca tgttggccag gctggtctta aactcctgac cttgtaatca 5100
tcccgcctcg gcctcctaaa gtgctaggat tacaggcatg agccaccgca cccggcccag 5160
ataatttttа atagcctttg atcatggggt gagtgaggga gtaggtatac ttggcaaatg 5220
catggttctc tgatttctag ctctaaagca gccttatctg aatccccaaa tcttgtgatg 5280
ctgagtacca ttactgaacc agtctgcacg gtaggcatct gctaccaaaa tttacctcct 5340
acctggtagg tgtcatctga taagaaagaa gacaggttat tttaattttt tgagataatc 5400
acagaaaatt gcagcccata ctctttatta ccgaattcaa gtttggaaat agacccttg 5460
ttttaaatca tgatgggtct ttatcccaat catttatctg ggtcattttt ccaactttgg 5520
agttctagga aagaaccttg aaaacctgat atgattctgc agcatgaggt ctacggtgac 5580
catttgggca aagctccagt ggcaatcatt tattgtgttt tgcatttcct gggatttatt 5640
gaaataagaa ttcactgtga ttatgtagtc ttctggctag tatcaggcag ctctgctttt 5700
aatttggtta attttatttt ctctgaagag ggagaagagg tacaatttaa tcttggcctc 5760
cacaagcata ttaaagctca cgtgttaatc agtgcattct tatgctccta cattaaatgc 5820
cttgggtaaa tggataaatg gacatgtgcc cagctttaat ttttttgca acagaaagat 5880
cagacttccg tatggcatcg ttggatttca gaggctttct ggtgtatctg taaatctgaa 5940
tgttgccttc tgccagtctg tataaccagg tgattcatgc tgcaaatgaa atcaggaagc 6000
agtaaagtgt taaagcaaga gtattgtcca attcacttgt cttcctgatc cttgtacttt 6060
atttcacgtg tcggtgttta cattacatac ttatatttcc tgtgaaagaa agagttaaat 6120
aaattgtagc agtttga 6137

<210> 39
<211> 3531
<212> DNA
<213> 智人
<400> 39

agcggagcgc caggcagcgc ggagcggagg ccaggcccac agccgctccg cctcccggcc 60
cgcagatccc cgacggccgc accgcgggct cctctggccc gcaagaacac gtgcatggcg 120
tcctggggaa ggcgctgagt gcggagtcgc ggcgccgcac gcggcaccat ggccctggag 180
caggcgctgc aggcggcgcg gcagggcgag ctggacgtgc tgaggtcgct gcacgccgca 240
ggcctcctgg ggccctcgct gcgcgacccg ctggacgcgc tgcccgtgca ccacgcggcc 300
cgcgctggga agctgcactg tctgcgcttc ctggtggagg aagccgccct ccccgccgcg 360
gcccgcgccc gcaacggcgc cacaccggcc cacgacgcct ccgccaccgg ccacctcgcc 420
tgcctgcagt ggctgctgtc gcagggcggc tgcagagtgc aggacaaaga caattctggt 480
gccacagtct tgcatctggc tgcccgcttc ggccaccccg aggtggtgaa ctggctcttg 540
catcatggcg gtggggaccc caccgcggcc acagacatgg gcgccctgcc tatccactac 600
gctgccgcca aaggagactt cccctccctg aggcttctcg tcgagcacta ccctgaggga 660
gtgaatgccc aaaccaagaa cggtgccacg cccctgtacc tggcgtgcca ggagggccac 720
ctggaggtga cccagtacct ggtgcaggaa tgcggcgcag acccgcacgc gcgcgcccac 780
gacggcatga ccccgctgca cgccgcggcg cagatgggcc acagcccagt catcgtgtgg 840
ttggtgagct gcaccgacgt gagcctgtcc gagcaggaca aagacggcgc caccgccatg 900
cacttcgcgg cgagccgcgg ccacaccaag gtgctcagct ggctgctgct gcacggcggg 960
gagatctcgg ctgacctgtg gggcgggacc ccgctgcacg acgccgccga gaacggggag 1020
ctagagtgct gccagatcct ggtagtgaac ggcgcggagc tggacgtccg cgaccgcgac 1080
gggtacacgg ccgccgacct gtcggacttc aacggccaca gccactgcac ccgctacctg 1140
cgcacggtgg agaacctgag cgtggagcac cgcgtgcttt cccgggatcc atccgcagag 1200
ctggaggcta agcagccgga ttcaggcatg tcctcaccca ataccacggt gtcggtccag 1260
ccgctgaact ttgacctcag ctcgcctacc agcaccctct ccaactacga ctcctgctcc 1320
tccagccact ccagcatcaa gggccagcac cctccatgtg ggctttccag cgctagagct 1380
gcagacatac agagctacat ggacatgctg aacccggagc tgggcctgcc tcggggcacg 1440
attgggaagc ccacaccccc accaccccca cccagcttcc ccccgccacc cccgccccca 1500
[0051] ggcacccaac tgcccccacc cccacctggc tacccagctc ccaagcctcc tgtaggacca 1560
caggcagctg acatctacat gcagaccaag aacaaactcc gccacgtgga gacagaggcc 1620
ctcaagaagg agctgagctc ctgtgacggc cacgacgggc tgcggaggca ggactccagc 1680
cgcaagcccc gcgccttcag caagcagccc agcacggggg actactaccg gcagctgggc 1740
cgctgccccg gcgagacgct ggccgcacgc ccgggcatgg cgcacagcga ggaggtgcgt 1800
gcccgccagc ccgcgcgcgc cggctgcccg cgcctcggcc ctgccgcccg cggctcactc 1860
gaaggcccct ccgctccccc gcaggcggcg ctgcttcctg ggaaccatgt tcctaacggc 1920
tgcgccgcgg accccaaggc gtccagggag ctgccaccgc cgccccccacc gccgccgccg 1980
cccctgccgg aggccgcgag ttcgccaccg ccggccccgc ctctgccccct cgagagcgct 2040
ggccctggct gcgggcagcg ccgctcctcc tcgtccaccg gcagcaccaa gtctttcaac 2100
atgatgtccc cgacgggcga caactcggag ctactggctg agattaaggc aggcaagagc 2160
ctgaagccga cgccccagag caaggggctg accacagtgt tctcaggcat cgggcagccg 2220
gccttccagc ccgattcgcc gctgccttct gtgtcacctg cactgtcacc agtccggagc 2280
cccacaccgc cagctgcggg gtttcagccg ctgctcaatg gaagcttggt tcccgtgccg 2340
cccactactc ctgcgccggg agtgcagctg gacgtggagg ctctcatccc cacgcacgat 2400
gagcagggcc ggcccatccc cgagtggaag cgccaggtga tggtgcgcaa gatgcagctg 2460
aagatgcagg aggaggagga gcagaggcgg aaggaggagg aggaggaggc ccggctggcc 2520
agcatgcccg cctggaggcg ggacctcctg cggaagaagc tggaagaaga gagggagcag 2580
aagcggaaag aggaggagcg acagaagcag gaggagctgc ggcgggagaa ggaacagtca 2640
gagaagctgc ggacgctggg ctacgatgag agcaagctgg cgccctggca gcgacaggtc 2700
atcctgaaga agggggacat cgctaagtac tagaggccgc agactcctgt ccgcagcctc 2760
gcagctccgt ggggccctcc gccccagccc cagccagcca ggccctggtg gaaaggctgg 2820
gagccgcaca gccctccct cctgcgctgg aaaccctccc tgaccccac cctggccccc 2880
cgtatcccca gcccttggca acactggagt gcacacgccg ccacggttgc ccagaaaaag 2940
tgcccaagct gctgacgcaa acaacaacaa atgctgctta tttgcatgcc gacttacata 3000
tatttgcatg ttcgttgact atcaaagagt gcagagctct ccccagcccc gtgggtggtg 3060

actttgtttt cctgcggggc tcagcccccc ccaggatgca gccccctccc ccgcaccccg 3120
gaaccggcgt cgctggcgca tcctgggtgg aggcaggccc cgagctcggg gaaggggttt 3180
tcccttcctc tctgacccag atctgcgcgc ggcctagccc gggcctcatt tcttatcccc 3240
gccaagggtt tcctctcagt catttgttta ccagaaacat gaaaactgcc tgtctggccg 3300
ggccgcactt gtggcccccg ggaccccacc tctggcccca cctccctcaa gtctgcgccc 3360
cgtccccagc cagacccact cgctgccggg acccctttcac tgccccggtg gagtgaatag 3420
aggatgaggg gccctgaccc tgtgtctcca actgctgcac cccatcccga ccctgtctcc 3480
gccacctcgc agccccatta aagcgctctc atctgggctc cggttcactc a 3531

<210> 40
<211> 2272
<212> DNA
<213> 智人
<400> 40

ttgggcggtg gaccgccccc cggccccggg gtaggctgac acgggagggt cctcagctaa 60
agccaaaagc agatcaaagt ggtgggactc gcgtcgcggc cgcggagacg tgaagctctc 120
gaggctcctc ccgctgcggg tcggcgctcg ccctcgctct cctcgccctc cgccccggcc 180
ccggccccgc gcccgccatg gagaagactg agctgatcca gaaggccaag ctggccgagc 240
aggccgagcg ctacgacgac atggccacct gcatgaaggc agtgaccgag cagggcgccg 300
agctgtccaa cgaggagcgc aacctgctct ccgtggccta caagaacgtg gtcgggggcc 360
gcaggtccgc ctggagggtc atctctagca tcgagcagaa gaccgacacc tccgacaaga 420
agttgcagct gattaaggac tatcgggaga aagtggagtc cgagctgaga tccatctgca 480
ccacggtgct ggaattgttg gataaatatt taatagccaa tgcaactaat ccagagagta 540
aggtcttcta tctgaaaatg aagggtgatt acttccggta ccttgctgaa gttgcgtgtg 600
gtgatgatcg aaaacaaacg atagataatt cccaaggagc ttaccaagag gcatttgata 660
taagcaagaa agagatgcaa cccacacacc caatccgcct ggggcttgct cttaactttt 720
[0052] ctgtatttta ctatgagatt cttaataacc cagagcttgc ctgcacgctg gctaaaacgg 780
cttttgatga ggccattgct gaacttgata cactgaatga agactcatac aaagacagca 840
ccctcatcat gcagttgctt agagacaacc taacactttg gacatcagac agtgcaggag 900
aagaatgtga tgcggcagaa ggggctgaaa actaaatcca tacagggtgt catccttctt 960
tccttcaaga aacctttta cacatctcca ttccttattc cacttggatt tcctatagca 1020
aagaaaccca ttcatgtgta tggaatcaac tgtttatagt cttttcacac tgcagctttg 1080
ggaaaacttc attccttgat ttgtgtttgt cttggccttc ctggtgtgca gtactgctgt 1140
agaaaagtat taatagcttc atttcatata aacataagta actcccaaac acttatgtag 1200
aggactaaaa atgtatctgg tatttaagta atctgaacca gttctgcaag tgactgtgtt 1260
ttgtattact gtgaaaataa gaaaatgtag ttaattacaa tttaaagagt attccacata 1320
acttcttaat ttctacattc cctcccttac tcttcggggg tttcctttca gtaagcaact 1380
tttccatgct cttaatgtat tccttttag taggaatccg gaagtattag attgaatgga 1440
aaagcacttg ccatctctgt ctaggggtca caaattgaaa tggctcctgt atcacatacg 1500
gaggtcttgt gtatctgtgg caacagggag tttccttatt cactctttat ttgctgctgt 1560
ttaagttgcc aacctcccct cccaataaaa attcacttac acctcctgcc tttgtagttc 1620
tggtattcac tttactatgt gatagaagta gcatgttgct gccagaatac aagcattgct 1680
tttggcaaat taaagtgcat gtcatttctt aatacactag aaaggggaaa taaattaaag 1740
tacacaagtc caagtctaaa actttagtac ttttccatgc agatttgtgc acatgtgaga 1800
gggtgtccag tttgtctagt gattgttatt tagagagttg gaccactatt gtgtgttgct 1860
aatcattgac tgtagtccca aaaaagcctt gtgaaaatgt tatgccctat gtaacagcag 1920
agtaacataa aataaaagta cattttataa accatttact atggctttgt aacaattgca 1980
tacccatatt ttaagggaca ggtgaattta ctactttcta aagtttattg atacttccct 2040
tttatgtaaa atgtagtagt gatacctata tttccacatt gtgcattgtg acacacttgt 2100
ctagggatgc ctggaagtgt ataaaattgg actgcatttc ttagagtgtt ttactataga 2160
tcagtctcat gggccatctc ttcctcagat gtaaatgata tctggttaag tgttatatgg 2220
aataaagtgg acattttaaa actagcaaag ttaaaaaaaa aaaaaaaaaa aa 2272

<210> 41
<211> 4510
<212> DNA
<213> 智人
<400> 41

gcagaggggg cggagagcgc ccccgggggc ggggcacgca agtgacggcg gcgcgggtgg 60
tggagcgctg ggcggccagg ctccctggct ggccggtttg ggcgtctggg ccgtgaaggt 120
gggacctcct gttccgggcc gcaagtttcc ctctccagcc gcccgccgtt cgtagcatgt 180
cccccagaac tcggggagcg caggcaggac aggcttagag aagacgcggt ccccagcgct 240
tgggccacgg acgtcccacc ccgctcctct gtcgctggag aaccgccggg ccgagccact 300
gggagaagca ggccagagcc ttccagggcc tccggcccgt ggacccgagg aggatgagct 360
ggctttttcc cctgaccaag agcgcctcct cctccgcggc tgggtccccc ggtggcctca 420
ccagcctcca gcagcagaag cagcgcctga tcgagtccct ccggaactca cactccagat 480
tgcttcctcc acagtttcct caggaaaaac cagtgatcag tgtttatcca ccaatacgac 540
atcacttaat ggataaacaa ggagtgtatg ttacctctcc attagtaaac aattttacaa 600
tgcactcaga tcttggaaaa attattcaga gtctgttgga tgagttttgg aagaatcctc 660
cagttttagc tcctacttca acagcatttc cttatctata cagtaaccca agtgggatgt 720
ctccttatgc ttctcagggt tttccatttc ttcctccata tcctccacaa gaagcaaaca 780
ggagtatcac ttctttatct gttgctgaca ctgtttcttc ttcaacaaca agtcatacca 840
cagccaagcc tgccgctcct tcatttggtg tcctttcaaa tctgccatta cccattccca 900
cagtggatgc ttcaataccg acaagccaaa atggttttgg gtacaagatg ccagatgtcc 960
ctgatgcatt tccagaactc tcagaactaa gtgtgtcaca actcacagat atgaatgaac 1020
aagaggaggt attactagaa cagtttctga ctttgcctca actaaaacaa attattaccg 1080
acaaagatga cttagtaaaa agtattgagg aactagcaag aaaaaatctc cttttggagc 1140
ccagcttgga agccaaaaga caaactgttt tagataagta tgaattactt acacagatga 1200
[0053] agtccacttt cgaaaagaag atgcaaaggc agcatgaact tagtgagagc tgtagtgcaa 1260
gtgcccttca ggcaagattg aaagtagctg cacatgaagc tgaggaagaa tctgataata 1320
ttgcagaaga cttcttggag ggaaagatgg aaatagatga ttttctcagt agcttcatgg 1380
aaaagagaac aatttgccac tgtagaagag ccaaggaaga gaaacttcag caggcgatag 1440
caatgcacag ccaatttcat gctccactat agattttcct ggaaacatga actgccaaga 1500
gaggaatggg acacaaaacc aaacactgtt ttatatttat ggtttgcaaa ctggcatttc 1560
atcagtggct aaattcacag atatcctata tagattgtat acagaactga gactgatttt 1620
gtaccgatta gaatgattgc tatgatcttt gagaaatttt tctgcactat ttgcactgaa 1680
atgtttattt attgttgata aattgtatca tatttaagtt ccactgctgt tcctcttacc 1740
ttgattaaat gcctatgcat gtacttttag ctagttttta atattttata aaacttcatt 1800
taaatttgta tttttaactt gaagttccat ttctttatca aggatggtat ttagattttt 1860
ttcctcttaa cctttttca aaaactattt tcaactgtga ggaaaccctt atttttcttt 1920
ctttgtggat aaaactttca aaagcaattt aagatattca tagtgttagg aaacaccaaa 1980
cctgcctatg tgccatctca caaaagaaac ttttaatacc tacaataaat caaaagaata 2040
aaccagctgt tcttatatat tgtttcattt ttaaaactaa agatgcattt aagaagcaat 2100
acaagtaaat attttaccta ataggaaaaa aaaaagttgc ctttcattta aaccattcca 2160
acagaaattc ttatgctaat ttaaaacata tatatatctg gtaggtttgt ggttggatag 2220
gttttctaaa ttcctaatgt taaaaacaat ctttatgtta atatacacta aatctataca 2280
caaaaaaagt cagtgaactt ttctgacctt tactgtgagt tacctttcc taagaggaaa 2340
gctatagtaa taagtaaaat ttaattttta ggcaatcctg atttttaatg aatttaattg 2400
agtgttcttg tatactacat tgagcagttt gcttctatac cgtgtcacaa aattcatgta 2460
tttcttgaga agccctaaaa gctcataaag gaaaatgccg tgaactatgt agctcaggct 2520
tggtaaggtg ccatctaaat tacaaaacaa actaatgcat aattttgctt aaatttcatc 2580
ccagtatgat tgtcttccca acaccagcat atagtataga ttgtctgtct tttttatatt 2640
ttttagttct tcctgtacat gtttttggca ataaagttat aggaagaaca aaattatttt 2700
gttagaatta aaacatgctt aatatttagt ctgtttgtgg agggcaggta ttcacgtgga 2760

ctgagataca atgttggata cagaaaataa ctttcattgt cttcctgaca ctgtgctaag 2820
gacatgctgt taaagcttca aagtgaccag atgaggaagg aataattaat tattactcct 2880
gatttgtaga taactgaggt aagagtgttt caaatttatg atagtctttt gggtattcag 2940
aaaccttcc ttatactgca ctggccacca gagcttaatt ttcccagcag ttacagcaat 3000
gggagataga acagtctcaa tcttttgcca accatcaggt tcctagaaac caggtaggtg 3060
tatcccataa caagggagga gcataccaca gcccctcatt tgattaattc atttgatcta 3120
tctatgttat taagtaccta ctaggaataa ggcattgtgg aaatactata caaagataaa 3180
cattgtttag atgcttatct actttccttt tcaccagaaa aacagaaaaa aaagaaacat 3240
tttcttacag agtaaaaatg ttctacataa tcacatgagt agttcatctc agtgtttttt 3300
attctttaaa gttgaactat cccagtttca ttctatacca ttcattggat aaccttgtta 3360
caacccagtc atgaaacaga gcagtgtgat cagttatctg catttaacaa atagacaaat 3420
cagtttacat aaaggttatg tatgtcaccc acgatgaaaa gaatctgcat ttgaatatgc 3480
ccgtatgaat gtgggttctg tttttgcaac agagattaag tgaccatttt ttctaatttt 3540
atggctatat attttcttca taaaaattgg tcacatcgga gaagcagtgc cacaggaaaa 3600
atgaaatgca tgtgaaagtt tgtattctga ttttacaaga tgagatagaa atcagaatta 3660
aagaggaata cttaggagtt actaggctaa tcagtgtacg aatttgtcat aggtagagat 3720
ttaaaggtta atatcttaaa atagaagaaa attctaaatc aatcaatcag tgagatataa 3780
actaaacaga cccacttcaa agttgaaaga aatttctagg cataaattga gactaggaaa 3840
tttatatcag aatagagggt gcttgacaca tatatatgct taaattgaag gacagctcag 3900
attcattttt aggagaagaa agtaaactaa tgtgctctta aagaataaaa atttattcta 3960
tggtttctgt ctctgatcat caccttccat tctataaaaa gctcagttac tgatttgctg 4020
ggtcatggtc aaaattctta cctatttatt tcatatcaac tttaaaaaat aaattacttg 4080
cattctatat attactaatt gggaagtaat atgcctcaaa tcagttttat actggattat 4140
tccctatgct ttaaaccact gctctcaata aaacacttcc tgattaatgt ttgattatta 4200
gatattttag tcttgttggg gatattttag tcttgttggg ttagccatgc tctgaagaat 4260
[0054] ctgtgaaagt acagtaaagt tttaataagc aataaatgta acctttata taaatctcag 4320
tgctaggtta acttctaata agcagacgaa catgttacat aaattataat gtctgtcttg 4380
taaaaaagtt gaggggacta aaagtttatg actctgatat ggaagttgtc atattaaaaa 4440
actacatttt aaaacatcaa atatttatac tatttgcttt tcaaataaaa gcatagtgct 4500
gtttggcata 4510

<210> 42
<211> 11062
<212> DNA
<213> 智人
<400> 42

gcagatcggg agcggtgccg agaaaaattt ccttactaga tgacatttca tcgcaatgtc 60
cgatcgtttg gggcaaatta ccaagggcaa ggatgggaaa agcaagtact cgactctcag 120
cctgtttgat aagtataaag gaaaatcagt agacgcgatt agatcctcag ttattcctag 180
acatggctta cagagtcttg ggaaagttgc tgcagcccgg cgcatgccac cgcctgcaaa 240
cctgccaagc ttgaagtctg aaaacaaagg aaacgacccc aacatcgtga tagtacccaa 300
ggacgggacg ggatgggcaa acaagcagga tcagcaagac ccaaagagtt ccagtgcgac 360
ggcctctcag ccgccggagt cgctgccgca gccgggtttg cagaaatctg tctccaattt 420
gcagaaaccg acacagtcaa tcagtcagga gaatacaaat tcagtgccag gtggaccaaa 480
gtcatgggca cagctgaatg gaaagccagt aggacacgaa ggtggtttaa ggggctcaag 540
ccgactgtta tccttctctc ccgaggaatt tccgacgctg aaagcagctg gagggcagga 600
caaggctggc aaagaaaagg gcgtcttaga tctgtcgtat gggccaggac caagcctccg 660
ccctcagaat gtgacaagct ggagggaggg cggtgggcga cacataattt ctgccacgtc 720
tctgagcacc tccccaactg agctgggcag caggaactcg agtacgggag atggagcccc 780
ctcctcggca tgtaccagcg attctaagga cccctctctc cgcccggctc agcctgtccg 840
aaaaggggct tcacagttca tgggaaatgt ataccaccca cctacatacc atgacatgct 900
tcctgctttt atgtgttcgc cgaagtcatc agaaaaccag ggtacagtgg aacgaggctc 960

ttttcccctt cctcagctcc gccttgaacc tcgagttcct tttagacagt tccagatgaa 1020
tgaccaagac ggaaaagaaa acaggctggg attgtctcgc ccactccgcc cactaaggca 1080
gctggtggag cgggcaccac ggcccaccat tatcaatgcg gaaaacctga agggccttga 1140
cgatctggac gccgatgccg atgatggctg ggcaggcctc catgaagaag tggactattc 1200
tgagaaactg aagttcagtg atgatgaaga ggaggaagaa gttgtgaagg acggcaggcc 1260
aaagtggaac agttgggacc ctaggaggca gcggcagttg tcaatgagct ctgcagacag 1320
tgcggacgct aagcggactc gagaggaagg gaaggactgg gctgaagcag tgggtgcgtc 1380
ccgtgtggtc cgaaaggcgc cagaccctca gccaccgccc aggaagcttc atggctgggc 1440
accaggccct gactaccaga agtcatcaat gggcagcatg ttccggcaac agtccatcga 1500
ggacaaggag gacaagcccc caccaaggca gaagttcatt cagtcagaga tgtccgaggc 1560
ggtggagcga gcccgaaagc gccgggaaga agaggagcgc cgagcccggg aggagaggct 1620
ggccgcctgt gctgccaaac tcaagcagct ggaccagaag tgtaagcagg cacgaaaggc 1680
aggtgaggcc cggaagcagg cagagaagga agtgccctgg tctccaagtg ctgagaaggc 1740
atctccccag gaaaacggcc ctgctgtcca caaaggctcc ccagaattcc ctgcccaaga 1800
gacccccacc acattcccag aagaggcacc cacagtgtcc ccagcagtgg cacagagcaa 1860
cagcagtgag gaagaggcca gagaggctgg gtcccctgca caggagttca agtatcagaa 1920
gtcccttcct ccccgattcc agcgccagca gcagcaacaa cagcaggagc agctgtacaa 1980
gatgcagcac tggcagccgg tgtaccccca gccgtcccac ccccagcgca ccttttaccc 2040
acaccacccc cagatgttgg gcttcgatcc caggtggatg atgatgcctt cctacatgga 2100
cccacgtatc acgcccactc ggaccccggt ggacttctac ccctccgccc tgcatccctc 2160
aggactgatg aagcccatga tgccccagga gtccctcaat gggacaggct gtcgctctga 2220
ggatcagaac tgtgtgcccc cactccaaga aagaaaagtg acccccatcg actcaccccc 2280
tgtgtggagc ccagagggct acatggcact gcagagcaag ggctacccgc tcccgcaccc 2340
gaagtcgagt gacaccttgg ctatggacat gcgtgtcagg aatgaaagct ctttctctgc 2400
ctcactcgga agggcagggg gcgtaagtgc tcagcgcgat ctctttgagg agagagggga 2460
[0055] ggagtacttg agtgcttttg acaagaaggc ccaagcagac tttgacagct gtatctcttc 2520
tcaaagaata ggccaggagc ttttgtttcc accccaagaa aatgttcagg atgcaggtgc 2580
tcctgggggt cacacccaaa acctcaggtg ttccccattg gagcctgact ttgtcccaga 2640
tgagaaaaag ccagagtgtg gcagttggga tgttagccac cagccagaga ccgctgacac 2700
agcccatggt gttgagcggg agacaccccg ggaggggacg gcctttaaca tctcctcctg 2760
ggacaagaac gggagcccca acaaacagcc atcctcggag cctgaatgga ctcccgagcc 2820
ccggagctcc agcagccagc acccggagca gacgggcagg acccggaggt cgggacccat 2880
caagaaacca gtcctgaaag ccctcaaggt ggaagacaag gagaaggagc ttgagaagat 2940
taagcaggag ctaggggagg agagtacccg gctggccaag gagaaggagc agagccccac 3000
ggcagaaaag gatgaggacg aagagaacga tgcctctctg gccaactcct ccaccaccac 3060
tttggaggac aaaggccctg gccatgccac ttttggccgc gaggccacca aatttgaaga 3120
ggaggagaaa cctgacaagg cctgggaagc cagaccccca cgagagtcca gcgatgttcc 3180
ccccatgaag agaaataact ggatctttat tgatgaggag caagcctttg gggtcagagg 3240
acaggcccgg ggccggggcc gtggtttcag agagttcact tttcgtggtc ggcctgctgg 3300
cggaaatggg agcggcctct gtggtggggg ggtcctgggg gcccgcagca tctactgcag 3360
cagtcagcgc agcggccgtg gccggggcct gcgagagttt gcgcggccag aggactgccc 3420
cagagccaag ccccgacgga gagttgccag tgagacccat agcgagggct cagagtatga 3480
agaacttccc aagcgccgcc ggcagagggg ctccgagaac gggaatgaag gctcgctcct 3540
ggagagggag gagagcacct tgaagaaggg cgactgcaga gattcttggc ggtccaacaa 3600
ggggtgctct gaggaccaca gcggtctaga tgccaagagc cgaggccctc gggcctttgg 3660
gcgagccctc cctccccggc tgagcaattg cgggtatgga cggagaacct tcgtctccaa 3720
agagtcaccc cactggcaga gcaaaagtcc aggcagctct tggcaggaat atggcccttc 3780
cgacacatgc ggatcccggc gacctacaga cagagactat gtcccagatt cctacagaca 3840
ccctgacgca tttggtggcc ggggctttga ggacagccgc gcggaggaca agagatcctt 3900
cttccaagat gaacacgtgg cagattctga aaatgcagag aaccggccct tcaggagaag 3960
gcgccccccа cgccaagata agccccctcg attccggcgc ctccggcaag agcgggagtc 4020

cctgggcctg tggggacccg aggaggagcc ccacctgctg gcaggtcagt ggccaggcag 4080
gcccaaactg tgttctgggg acaagagtgg cactgtgggc cgcaggtccc ctgagctctc 4140
ctaccagaac tcctccgatc acgccaatga ggagtgggag acggcctccg aaagcagcga 4200
cttcagcgag cggcgggagc ggcgggaagg ccctgggtcc gagcccgact cccaggtgga 4260
tggtggcctg tcgggggcta gtttgggtga gaagaaggag ctggccaaga ggagcttctc 4320
cagtcagaga cccgtggttg acagacagag ccgaaagctg gagccgggag ggtttgggga 4380
gaagcccgtt aggccaggtg gtggtgacac ctcccctcgc tatgagagcc aacagaatgg 4440
gacgcctttg aaagtgaaaa gatccccaga cgaggccttg cctggaggtc ttagtggctg 4500
cagcagtggg agtggccact ccccctatgc cctggagcgg gcagcccatg ccagtgctga 4560
ccttcccgaa gcctccagta aaaaggcaga gaaggaggcc aagttggctg ctccgagggc 4620
aggtgaacag ggagaggcca tgaaacagtt tgacctgaac tatggaagtg ccatcattga 4680
aaattgcggg tccagccccg gggaggagag tgaggtgggt tctatggtgg gcgaaggctt 4740
catcgaagtc ctgaccaaga agcagcgccg cctgctggag gaagagagaa gaaagaagga 4800
gcaggccgtg caggtgcctg tcaaaggtcg aggcctttcc tcccgtattc ctcctcgatt 4860
tgcaaaaaag cagaacaact tatgtctgga gcaaggtgac gtgaccgtgc ctggcagcag 4920
cctgggcact gagatctggg agagcagcag ccaggctctc cctgtgcagg ccccagccaa 4980
cgactcctgg aggaaagctg tcactgcctt cagcagcacc gagactggct ctgcggagca 5040
gggttttaag agcagccagg gagatagtgg cgttgacttg agtgccgagt ctcgggagtc 5100
gtctgcgacc tcctcgcagc gcagctcccc atatgggact ctgaagccag aggagatgag 5160
cgggcccggc ctggcggaac ccaaggccga cagccacaag gagcaggctc caaagccatc 5220
tgagcagaag gattcagaac aaggctctgg acagagcaag gagcacagac caggacccat 5280
cggcaacgag cgttctctga aaaacagaaa gggctcggag ggggccgagc ggctgcaagg 5340
ggctgtcgtc ccgcctgtta acggggtgga gattcacgtg gactccgtgc tgcctgtgcc 5400
acccattgaa tttggagtca gtccaaaaga ctccgatttc agcttgccac ctggttctgc 5460
ctctggtcct actgggagtc cagttgttaa acttcaggat gccttggcca gtaatgcagg 5520
[0056] gttaacacag agtatcccca tcctgcggcg ggaccatcac atccagaggg ccatcggtct 5580
ctccccaatg tccttcccca ccgccgacct tactctgaag atggagtctg cgcgcaaggc 5640
ttgggaaaac tcccccagtt tgccggagca gagctctcca ggcggcgctg gctcaggcat 5700
ccagcctcca tcctctgtgg gtgcctccag cggggtcaac tacagctcct tcggtggagt 5760
gtccatgcca cccatgcctg tggcctctgt agcaccttct gcttctatgc caggcagcca 5820
cctcccgccc ctgtacctgg atggccatgt gtttgcaagt cagccccggc tggttcctca 5880
aacgatacct cagcagcaga gttaccaaca ggccgccgct gcccagcaga tcccgatctc 5940
ccttcacaca tctctgcagg cacaagctca gcttggactg aggggtgggc ttcctgtgtc 6000
ccagtcccag gagatcttca gctccttgca gcccttcaga tctcaggtgt acatgcaccc 6060
cagcctgtca ccgcccagca ccatgatcct ctctgggggc acagccttga agcctccata 6120
ctcggcgttc ccaggcatgc agcccttgga gatggtgaag ccgcagtctg gctcacccta 6180
ccagcccatg agcgggaacc aagccctggt ctacgagggc cagctcagcc aggctgctgg 6240
cctgggtgcc tcccagatgt tggactccca gctcccacag ctgaccatgc cactgcctcg 6300
gtacggctcc gggcagcagc cactgatcct gccccagtct attcagctgc cacctgggca 6360
gagcctctcc gttggggccc cccgaaggat tcctccgccc gggtcccagc cgccagtcct 6420
gaacaccagc agagagccct ctcagatgga gatgaaaggc ttccactttg ccgacagtaa 6480
acagaatgtc ccttcaggag gccccgtgcc atcgccacag acctacaggc ctagctctgc 6540
tagccccagt gggaagccct ctggatcagc agttaacatg ggctctgtgc agggacacta 6600
cgtgcaacag gcaaaacaac gagtggatga gaaacccagc ctgggagccg tgaagctgca 6660
ggaggccccc tcggctgcct cccagatgaa gcgaaccgga gcgatcaagc ctcgggctgt 6720
caaagtggag gagagtaagg cctgacagtg cctggctgcc acctcgcctc tccctactga 6780
ggacggtgcc gccatgcggc ctcgacacag ccgacactcg ggagcctcac cagatccacc 6840
gtccaaatgc gtggcccaga ctgagagacc tccctcctct ccactcccga aagctccgtt 6900
gtcaaccagc ttgcacccgt ggatatatgg cattgacccg cttgctttga tacgaaacaa 6960
aaaagcagac gactccttca tcccatctgc tcctaccgtg actgtggagt gacgcctcct 7020
gtgcagtgca gatttgccct ccctgcctcc tccctgtcct gccgcgcagc cagggcgcct 7080

tctcagcagt gcttccggcc cagccgccca tccctaggca cagtgatttg gcagcagggt 7140
cattttactt tgaggctttt tgttttaaaa tgtagccaag gtttttacaa aggggaaagg 7200
aaaagaaaac aaaaacgcaa gctccatgtg tatagctgaa cttttatatg tttcttgcca 7260
gcccctccgc tcccttccat ctctagcctc tgtcctgttt agtttgatac gtcactgcag 7320
taccttaaga ggtgactctt aagaatgcat cccctcctga ttcctcagct ggttcaccct 7380
tgaggttatt tgcaaaaaga aaaggaggtt cttgagggca ccgattgcga gcattctggt 7440
gcctggctcc ccgcctggga agcgatgggg tgctcagagc agcaggcagg ttgggggagg 7500
ggggggtca tagttgggtt ccagctcctg gcttgatgag cccagggcgc ttacaggcag 7560
cccatgaagt tgatgacagt tttagcatga gaatcacaca gggtccctgt cctgggctcc 7620
tctaaagcca gtggatgtgc tgggcaccag agacaaatca tggagatggc tgctggtggc 7680
tcccaggttg gcccagatgg ggtgagctga cataccacag gcccatccca ggccccgtgg 7740
gctctgcttc tggggctcca taccctgccc tgcaggggtg ctgtgttttt cacacatttc 7800
tttccctgaa gccttctgta acctgtcatt ttccttcctt cctcttccgg agcctgctgc 7860
tttctctgga cctgtctcca cctcccacac agctcatcgt gaacaccact tggtgatgga 7920
gggagtggac ccgtgtgtgg tccccaagtg aggccactgg gagtttgtcc ttttcctcct 7980
ttgcttcact cccagcagca gacccaggtt gtcaggacag gagggcctga gctaagcagt 8040
aggcatcagt ctcgtttgtc ttcagacggc gggggcaggt ccagggtgag gctgggtgga 8100
gggctgacca aggtccaaag ggcctgcgca gcctccggga gggcagcttc tccagccaga 8160
ggcttgtgtg agccatcgtg tgctgggctt gtttttaagt aagaaacaag gaaatcactc 8220
cagattctgt cattccaagg aaagggaagg ggacagttca ggtttctcag ctgttcttag 8280
gggtcactga gcgtctacct cctcctccag aggaggctgg ctcagaacac ctagaggagg 8340
gggccgggga tgcacccccc accagaggct gccttcagcg tctcacgggt gcaggacagc 8400
gctcaggctt gggctctaag ctctgtgtct agtgtagaac atggggaagg agcatcttag 8460
gaactgctga agtaacttct tactgctctc acaattctaa ggaagcggga gaacggcctc 8520
ctaccaacag cgcccacccc agagctgcct gggaaagggc agttttactg aaaggtgctt 8580
[0057] tactgttcac ctgcatcttt cagcagctcc cctcctgccc tcacctggtc ttttccctct 8640
ttatcccaag cctttatgct tgagtccctt ccccaggggc tgcccacccg acagttccag 8700
gcattcccta cctgagcttc ttgtctgctt ttccttctcc cactgcaagc ggctgcttgt 8760
ggggcctggg atgagccctc tctgtcccca ccggccctcc ttgccaagcc attcctgggt 8820
gagttcaggc ctgcgggagc cacacattca tctccacctg gacacttgag ccgcatggcc 8880
agacccctcc cacctgatgc ggtggtgcgt gtgatttgtc aaaagaaagc cttctggatg 8940
ctgttaagat gtacccttca ggtgaacctg gtatcagacc cacagtactt gctgtttgag 9000
aaaaaataaa aacaaaaagg tcacctgttc tccagccctt ttctcttacc tggtatttcc 9060
ttcctttctc ctcccccacc ccaaataaaa aaacaaaaaa cactagaatt tatttatatg 9120
tattgatgtt gtaggtctag gtgaaaaaaa aagaagtaaa tgtttcactg ctctatttat 9180
atataatgtc tgaattaatt ctgtgcagga aaggccagga aattgcatgt gaagttcggt 9240
gcagtcacca cctgtgtgtg acctgagctg cagtctcttc gctgagatgc aggttttaaa 9300
tgagacttgg ggggctgagg gcaggcctca ggcctcccag cgccccaacc cctccttggt 9360
ctaatgaaat gcagttctta gtgcagagat gttttaaggt gcaatatatc tcttcctttc 9420
ccgtggtttt agagccaagc tcaaggtagt aggacgtagg gtcttatttt gttttcaaac 9480
ccccatcctc agagcgcaga tacatgcaga ggcttctgcc aggataccac ggggccttag 9540
tgggaacagg tggagaccag cacttccctt tcctgctgct gaggtaggga ttgggggtc 9600
agaacccact cacttttgcc tgttaaagtt gccctcctga cgctggcagc tctgccttgg 9660
tcactgggga tgcggctcgt tgctcagcca ccagtggcct tgcggtattg tccaccatcc 9720
actagagtgg gatgaagtcc agagtgtggg tatacatctc agatgcccat ctacccactg 9780
gggacttcaa tgccagctgc atttggtttg gttttcttaa ctgttggctt ctccccacag 9840
cgtttttgt ttttttttaa acattcatat tgttttcaaa cttggaattc atagacactc 9900
tggctctagg ttccttaagg gggaaaacaa aagatgactt tatttcacat tcaagaaaat 9960
cagttcagtt ccaaagctgt ggtccttcca gccacttcta gggacactgg ggaaccttgt 10020
taaacgttga catcagtgct ctccagccgt gctgtcaccc tcctatcttc tggatctgcc 10080
ttcgcgatgg tcagtgacag cttctggaag ctgagcacac acaggtgcac agccatgctg 10140

tggtctggcc tgctacggca gcatggcagc tctggtggag ccttctccct tgccatttgg 10200
ttcccctgtg ccaagtagct gcaggctgcc cctcaaatct tcatttgtcc cttttcactt 10260
cctgcagaac aagcctgggt tagagggtct gctggaaatg gcctttgaag accaaggata 10320
ccaggatgtg tgcactctgt cgtgttctgt gatgaatggg aaacgtaggc ttccagaaag 10380
ccagctctct tctgaaatgt gacggaccta agcaggaagt catccaggac aggagtggct 10440
cagtgttggg gatggacgct gtcgcccagc catgctccac cagggccacc aatgtgtagt 10500
tggctggtgg tcttcgggca tgtgagacct gctcttcact gtttccaccc cacttggtgg 10560
cctccaggat ggtagtggca ccctcagagc cccatcttca gcatgttctg aagcctcaga 10620
gtggaaattc ctgctaaggc tctgtgtgga cgcctttctc ccgtgatcta aaggggacac 10680
tgtactcaag cttttgacct catgccttgt gtagtaaaaa aggatttggg ggttttgttt 10740
ggttcctgag agggttgtgt tttgtttttg tttccttttg tttatgtttt ggcctttcct 10800
ctttgtcttt ccatgtagac cagatatttg aaagggcaga cgatggctag aggtgtaatg 10860
tgcagcttgt ttatacggta ttttgggaaa cttaccttgg atgggaaatc gaatcgtgga 10920
ttcaccaggc cggtgctggc acactcaccc tcgcctttc cctccggttc agtacctatt 10980
gtttctcctt tcaaatatgt gattgtacta gctctttcca tatgaaagaa ttctccttat 11040
ttaaataaaa aaagtttaaa aa 11062

<210> 43
<211> 7689
<212> DNA
<213> 智人
<400> 43

tcccacagtg cctggcccag aagccttgct aaatatttga acaggattgc ccaatacttt 60
tctgctgtga gaatgtaaga tggatccaga agagcaggag ctcttaaatg attacagata 120
cagaagctac tcttcagtga ttgaaaaggc tttgagaaat tttgagtcct cgagtgaatg 180
ggcggatctc atatcttcac ttggcaaact caacaaggct cttcagagta acctgaggta 240
[0058] ctccttgttg ccaagacggc tcctcatcag caaaagatta gctcagtgtt tgcaccctgc 300
cctgcccagt ggtgtccact taaaagctct ggaaacctac gagattatct ttaaaatcgt 360
ggggaccaaa tggctggcca aggacttgtt tctgtacagc tgcgggttat ttcctctcct 420
ggcacacgcg gcggtgtcgg tgaggccggt gctgctcacc ctgtacgaga agtacttcct 480
cccactgcag aagctgctcc tgcccagtct gcaggccttc atcgtgggcc tgctgcccgg 540
ccttgaagag ggctccgaga tctccgacag aacggatgct ctgctcctga gactgtcgct 600
ggtggttggc aaagaggtgt tttacaccgc cctctggggg agcgtcctgg ccagcccgtc 660
catccgcctc cctgcctcag tcttcgtggt gggccacatc aacagggatg cccccggccg 720
ggagcagaag tacatgctgg ggaccaatca ccaactcacg gtgaagtctt tgcgtgcctc 780
cctgttggac tcaaatgttc ttgtgcaaag aaataatctg gaaatcgttc tgtttttctt 840
cccattttat acctgtctgg attccaatga gagagccatc cccctcctca gatctgacat 900
cgtgcgcatt ctctcagccg ccacccagac cctactgaga agggacatgt ccctgaacag 960
aagactgtat gcatggttac taggctcaga cataaaagga aataccgttg tgccagaatc 1020
tgaaatctca aattcttatg aagaccagtc gtcttatttt tttgaaaaat actccaagga 1080
tcttttagtt gagggtttgg ctgagatatt gcatcagaag ttcatagatg ctgacgtgga 1140
ggaacgccat catgcatacc tgaagccttt tcgcgtcctc atcagtctgc ttgacaagcc 1200
agaaaataggg cctcaagtgg ttgggaattt gtttctcgaa gtcatcaggg ccttttattc 1260
ttactgcaga gatgcccttg gctctgatct taaacttagc tacacccaga gtggaaattc 1320
gctgataagt gcaatcaagg aaaacagaaa tgcctctgag attgtcaaaa cggtaaattt 1380
gctgataact tctctaagca cagactttct ctgggattat atgacaaggt gttttgagga 1440
atgctttaga ccagtgaagc agcgttacag cgtgaggaac agcgtcagcc ctccccccac 1500
ggtctcggag ctctgcgccc tcctggtctt cctgctggat gtcattcctt tggaacttta 1560
ctctgaggtg caaacccagt atctccctca ggtgctcggc tgcctggtgc agcctcttgc 1620
tgaggacatg gaggccttaa gtttacctga actcacgcat gccttgaaga cgtgtttcaa 1680
ggtgctcagc aaagtccaga tgcctccttc ctacctcgac acggagtcca ccagcggaac 1740
ctcgagtcca gtaaaaggtg aaaacggcaa aataattttg gaaacaaagg cagtgattcc 1800

cggtgacgaa gatgcttcgt ttccccctct gaagtctgag gacagtggga tcgggctcag 1860
tgcctcgtca ccggagctct ctgagcactt gagggttcct cgagtttctc tggaaaggga 1920
cgacgtttgg aagaagggcg ggagcatgca gaggacgttt ctttgcatcc aagagctaat 1980
cgccaacttt gccagcaaga acatttttgg agtacagctg acagcgtcag gagaagaaag 2040
caagtccgag gagcctgcag ggaagaggga cagggatggg acgcagagcc tggcagccaa 2100
tgattccagc aggaagaact cttgggagcc caagcccatc actgtgcctc agttcaagca 2160
gatgctgtca gacttgttca cagcacgagg gtctccattc aagacaaaaa gttcagagtc 2220
accatcgtct tcgcccagca gccctgccag gaaaaacggg ggagaatggg atgttgagaa 2280
ggtggtcatt gacctggggg gttccaggga ggaacgcagg gaggcctttg ccgccgcctg 2340
ccacctgctg ctggattgtg ccactttccc tgtctacctg tccgaggaag agaccgagca 2400
gctctgtgca acgctcttcc agctgccagg agccggtgat tccagttttc catcttggct 2460
gaagtccctc atgactattt gctgctgtgt gactgactgc tacctccaga acgtggccat 2520
ttccactctg ctggaagtga taaaccattc ccagtccctg gcgcttgtca ttgaagacaa 2580
gatgaaacgc tataagagct ctggacacaa ccctttttttt ggcaagctgc agatggtgac 2640
ggttcctccc attgctccag ggatattgaa agtcattgca gagaaaacag atttctatca 2700
gagggtggct cgtgtgcttt ggaatcagct gaacaaagag acccgggagc atcacgtcac 2760
ctgcgtagaa ttgttctacc ggctgcactg cctggcccct acggccaaca tctgcgagga 2820
catcatctgc catgccctcc tggaccctga caagggaaca aggctggaag ctctgtttag 2880
attttccgtg atctggcatc tgacaagaga gatccaaggc agtcgagtaa catctcacaa 2940
tcgctccttt gataggtcct tgtttgtcgt gctggacagc ctggcctgca cggatggtgc 3000
catcggtgcg gcagcccagg gctggctggt gcgtgcgctc tccctcgggg acgtggctcg 3060
catcctcgaa cccgtgctcc tgctgctgct gcagccaaaa acccagagaa cctccatcca 3120
ctgcctcaag caggagaact cggccgatga cttgcaccgt tggtttaaca ggaagaaaac 3180
ctctttcaga gaggcatgcg cagtgcccga gcctcaggag agcggctctg aagagcacct 3240
gcctctgagc cagttcacca cagtggaccg tgaagccatt tgggccgaag tggagaagga 3300
[0059] gcccgagaag tacccgctgc gaggcgagct gagcgaggaa gagctgccct actacgtgga 3360
gcttccagac aggacggccc acggcgcccc ggacagcagc gagcacaccg agtctgcaga 3420
tacaagctcc tgccacacgg acagcgagaa cacgtcctcc ttctcctccc cttcccacga 3480
cctgcaggag ctgagcaacg aagagaactg ctgtgcaccc atccccatgg ggggcagggc 3540
gtaccccaag cgctcggccc tgctggcggc cttccagtca gaaagcttca aggctggggc 3600
caagttaagc ctggtgcggg tggactcgga caagacgcag gcttctgagt cgttctccag 3660
cgacgaggag gcggacttgg agctccaggc cctcaccaca tccaggctgc taaagcagca 3720
gcgggaaagg caggaggccg tcgaggcctt gttcaagcac atcctgctct acctgcagcc 3780
ctacgactct cggcgggtcc tctatgcctt ctcggtgctg gaggctgtgc tcaaaaccaa 3840
ccctaaggaa ttcatcgagg ctgtgtccag gactagcatg gataccagct ccaccgcgca 3900
cctcaacctc atctccaacc tcctcgctcg ccaccaggag gccctcattg gccagagttt 3960
ctacggaaag ctccagaccc aggtccccaa cgtgtgcccc cactctctgc tcctggagct 4020
gctcacctac ctctgcctga gcttcctgcg ctcctactac ccttgctatt tgaaggtctc 4080
gcaccgagac attctcggca accgggacgt gcaggtcaaa agtgtcgagg ttttgatcag 4140
gataatgatg cagctggtct cagtggccaa gtcttcggaa gggaagaacg tggagttcat 4200
ccacagcttg ctgcagaggt gcaaagttca ggagtttgtc ctgctctccc tgtcggcgtc 4260
catgtacacg agccagaagc gctacgggct ggccaccgcc caccacggca gggccctgcc 4320
agaggacagc ctctttgagg agagtctcat taacttgggt caggaccaga tctggagtga 4380
gcacccgctg cagattgagc tgctgaagct gctgcaggtg ctgattgtct tggaacacca 4440
cctgggtcgg gcccatgagg aggcggaaaa ccagcccgac ctgtcccggg agtggcagag 4500
agccctgaac ttccagcagg ccatcagcgc cctgcagtac gtgcagcccc acccccctcac 4560
ctcccagggt cttctggtct ctgcggtggt gaggggtctg cagcccgcct acggttacgg 4620
catgcatccg gcctgggtga gcttggtcac gcattccttg ccctacttcg gaaagtccct 4680
gggctggacg gtgacaccct ttgttgtcca gatttgcaaa aacttggatg acttggtcaa 4740
gcagtatgaa agcgaatctg tgaagctctc tgtcagcaca acctccaaga gggaaaacat 4800
ttctccagat tatccactca cccttctaga aggtctaacg accattagtc atttttgtct 4860

tttggaacaa gccaaccaaa acaaaaagac catggctgca ggtgatcctg ccaacttgag 4920
gaatgccaga aatgccattt tggaagagct gcctcgaact gttaacacca tggcccttct 4980
ctggaatgtt ctcagaaagg aggagactca aaagagacct gtcgatctcc taggggccac 5040
gaagggatcc tcttccgttt actttaaaac caccaaaacc ataagacaaa aaattttaga 5100
cttcttaaac cccttgacgg cccatcttgg ggttcagttg acagcggctg ttgcggcagt 5160
gtggagcaga aagaaagccc agcgtcacag taagatgaag attatcccaa cggcaagtgc 5220
atcccagcta acccttgtcg acttggtgtg tgcactcagc accctgcaga ctgacacgct 5280
gctgcacctg gtgaaggagg tggtgaagag gccaccccaa gtcaaagggg gtgatgagaa 5340
atcgccccta gtggacattc ctgtgttgca gttttgctat gcttttctcc aaaggctccc 5400
agtaccagcc ttgcaagaga acttttcttc actgttggga gtattgaaag agtctgtaca 5460
gttgaatcta gccccacctg ggtattttct gcttctcagc atgctgaatg actttgtaac 5520
aagaactccc aacctggaaa acaagaagga ccaaaaagac ctgcaggaaa tcactcagaa 5580
aatcctagaa gctgtgggga acattgccgg ctcttccttg gagcaaacca gctggctaag 5640
cagaaacctg gaagtgaagg cccaacctca ggcctctcta gaagaatctg atgctgagga 5700
ggacctgtat gatgctgctg cagcttcagc aatggtgtct tcatccgccc cgtcggtgta 5760
cagcgtgcaa gccctctctc tcctggcaga ggtactggct tccctcctgg acatggttta 5820
tcgaagtgat gagaaggaga aagctgtgcc gttaatctcc cgtctgcttt actatgtttt 5880
tccatactta cgcaaccaca gtgcctacaa tgctcccagc ttccgggctg gcgctcagct 5940
gctgagctcc ctgagtggct atgcctacac aaagcgagcc tggaggaagg aggtcctgga 6000
gctgtttctc gaccccgctt tctttcagat ggatacttcc tgtgttcatt ggaagtccat 6060
tattgaccat cttttgactc atgagaaaac aatgtttaag gatttaatga acatgcagag 6120
cagttctttg aaactattct caagttttga acagaaagcc atgctgttaa agcgccaggc 6180
ttttgctgtc ttcagtggag aacttgatca ataccacctt taccttccac tgatacaaga 6240
acgcctgaca gacaatctca gagttggaca gacatccata gttgctgctc agatgtttct 6300
ttttttcaga gttttgctgc taagaatatc tcctcaacat ttgacttcat tgtggccaat 6360
[0060] aatggtctct gaattgattc agacattcac acagcttgaa gaagatctaa aagatgaaga 6420
tgagtcattg agaagcacca acaaagtaaa cagaacgaaa gtttcagtcc cggatgcaaa 6480
tggaccctca gtgggggaga taccccagag tgaactcatc ttgtatttat cagcttgcaa 6540
attcttggac acagcgcttt cttttccacc tgacaagatg ccattatttc aaatttatag 6600
gtgggcattt attccagaag tggacacaga gggccctgcc ttcctgtcgg atgtagagga 6660
gaatcaccaa gaatgcaaac cccacactgt caggattcta gaacttctaa aattaaagtt 6720
tggggaaatc agtagctctg atgagatcac catgaagagt gaattcccgc ttctgcgcca 6780
acattctgtt tccagcatca ggcagttgat gccattcttc atgactctaa atggtgcatt 6840
taagacccag agacagctgc ctgctgatag cccaggaact ccattcttgg actttcctgt 6900
cacagatagc ccaaggatct taaaacaact ggaagaatgc atcgaatatg attttctgga 6960
acatccagaa tgttaaccat gtgagagaga atatgtttaa tccatgtatt ggtactttac 7020
tgaaaaccag gttatattct aaagaagaaa gaaggcagga tagtgctttt gaacaagcct 7080
atttccattt tgaaagtaga tttcaggcta ggtgcggtgg ctcacacctg taatctcagc 7140
actttgggag gccaaggcag gcagatcact tgaggtcagg agttcgagac cagcctgacc 7200
aacatggtga gaccctgtct ctactaaaaa tacaaaaatt agctgggtgt ggtggcggcg 7260
cctgtaatcc cagctacttg ggaggctaag gcatgagaat tgcttgaacc caggaggtgg 7320
aggctgcagt gagccgagat cacgacactg cactccagct gtgtgacaga atgagaccat 7380
ctccaaaaaa aaaaaaaagt agatttcaga taatttactg ttcagcaaca ggacacacct 7440
ccctaaatgc cttgtaatat atttgaatct gattctgcat ttcttcctca atttatgtaa 7500
tgaaaataaa attaatatat catctaacag tagcacaaaa tttgtaatat gaagtaaagt 7560
atgaagataa tgaagaagtt gttttctttg ttgaagcagt tatatgggtc tttctcagta 7620
tatttctctt ttctctaaaa gtttaaactt attaaaagaa tgttatttt aacctttcaa 7680
aaaaaaaaa 7689

<210> 44
<211> 1138
<212> DNA

<213> 智人
<400> 44
gctctggccg gccccggcga ttggtcaccg cccgctaggg gacagccctg gcctcctctg 60
attggcaagc gctggccacc tccccacacc ccttgcgaac gctcccctag tggagaaaag 120
gagtagctat tagccaattc ggcagggccc gctttttaga agcttgattt cctttgaaga 180
tgaaagacta gcggaagctc tgcctctttc cccagtgggc gagggaactc ggggcgattg 240
gctgggaact gtatccaccc aaatgtcacc gatttcttcc tatgcaggaa atgagcagac 300
ccatcaataa gaaatttctc agcctggccg aaaatggttg gccccacgaa gccacgacaa 360
ctggaggcaa agagggttgc tcaacgcccc gcctcattgg aaaaccaaat cagatctggg 420
acctatatag cgtggcggag gcggggcgat gattgtcgcg ctcgcaccca ctgcagctgc 480
gcacagtcgc atttctttcc ccgcccctga gaccctgcag caccatctgt catggcggct 540
gggctgtttg gtttgagcgc tcgccgtctt ttggcggcag cggcgacgcg agggctcccg 600
gccgcccgcg tccgctggga atctagcttc tccaggactg tggtcgcccc gtccgctgtg 660
gcgggaaagc ggcccccaga accgaccaca ccgtggcaag aggacccaga acccgaggac 720
gaaaacttgt atgagaagaa cccagactcc catggttatg acaaggaccc cgttttggac 780
gtctggaaca tgcgacttgt cttcttcttt ggcgtctcca tcatcctggt ccttggcagc 840
acctttgtgg cctatctgcc tgactacagg tgcacagggt gtccaagagc gtgggatggg 900
atgaaagagt ggtcccgccg cgaagctgag aggcttgtga aataccgaga ggccaatggc 960
cttcccatca tggaatccaa ctgcttcgac cccagcaaga tccagctgcc agaggatgag 1020
tgaccagttg ctaagtgggg ctcaagaagc accgccttcc ccacccccctg cctgccattc 1080
tgacctcttc tcagagcacc taattaaagg ggctgaaagt ctgaaaaaaa aaaaaaaa 1138
<210> 45
<211> 1377
<212> DNA
<213> 智人
[0061] <400> 45
atgctaaaac taatcgtccc aacaattata ttactaccac tgacatgact ttccaaaaaa 60
cacataattt gaatcaacac aaccacccac agcctaatta ttagcatcat ccctctacta 120
ttttttaacc aaatcaacaa caacctattt agctgttccc caacctttтc ctccgacccc 180
ctaacaaccc ccctcctaat actaactacc tgactcctac ccctcacaat catggcaagc 240
caacgccact tatccagtga accactatca cgaaaaaaac tctacctctc tatactaatc 300
tccctacaaa tctccttaat tataacattc acagccacag aactaatcat attttatatc 360
ttcttcgaaa ccacacttat ccccaccttg gctatcatca cccgatgagg caaccagcca 420
gaacgcctga acgcaggcac atacttccta ttctacaccc tagtaggctc ccttccccta 480
ctcatcgcac taatttacac tcacaacacc ctaggctcac taaacattct actactcact 540
ctcactgccc aagaactatc aaactcctga gccaacaact taatatgact agcttacaca 600
atagctttta tagtaaagat acctctttac ggactccact tatgactccc taaagcccat 660
gtcgaagccc ccatcgctgg gtcaatagta cttgccgcag tactcttaaa actaggcggc 720
tatggtataa tacgcctcac actcattctc aacccccctga caaaacacat agcctacccc 780
ttccttgtac tatccctatg aggcataatt ataacaagct ccatctgcct acgacaaaca 840
gacctaaaat cgctcattgc atactcttca atcagccaca tagccctcgt agtaacagcc 900
attctcatcc aaacccccctg aagcttcacc ggcgcagtca ttctcataat cgcccacggg 960
cttacatcct cattactatt ctgcctagca aactcaaact acgaacgcac tcacagtcgc 1020
atcataatcc tctctcaagg acttcaaact tactcccact aatagctttt tgatgacttc 1080
tagcaagcct cgctaacctc gccttacccc ccactattaa cctactggga gaactctctg 1140
tgctagtaac cacgttctcc tgatcaaata tcactctcct acttacagga ctcaacatac 1200
tagtcacagc cctatactcc ctctacatat ttaccacaac acaatggggc tcactcaccc 1260
accacattaa caacataaaa ccctcattca cacgagaaaa caccctcatg ttcatacacc 1320
tatcccccat tctcctccta tccctcaacc ccgacatcat taccgggttt tcctctt 1377
<210> 46
<211> 1779

<212> DNA
<213> 智人
<400> 46

cggcgtgccc tggggcggcg cgggcgcagg ggcgcgtgcg cggcgggctg tcgttggctg 60
gagcagcggc tgcgcgggtc gcggtgctgt gaggtctgcg ggcgctggca aatccggccc 120
aggatgtaga gctggcagtg cctgacggcg cgtctgacgc ggagttgggt ggggtagaga 180
gtagggggcg gtagtcgggg gtggtgggag aaggaggagg cggcgaatca cttataaatg 240
gcgccgaagc aggacccgaa gcctaaattc caggaggttg ggatgaatgg gttccggaga 300
gcagagtact caaatacgtg gacaccaatt tgcagaaaca gcgagaactt caaaaagcca 360
atcaggagca gtatgcagag gggaagatga gaggggctgc cccaggaaag aagacatctg 420
gtctgcaaca gaaaaatgtt gaagtgaaaa cgaaaaagaa caaacagaaa acacctggaa 480
atggagatgg tggcagtacc agtgagaccc ctcagcctcc tcggaagaaa agggcccggg 540
tagatcctac tgttgaaaat gaggaaacat tcatgaacag agttgaagtt aaagtaaaga 600
ttcctgaaga gctaaaaccg tggcttgttg atgactggga cttaattacc aggcaaaaac 660
agctctttta tcttcctgcc aagaagaatg tggattccat tcttgaggat tatgcaaatt 720
acaagaaatc tcgtggaaac acagataata aggagtatgc ggttaatgaa gttgtggcag 780
ggataaaaga atacttcaac gtaatgttgg gtacccagct actctataaa tttgagagac 840
cacagtatgc tgaaattctt gcagatcatc ccgatgcacc catgtcccag gtgtatggag 900
cgccacatct cctgagatta tttgtacgaa ttggagcaat gttggcttat acacctctgg 960
atgagaagag ccttgcttta ttactcaatt atcttcacga tttcctaaag tacctggcaa 1020
agaattctgc aactttgttc agtgccagcg attatgaagt ggctcctcct gagtaccatc 1080
ggaaagctgt gtgagaggca ctctcactca cttatgtttg gatctccgta aacacatttt 1140
tgttcttagt ctatctcttg tacaaacgat gtgctttgaa gatgttagtg tataacaatt 1200
gatgtttgtt ttctgtttga ttttaaacag agaaaaaata aaaggggtga atagctcctt 1260
ttttcttctt tctttttttt tttcatttca aaattgctgc cagtgttttc aatgatggac 1320
[0062] aacagaggga tatgctgtag agtgttttat tgcctagttg acaaagctgc ttttgaatgc 1380
tggtggttct attcctttga cactacgcac ttttataata catgttaatg ctatatgaca 1440
aaatgctctg attcctagtg ccaaaggttc aattcagtgt atataactga acacactcat 1500
ccatttgtgc ttttgttttt ttttatggtg cttaaagtaa agagcccatc ctttgcaagt 1560
catccatgtt gttacttagg cattttatct tggctcaaat tgttgaagaa tggtggcttg 1620
tttcatggtt tttgtatttg tgtctaatgc acgttttaac atgatagacg caatgcattg 1680
tgtagctagt tttctggaaa agtcaatctt ttaggaattg tttttcagat cttcaataaa 1740
ttttttcttt aaatttcaaa gaacaaaaaa aaaaaaaaa 1779

<210> 47
<211> 7827
<212> DNA
<213> 智人
<400> 47

gtagtcttga cgtgagctag ctggcatggc ggcctgcatt gcagcggggc actgggctgc 60
aatgggccta ggccggagtt tccaagccgc caggactctg ctccccccgc cggcctctat 120
cgcctgcagg gtccacgcgg ggcctgtccg gcagcagagc actgggcctt ccgagcccgg 180
tgcgttccaa ccgccgccga aaccggtcat cgtggacaag caccgccccg tggaaccgga 240
acgcaggttc ttgagtcctg aattcattcc tcgaagggga agaacagatc ctctgaaatt 300
tcaaatagaa agaaaagata tgttagaaag gagaaaagta ctccacattc cagagttcta 360
tgttggaagt attcttcgtg ttactacagc tgacccatat gccagtggaa aaatcagcca 420
gtttctgggg atttgcattc agagatcagg aagaggactt ggagctactt tcatccttag 480
gaatgttatc gaaggacaag gtgtcgagat ttgctttgaa ctttataatc ctcgggtcca 540
ggagattcag gtggtcaaat tagagaaacg gctggatgat agcttgctat acttacgaga 600
tgcccttcct gaatatagca cttttgatgt gaatatgaag ccagtagtac aagagcctaa 660
ccaaaaagtt cctgttaatg agctgaaagt aaaaatgaag cctaagccct ggtctaaacg 720
ctgggaacgt ccaaatttta atattaaagg aatcagattt gatctttgtt taactgaaca 780

gcaaatgaaa gaagctcaga agtggaatca gccatggctt gaatttgata tgatgaggga 840
atatgatact tcaaaaattg aagctgcaat atggaaggaa attgaagcgt cgaaaaggtc 900
ttgattctga gaatgaattt ggttagttgc agaagataca ttggctctaa gaggatatat 960
tttgagacca atttaatttc atttataaga acatagtaat taagtgaact aagcattcat 1020
tgttttatta atacttttt tctaaaataa aacttgtaca ccagtttatt actctaaaaa 1080
gagaattaca catgccaaat ggaccaatgt ccatttgctt attggaggca aagctacaat 1140
agaagtcaga gcatcaccag aatggtcttt aatgagcatg gaacctgagc aaagggaata 1200
ggtgggatga attttttttt taattgtgaa acaattcata agcacaatat gatttacaga 1260
ataataaaca ttcatgtacc cactatcagg ttaagaaata gaacatttat taatatgtag 1320
gaatgttaag aaataaaaca tttaataaga tctcagaaga ctccagtaaa tctgcaattg 1380
tatctctctc ctttttaaat gtaaatatca tcttgacttg ttaattattc ccttgcattt 1440
cttttagttt actgccaaca catatattct tcaacaatat atttaatttt gaaaaacctg 1500
aaaaaaaaaa cctgttagca agtataaagg ggcagtatta ctattattgc atgaaggctt 1560
caagggaaac gttacagtct ttgggtcata gtctggcttc agcttcctct gagagtttac 1620
agaggccaat tttgagcaaa ttcatggcta aggttatgag tgagttctgc taaacagaag 1680
gctcaccaca aggtatctgg caggattata ctgggtagct ggatgttgca gaaatgtggt 1740
tagaggaagt aaactgtttt ttgatgctca cagcatgatg aatcaaactc tgtatcttag 1800
gattaggtta aaacaatacc tttggtatga tatgagtgtt gttgctgatc catgcagcat 1860
ggattggaaa gctggggtat aagcacacat gctaaagaaa aacatgtaat ttggtccata 1920
ctcacctgga tatactgttc ctcaggttaa aaaatacagt actatcctaa atcttgaagg 1980
caactctcag cctatccatt gagttacctt cagatctgcc ctctggttcc tagctgtctt 2040
gggactaact tctttcctgc gctcagctgt tttctggatt ccatgttttc cattttattg 2100
agtactaact tgttttgctg cagcacatcc tttggtagct tctagaggaa gtttgtgtgg 2160
aggtaaaatt tttgagacct tgcatgtctc atgtttgatt gatactttat acgtttaggt 2220
aggaggtaat tttccttcag gactttaaaa atattgttgc tccattttct ttgtttctat 2280
[0063] tgttgtattg agaaatccaa tgccattttg atttccccat cataaatttc atgatgatgt 2340
gtcttggtgt gggtctatat ttatccattg tattgggttt taggtgaacc cttccagata 2400
gtaactcatt tctgtcagtt ctgggaaaca cttagcattg gttgatgatt tattctctgc 2460
tgctttgttc tcccaactat tatttggatg ttggatatcc agcactgggt atctattttc 2520
ttacctccct cccttgaccc cagtctctgt tttttagctc tttagctcaa tcttccaact 2580
ctttgctatt gtattttaaa atcttaagac cccttcttga tttgtagaag ttccttttct 2640
tacaaccaaa aagcctttat ctatggattt gttcacagat aaggggtatt caatatagtg 2700
tatttttttt tcatttaaaa ttgtttgcgc atctatttcc tccaaatttc tttctgtatt 2760
tatttttgt tgtctatatt tcagactttt ccaggatatc tgataatctt tggctgtctt 2820
cttatggttg aaagagggac taaaaagctt ggaaagcctt tgggttgtgg gaaggggctg 2880
tctttaggat tatctgaatg ggctttttg ggagtcccct cctccacatg aatattttgg 2940
ttttgtcaga ttccctagaa tagaggcttc caatctcctt cctggagggg tctgtccagg 3000
aaggagattg tctaggggtc tgtcagacag cagctttcag ctacttcctt gatctttttc 3060
actaatgatt atatagtcat ctaactactg tcaacaagta atagatatcc tatccttcac 3120
ttgtttagat tatttgctga gataacctct caaaagaacc tctcaaaata aaaggttaac 3180
aagagcctat atcttatatt tttcttctct ttatcttgtt agaagatagc tattaaaacc 3240
tgttcttttt ctgtcttgat aaacacactt caatcttggt agaatggtag atgggacagt 3300
atattttagg acctaaagct ctgcaaatgt atgatcagct tgtaagtaca ggtgctcaaa 3360
aacatgtaaa caatcatgct ttttactctg taggaatatc tttaaaattc ttgtgaattt 3420
ttccccagaa gtaaagcaaa tcttcccccа gaaataaaat taaatgtgca taatctaaag 3480
ctttttttt ttattgtggt aggatatata tataaaacat aatttgccat tgtaaacatt 3540
ttaaatttac aagtcagagg cattaattac atcacaatgt tgtgaaatta ttactactat 3600
ttccaaaatt ttctcatcac cccaaactga aactctgtaa ctgttgagca ataacctcat 3660
tcctgtatct ctcccaaccc caggtaacct caaatctttc tttttatctt tgagacaagg 3720
tctcattcta tcactcaggt aggagtgcag tggtgtgatc atagctcatt gcagcctcaa 3780
aatcctgggc tcaagcaatc ctccttgagt agctaagact ataggcacac attaactgcg 3840

cctggctgat tttgtttttt gtagagatgt ggtcttgcta tgtttcccat gctggtcttg 3900
agttcctggc ctcaagcagt ccttaagatt catccatgtt gtggcatgtg tcagaatttc 3960
atttgttttt atgactaaat aatattccat tgtatgtata tacattttgt tcatccatct 4020
tctgatgaac actgggatat gtctaccttt tggctattgt gaataatgct gcagtaaaca 4080
ttgacataac aagtatgtat ttgattgcct gtttctaagt tcttttgggt atacatcttg 4140
agtagaattg ctagataatg tcatgtttta tttctcttgt gatttcttct tcgatcccct 4200
ggttgagtgt gttaatttct acatgtttat gaatttccca ctgtttttt gttattgatt 4260
tccaagttca ttccattgtg attagagaag atacttagta tgattttaat gtttttgaga 4320
attggtgtgt ggcctgatag atggtctgtc ctggagaatg ttcctcatac acttgagcaa 4380
aatatttatc atgctattgt tgactgtagt tttctatatg tctcttaggt caaggtggtt 4440
tacaatgtgt taaggttctc ttttttaaa aaaatttttg cacagagtat ctttttctat 4500
gtgttccatg tatttgtgtc tttggagcta tagtctcttg tagacagcat atcactatct 4560
tgttttgttt tgtttttttct gtccattctg ccaatttctg ccttttgatt ggaaaattta 4620
atccatttgc atttaaagta attaaggaag gactttcttc taccatttaa cacttcttct 4680
atatgtcata tacttttttg gcccctcatt tcctctttat ggccttcttt tctgtttttt 4740
tgtagtgaac tagtctgatt ctctttccac tccccttttgt gtatatttgt tagatgtttt 4800
atttgtggtt gctatgggga ttatagttaa catcctacac ttaaaacaat ctaatttaaa 4860
ctgataccaa tttaccttca atagcataca aaatctctac tcctgtaaag ctctgcccct 4920
gccccccctta tgttattgat ggcacaaatt gcctaataaa taatttatag ttatttgtat 4980
gagtttgtct tttaaatcat ttaggaaata aaaagtggag ttagaaaaca gtatgatagt 5040
aatactgact tttatatttg tcaatatatt tatcttattt tggatcctta tttcattata 5100
tagatttgag ttactgtcta gtgcccttcc atttcggccc aaaggattcc cttatgcatt 5160
tcttgcaggg caagtctaat tgtaataaac tccctcagct tttgttttat ctgagaatgt 5220
cttgatttct cccttatttt tgatggataa ttttgccaga tacatgaatt tttggtaaca 5280
gtatttttct ttcagcactt taaatatgtc atcccactac cttctgactt catggtttct 5340
[0064] catgagatat tagatgttat aaaatttgag gattcctcat tcttgatgag tcagttctgt 5400
cttattgctt ttcggatttg ctcagctttt gtcttttgac agtttgatta taacgcggct 5460
cagtgtgggt ctctgagttt atcccactta gagtttgttg agtttcttgg agtcatagat 5520
ttatgtcttt tatcaaattt tggacatatt tggctattat ttcttcaatt tttttcactg 5580
cttctttctt ttccttctga aatattctta atgtatatgt tggtctgttt gatgctgtct 5640
caccagtttc ttaggctgtg ttctcttttg ttcctcagac ttgattattg cagttgccct 5700
tctttttatt tttttcaagt ttgttgattc ttctccctgt tcagatcaac tgttgaactc 5760
ctctagtgaa tttatttcag ttactgtact tttcagctcc aagatttatc tttggttcct 5820
ttttataacg tctgtgtctt tattgatatt ctcattttgt tcatatgtct ctttcttcct 5880
ttagttcttt gtccatgttt tcctttagct ctttgggctt atttaagaca attgtttaaa 5940
gtctttgcat agtaagtcca atgtctgtgt ttcttcaggg atggttttca ttattttgtt 6000
ttcaatgagc catactttcc tgtgtctttg tatgctgtct ttttgttgtt gaaaactgta 6060
tgtttgaaca tcataacgtg gtggccctga aaatcagata ttccccccctt cctgagagtt 6120
agttttattt ttattattga agattgtagc agtctattgc tacatgtgca gtcatttcca 6180
aactatttttt gcaaagactg tattccttct gtgtgtcatc actgaagtct ctgttcctta 6240
gtttgtgttt aatagtttga catagatttc cttgaaagga gttaaaacta gcagaaaaat 6300
ctctctccca gtctttccag tctttgtaga ttggttctgt gctgggcttt tccattaata 6360
cttagccagg cttgtactga gcctaacaat caggcccaaa agcgtagggt ctttgcagat 6420
cttgtctgag catgcttctt gctgtgtatg cacgtagttt tctaaatctc cctgtatgtg 6480
ctgttgaata ttctaatttc ccaaagaaac tcctttgcag ctttttctca cagaacatag 6540
atggtttttt ggatatcttg accatagtct ttcgacccag gtgtttgcgg ttgttagttc 6600
accttacact tttttcaagc attgcctact gcttacgatg agtgctctgt caatccttta 6660
agtagcccca gacaggctac cagagactta aacaagaatt tgtaagttct gctcagcttc 6720
ctctagaaat ggggatcagg gtccaagaca gaatgcagtt gctgatttca agactgctgc 6780
aacaccaggg agcttgtggg ggaagggcaa gcagaaatgt cacaaagctt tcttgccatt 6840
ttaaagttgc ctgttcttga ctcagcattt gcttcattgc tataaacttt ttactgtttt 6900

tcagagttct gataaaattg gctatgcctg ttcctgcttt aaaaaatata tatatatttt 6960
ttagggattg gggtctcact atactgacca ggctggtctt gaacttctgg cctcaagcca 7020
tcctctcatt tcagcttccc aaagtgctgc aattacacgc gtgaaccacc acacccagcc 7080
cctgcttgtt tttcaatgtg cctactccac catgttgctc aagtatgtat attttctaaa 7140
ctaccttgta gtgttgtgat gggaaataaa tccctgagcc ttttgaataa ctcagagaga 7200
tcaaaaactt agtttatcct attcgaagga ttagaaaaat gatatatctt tcacttttc 7260
agggataggc tcctcattag aaggctccta tgtgccgatg ctgtacaaga catttcattt 7320
ctcttaatgt ttacaacaag cttgttgcca aggctgatct tgaactcctg gcctcaaacg 7380
atcctcccag ctcagtctca caaagtgttg ggatgtctgg ccaactaatg actatcttaa 7440
ctcttgtgtt tcaatgttta tgccttcttt tatcttgact gattgtatga ctatgtcttc 7500
tagaacaatg ttgaacagaa atggtgagag cagacatcct tgctttaata tttcaccatt 7560
atatatgatg ttaggtatag atttttctca cagatgcctt ttatcagatt gaggaattta 7620
tattcctact ttgccgaaag gtttttgtag tatgaggggg tgctgaattt tgtcaaacac 7680
tttttcggta ataattgaga tgattggttc tgcagtcatc gagatgtgga ttttctcctt 7740
tattctgttc gtgagtgatt acactggttg actaatgtta aaacaacctt actttccagg 7800
aataaaccct attatctttt ttataca 7827

<210> 48
<211> 1821
<212> DNA
<213> 智人
<400> 48

tgcgggtacg gacagcgcat gagcttatgt tgagggcgga gcccagacca gcccttcgtc 60
ctatcctgcc cttccagcac ctctcagccg taacttaaac tacacttccc agaagcctcc 120
tcagccaggg acttccgttg tcgtcagcgg aagcggtgac agatcatccc aggccacaca 180
gaggccggct tggtcactat ggaggagata ggcatcttgg tggagaaggc tcaggatgag 240
[0065] atcccagcac tgtccgtgtc ccggccccag accggcctgt ccttcctggg ccctgagcct 300
gaggacctgg aggacctgta cagccgctac aaggaggagg tgaagcgaat ccaaagcatc 360
ccgctggtca tcggacaatt tctggaggct gtggatcaga atacagccat cgtgggctct 420
accacaggct ccaactatta tgtgcgcatc ctgagcacca tcgatcggga gctgctcaag 480
cccaacgcct cagtggccct ccacaagcac agcaatgcac tggtggacgt gctgcccccc 540
gaagccgaca gcagcatcat gatgctcacc tcagaccaga agccagatgt gatgtacgcg 600
gacatcggag gcatggacat ccagaagcag gaggtgcggg aggccgtgga gctcccgctc 660
acgcatttcg agctctacaa gcagatcggc atcgatcccc cccgaggcgt cctcatgtat 720
ggcccacctg gctgtgggaa gaccatgttg gcaaaggcgg tggcacatca cacaacagct 780
gcattcatcc gggtcgtggg ctcggagttt gtacagaagt atctgggtga gggcccccgc 840
atggtccggg atgtgttccg cctggccaag gagaatgcac ctgccatcat cttcatagac 900
gagattgatg ccatcgccac caagagattc gatgctcaga caggggccga cagggaggtt 960
cagaggatcc tgctggagct gctgaatcag atggatggat ttgatcagaa tgtcaatgtc 1020
aaggtaatca tggccacaaa cagagcagac accctggatc cggccctgct acggccagga 1080
cggctggacc gtaaaattga atttccactt cctgaccgcc gccagaagag attgattttc 1140
tccactatca ctagcaagat gaacctctct gaggaggttg acttggaaga ctatgtggcc 1200
cggccagata agatttcagg agctgatatt aactccatct gtcaggagag tggaatgttg 1260
gctgtccgtg aaaaccgcta cattgtcctg gccaaggact tcgagaaagc atacaagact 1320
gtcatcaaga aggacgagca ggagcatgag ttttacaagt gacccttccc ttccctccac 1380
cacaccactc aggggctggg gcttctctcg caccccccagc acctctgtcc caaaacctca 1440
ttccctttt tctttaccca ggattggttt cttcaataaa tagataagat cgaatccatt 1500
taatttcttc ttagaagttt aactcctttg gagaatgtgg gccttgaata ggatcctctg 1560
ggtccctctt aatctgacag atgagcagac gaggtgcatg gcctgggttg cagcttgaga 1620
gaaccaaaat attcaaacca gatgacttcc aaaatgtggg gaaagggatg gaaaatgaac 1680
ctgagatgga gtccttaatc acgggataaa gccctgtgca tctccctcat ttcctacagg 1740
taaaagacag taaagaaatt caggtcacag gccttgggag ttcataggaa ggagatgtcc 1800

agtgctgtcc agtagaactt t 1821

<210> 49
<211> 5159
<212> DNA
<213> 智人
<400> 49

ggtcccggaa gtgcgccagt cgtaccttcg cggccgcaac tcgctcggcc gccgccatct 60
tgcgagctcg tcgtactgac cgagcgggga ggctgtcttg aggcggcacc gctcaccgac 120
accgaggcgg actggcagcc ctgagcgtcg cagtcatgcc ggccggaccc gtgcaggcgg 180
tgccccccgcc gccgcccgtg cccacggagc ccaaacagcc cacagaagaa gaagcatctt 240
caaaggagga ttctgcacct tctaagccag ttgtggggat tatttaccct cctccagagg 300
tcagaaatat tgttgacaag actgccagct ttgtggccag aaacgggcct gaatttgaag 360
ctaggatccg acagaacgag atcaacaacc ccaagttcaa ctttctgaac cccaatgacc 420
cttaccatgc ctactaccgc cacaaggtca gcgagttcaa ggaagggaag gctcaggagc 480
cgtccgccgc catccccaag gtcatgcagc agcagcagca gaccacccag cagcagctgc 540
cccagaaggt ccaagcccaa gtaatccaag agaccatcgt gcccaaagag cctcctcctg 600
agtttgagtt cattgctgat cctccctcta tctcagcctt cgacttggat gtggtgaagc 660
tgacggctca gtttgtggcc aggaatgggc gccagtttct gacccagctg atgcagaaag 720
agcagcgcaa ctaccagttt gactttctcc gcccacagca cagcctcttc aactacttca 780
cgaagctagt ggaacagtac accaagatct tgattccacc caaaggttta ttttcaaagc 840
tcaagaaaga ggctgaaaac ccccgagaag ttttggatca ggtgtgttac cgagtggaat 900
gggccaaatt ccaggaacgt gagaggaaga aggaagaaga ggagaaggag aaggagcggg 960
tggcctatgc tcagatcgac tggcatgatt ttgtggtggt ggaaacagtg gacttccaac 1020
ccaatgagca agggaacttc cctcccccca ccacgccaga ggagctgggg gcccgaatcc 1080
tcattcagga gcgctatgaa aagtttgggg agagtgagga agttgagatg gaggtcgagt 1140
[0066] ctgatgagga ggatgacaaa caggagaagg cggaggagcc tccttcccag ctggaccagg 1200
acacccaagt acaagatatg gatgagggtt cagatgatga agaagaaggg cagaaagtgc 1260
ccccaccccc agagacaccc atgcctccac ctctgccccc aactccagac caagtcattg 1320
tccgcaagga ttatgatccc aaagcctcca agcccttgcc tccagcccct gctccagatg 1380
agtatcttgt gtcccccatt actggggaga agatccccgc cagcaaaatg caggaacaca 1440
tgcgcattgg acttcttgac cctcgctggc tggagcagcg ggatcgctcc atccgtgaga 1500
agcagagcga tgatgaggtg tacgcaccag gtctggatat tgagagcagc ttgaagcagt 1560
tggctgagcg gcgtactgac atcttcggtg tagaggaaac agccattggt aagaagatcg 1620
gtgaggagga gatccagaag ccagaggaaa aggtgacctg ggatggccac tcaggcagca 1680
tggcccggac ccagcaggct gcccaggcca acatcaccct ccaggagcag attgaggcca 1740
ttcacaaggc caaaggcctg gtgccagagg atgacactaa agagaagatt ggccccagca 1800
agcccaatga aatccctcaa cagccaccgc caccatcttc agccaccaac atccccagct 1860
cggctccacc catcacttca gtgccccgac cacccacaat gccacctcca gttcgtacta 1920
cagttgtctc cgcagtaccc gtcatgcccc ggcccccaat ggcatctgtg gtccggctgc 1980
ccccaggctc agtgatcgcc cccatgccgc ccatcatcca cgcgcccaga atcaacgtgg 2040
tgcccatgcc tccctcggcc cctcctatta tggcccccccg cccacccccc atgattgtgc 2100
caacagcctt tgtgcctgct ccacctgtgg cacctgtccc agctccagcc ccaatgcccc 2160
ctgtgcatcc cccacctccc atggaagatg agcccacctc caaaaaactg aagacagagg 2220
acagcctcat gccagaggag gagttcctgc gcagaaacaa gggtccagtg tccatcaaag 2280
tccaggtgcc caacatgcag gataagacgg aatggaaact gaatgggcag gtgctggtct 2340
tcaccctccc actcacggac caggtctctg tcattaaggt gaagattcat gaagccacag 2400
gcatgcctgc agggaaacag aagctacagt atgagggtat cttcatcaaa gattccaact 2460
cactggctta ctacaacatg gccaatggcg cagtcatcca cctggccctc aaggagagag 2520
gcgggaggaa gaagtagaca agaggaacct gctgtcaagt ccctgccatt ttgcctctcc 2580
tgtctcccac cccctgcccc agacccagga gccccccctga ggctttgcct tgcctgcata 2640
tttgtttcgc tcttactcag tttgggaatt caaattgtcc tgcagaggtt cattcccctg 2700

acccttccc cacattggta agagtagctg ggttttctaa gccactctct ggaatctctt 2760
tgtgttaggg tctcgatttg aggacattca tttcttcagc agcccattag caactgagag 2820
cccagggatg tcctacagga tagtttcata gtgacaggtg gcacttggct aatagaatat 2880
ggctgatatt gtcattaatc attttgtacc ttgacatggg ttgtctaata aaactcggac 2940
ccttcttgtg aaatcagtta aataagactt gtctcggtca cctgtgccct gtccagactc 3000
gaggcagtgg taacactgca cagtgctatg tggcttctct ttgaggattt ttgggttttg 3060
taactaaatt cttgctgccc tcatactttt tatgtattag aatcatattc gtattgccct 3120
tttaaaacat tgggatcctc caaaggcctg ccccatgtat ttaacagtaa tacaggaagc 3180
atggcaggca ccatgcaaac caaggatgga tggtgcagtc cctgtgtcag tgggcggtgg 3240
tttcctgctg gcctggaatc actcatcacc tgattgattg gctctgtggt cctgggcagg 3300
tgcctcatag gtgtgtggat atgatgacgt ttctttaaaa tgtatgtatt taacaaatac 3360
ttaattgtat taaggtcatg taccaaggat ttgataaagt ttaaataatt tactctctac 3420
ttttatccat tttatccatt ttaactcatg taatcctcat gtgagtattc ctgtttaaca 3480
cttgagtaaa ctgaggcaca gagaacataa gttgcatgcc atagtcacac actgtgaaag 3540
tgaaaagaga atgtgtgcaa aacacgtcac agtcctggtt tctgagtaaa ggcaggctgt 3600
tatctttaga atcaagctat cacagggaga taggcaatgc tgtgggtgtt ggaggaaggt 3660
gagagcctgt tgctaacaat ttcctggttt taaagctaag gctgatttta ttgggaagat 3720
ctcacatgtg tgtggcccct gagagttccc agtgcctttt atttgcagtc cttccatttg 3780
gacctcctag ctgccccatc aggtcatctc cagggctcag aggggtgaga ccatttccca 3840
aggtcacaga accagctctc tagtcaccac cctgcctctc cctctcaccc agagtcagta 3900
ccagttttat ggctttatta caaactgctg ggtccctccc attttcaact tgattgatgg 3960
gatgtcatcc cttatcctgt ctgacatttg cctctggcct ggttgctaga agtttgcccc 4020
aggggcaaga gttgaaattt ggcttcctga ggtgggcttt gtggtttgcg tccctaaagt 4080
gagcccacta ctggttgctt gtccatggcc aacaccagaa atcccctgag cactacctgg 4140
gtctcattcc aagaaggaag agggtcagga gacctgggga gtctcatatt ccaagttctt 4200
[0067] ctttctttct gggagcagtg ggcagttcat ggtgttaggg cactcacccc cacagactgg 4260
caaaccctgc aggacttccg tggctgaggc tgtgaccgga ggccaggaat gccgttgggt 4320
ggattgtgag tgaatgggcc ctttgagctg ccctctagag agcaaatcca gtttcctgga 4380
gctcctgaat gaatatctgt actggctcgc tcagatgcag aagctccatt gaccatgagg 4440
ccttgtgaac atcagtggcc acaggcccag tgtgctgctt ggcactgcac tagtttagga 4500
cctgcagcat gtaggtagcg tcctagtgtt tataatacaa agctgctctg cacagctttt 4560
ctgattcttc ttgcaatctc ctgaggatta tctgccccat ttttaaaacg aggtggaata 4620
cccaaggtca tgtagccagt gagtgctctg gaaagccaaa gcagctcatc ccttcctggg 4680
gaccacactg ctctgctcca ccagaccaca ctatgaaata ggaataagtg ctcctgttgc 4740
aggactgctg ggaaaacagg tggtgtggga cttaagtcac cataattttg aagacttgca 4800
tgcagagggc tccaggaatt gtagacatta aggaatttca ctttcagttc tacccactac 4860
ttaagtactt gtcatgtact cttagaggag gccagtaatg atcagaacca ttttacttta 4920
aaattaataa tattgtatta gagaatatat taaatggtta tattgggtta tgttaggata 4980
tatacttgaa tggaaataca tgtactatta gcaatcatat ttcatttatc cctgtaatta 5040
gacaagaaag cataatatag ctctactcat gggtacacat accagtgtat aagattttta 5100
gaagtttact ttttaaaaat aaaagcaaaa tgtaagatct taaaaaaaaa aaaaaaaaa 5159

<210> 50
<211> 5416
<212> DNA
<213> 智人
<400> 50

agtgggccgc catgttgtcg gagtgaaagg taagggggag cgagagcgcc agagagagaa 60
gatcgggggg ctgaaatcca tcttcatcct accgctccgc ccgtgttggt ggaatgagcg 120
ttgcatgtgt cttgaagaga aaagcagtgc tttggcagga ctctttcagc ccccacctga 180
aacatcaccc tcaagaacca gctaatccca acatgcctgt tgttttgaca tctggaacag 240
ggtcgcaagc gcagccacaa ccagctgcaa atcaggctct tgcagctggg actcactcca 300

gccctgtccc aggatctata ggagttgcag gccgttccca ggacgacgct atggtggact 360
acttctttca gaggcagcat ggtgagcagc ttgggggagg aggaagtgga ggaggcggct 420
ataataatag caaacatcga tggcctactg gggataacat tcatgcagaa catcaggtgc 480
gttccatgga tgaactgaat catgattttc aagcacttgc tctggaggga agagcgatgg 540
gagagcagct cttgccaggt aaaaagtttt gggaaacaga tgaatccagc aaagatggac 600
caaaaggaat attcctgggt gatcaatggc gagacagtgc ctggggaaca tcagatcatt 660
cagtttccca gccaatcatg gtgcagagaa gacctggtca gagtttccat gtgaacagtg 720
aggtcaattc tgtactgtcc ccacgatcgg agagtggggg actaggcgtt agcatggtgg 780
agtatgtgtt gagctcatcc ccgggcgatt cctgtctaag aaaaggagga tttggcccaa 840
gggatgcaga cagtgatgaa aacgacaaag gtgaaaagaa gaacaagggt acgtttgatg 900
gagataagct aggagatttg aaggaggagg gtgatgtgat ggacaagacc aatggtttac 960
cagtgcagaa tgggattgat gcagacgtca aagattttag ccgtacccct ggtaattgcc 1020
agaactctgc taatgaagtg gatcttctgg gtccaaacca gaatggttct gagggcttag 1080
cccagctgac cagcaccaat ggtgccaagc ctgtggagga tttctccaac atggagtccc 1140
agagtgtccc cttggacccc atggaacatg tgggcatgga gcctcttcag tttgattatt 1200
caggcacgca ggtacctgtg gactcagcag cagcaactgt gggacttttt gactacaatt 1260
ctcaacaaca gctgttccaa agacctaatg cgcttgctgt ccagcagttg acagctgctc 1320
agcagcagca gtatgcactg gcagctgctc atcagccgca catcggttta gctcccgctg 1380
cgtttgtccc caatccatac atcatcagcg ctgctccccc agggacggac ccctacacag 1440
ctggattggc tgcagcagcg acactaggcc cagctgtggt ccctcaccag tattatggag 1500
ttactccctg gggagtctac cctgccagtc ttttccagca gcaagctgcc gctgccgctg 1560
cagcaactaa ttcagctaat caacagacca ccccacaggc tcagcaagga cagcagcagg 1620
ttctccgtgg aggagccagc caacgtcctt tgaccccaaa ccagaaccag cagggacagc 1680
aaacggatcc ccttgtggca gctgcagcag tgaattctgc ccttgcattt ggacaaggtc 1740
tggcagcagg catgccaggt tatccggtgt tggctcctgc tgcttactat gaccaaactg 1800
[0068] gtgcccttgt agtgaatgca ggcgcgagaa atggtcttgg agctcctgtt cgacttgtag 1860
ctcctgcccc agtcatcatt agttcctcag ctgcacaagc agctgttgca gcagccgcag 1920
cttcagcaaa tggagcagct ggtggtcttg ctggaacaac aaatggacca tttcgccctt 1980
taggaacaca gcagcctcag ccccagcccc agcagcagcc caataacaac ctggcatcca 2040
gttctttcta cggcaacaac tctctgaaca gcaattcaca gagcagctcc ctcttctccc 2100
agggctctgc ccagcctgcc aacacatcct tgggattcgg aagtagcagt tctctcggcg 2160
ccaccctggg atccgccctt ggagggtttg gaacagcagt tgcaaactcc aacactggca 2220
gtggctcccg ccgtgactcc ctgactggca gcagtgacct ttataagagg acatcgagca 2280
gcttgacccc cattggacac agtttttata acggccttag cttttcctcc tctcctggac 2340
ccgtgggcat gcctctccct agtcagggac caggacattc acagacacca cctccttccc 2400
tctcttcaca tggatcctct tcaagcttaa acctgggagg actcacgaat ggcagtggaa 2460
gatacatctc tgctgctcca ggcgctgaag ccaagtaccg cagtgcaagc agcgcctcca 2520
gcctcttcag cccgagcagc actcttttct cttcctctcg tttgcgatat ggaatgtctg 2580
atgtcatgcc ttctggcagg agcaggcttt tggaagattt tcgaaacaac cggtacccca 2640
atttacaact gcgggagatt gctggacata taatggaatt ttcccaagac cagcatgggt 2700
ccagattcat tcagctgaaa ctggagcgtg ccacaccagc tgagcgccag cttgtcttca 2760
atgaaatcct ccaggctgcc taccaactca tggtggatgt gtttggtaat tacgtcattc 2820
agaagttctt tgaatttggc agtcttgaac agaagctggc tttggcagaa cggattcgag 2880
gccacgtcct gtcattggca ctacagatgt atggctgccg tgttatccag aaagctcttg 2940
agtttattcc ttcagaccag caggtaatta atgagatggt tcgggaacta gatggccatg 3000
tcttgaagtg tgtgaaagat cagaatggca atcacgtggt tcagaaatgc attgaatgtg 3060
tacagcccca gtctttgcaa tttatcatcg atgcgtttaa gggacaggta tttgccttat 3120
ccacacatcc ttatggctgc cgagtgattc agagaatcct ggagcactgt ctccctgacc 3180
agacactccc tattttagag gagcttcacc agcacacaga gcagcttgta caggatcaat 3240
atggaaatta tgtaatccaa catgtactgg agcacggtcg tcctgaggat aaaagcaaaa 3300
ttgtagcaga aatccgaggc aatgtacttg tattgagtca gcacaaattt gcaagcaatg 3360

ttgtggagaa gtgtgttact cacgcctcac gtacggagcg cgctgtgctc atcgatgagg 3420
tgtgcaccat gaacgacggt ccccacagtg ccttatacac catgatgaag gaccagtatg 3480
ccaactacgt ggtccagaag atgattgacg tggcggagcc aggccagcgg aagatcgtca 3540
tgcataagat ccggccccac atcgcaactc ttcgtaagta cacctatggc aagcacattc 3600
tggccaagct ggagaagtac tacatgaaga acggtgttga cttagggccc atctgtggcc 3660
cccctaatgg tatcatctga ggcagtgtca cccgctgttc cctcattccc gctgacctca 3720
ctggcccact ggcaaatcca accagcaacc agaaatgttc tagtgtagag tctgagacgg 3780
gcaagtggtt gctccaggat tactccctcc tccaaaaaag gaatcaaatc cacgagtgga 3840
aaagcctttg taaatttaat tttattacac ataacatgta ctatttttt taattgacta 3900
attgccctgc tgttttactg gtgtatagga tacttgtaca taggtaacca atgtacatgg 3960
gaggccacat attttgttca ctgttgtatc tatatttcac atgtggaaac tttcagggtg 4020
gttggtttaa caaaaaaaaa aagctttaaa aaaaaaagaa aaaaaggaaa aggtttttag 4080
ctcatttgcc tggccggcaa gttttgcaaa tagctcttcc ccacctcctc attttagtaa 4140
aaaacaaaca aaaacaaaaa aacctgagaa gtttgaattg tagttaaatg accccaaact 4200
ggcatttaac actgtttata aaaaatatat atatatatat atatatatat aatgaaaaag 4260
gtttcagagt tgctaaagct tcagtttgtg acattaagtt tatgaaattc taaaaaatgc 4320
ctttttgga gactatatta tgctgaagaa ggctgttcgt gaggaggaga tgcgagcacc 4380
cagaacgtct tttgaggctg ggcgggtgtg attgtttact gcctactgga ttttttttcta 4440
ttaacattga aaggtaaaat ctgattattt agcatgagaa aaaaaaatcc aactctgctt 4500
ttggtcttgc ttctataaat atatagtgta tacttggtgt agactttgca tatatacaaa 4560
tttgtagtat tttcttgttt tgatgtctaa tctgtatcta taatgtaccc tagtagtcga 4620
acatactttt gattgtacaa ttgtacattt gtatacctgt aatgtaaatg tggagaagtt 4680
tgaatcaaca taaacacgtt ttttggtaag aaaagagaat tagccagccc tgtgcattca 4740
gtgtatattc tcacctttta tggtcgtagc atatagtgtt gtatattgta aattgtaatt 4800
tcaaccagaa gtaaattttt ttcttttgaa ggaataaatg ttctttatac agcctagtta 4860
[0069] atgtttaaaa agaaaaaaat agcttggttt tatttgtcat ctagtctcaa gtatagcgag 4920
attctttcta aatgttattc aagattgagt tctcactagt gtttttttaa tcctaaaaaa 4980
gtaatgtttt gattttgtga cagtcaaaag gacgtgcaaa agtctagcct tgcccgagct 5040
ttccttacaa tcagagcccc tctcaccttg taaagtgtga atcgcccttc ccttttgtac 5100
agaagatgaa ctgtattttg cattttgtct acttgtaagt gaatgtaaca tactgtcaat 5160
tttccttgtt tgaatataga attgtaacac tacacggtgt acatttccag agccttgtgt 5220
atatttccaa tgaacttttt tgcaagcaca cttgtaacca tatgtgtata attaacaaac 5280
ctgtgtatgc ttatgcctgg gcaactattt tttgtaactc ttgtgtagat tgtctctaaa 5340
caatgtgtga tctttatttt gaaaaataca gaactttgga atctgaaaaa aaaaaaaaaa 5400
aaaaaaaaaa aaaaaa 5416

<210> 51
<211> 1940
<212> DNA
<213> 智人
<400> 51

gagtgagcgg cgcggggcca atcagcgtgc gccgttccga aagttgcctt ttatggctcg 60
agcggccgcg gcggcgccct ataaaaccca gcggcgcgac gcgccaccac cgccgagacc 120
gcgtccgccc cgcgagcaca gagcctcgcc tttgccgatc cgccgcccgt ccacacccgc 180
cgccagctca ccatggatga tgatatcgcc gcgctcgtcg tcgacaacgg ctccggcatg 240
tgcaaggccg gcttcgcggg cgacgatgcc ccccgggccg tcttcccctc catcgtgggg 300
cgccccaggc accagggcgt gatggtgggc atgggtcaga aggattccta tgtgggcgac 360
gaggcccaga gcaagagagg catcctcacc ctgaagtacc ccatcgagca cggcatcgtc 420
accaactggg acgacatgga gaaaatctgg caccacacct tctacaatga gctgcgtgtg 480
gctcccgagg agcaccccgt gctgctgacc gaggcccccc tgaaccccaa ggccaaccgc 540
gagaagatga cccagatcat gtttgagacc ttcaacaccc cagccatgta cgttgctatc 600
caggctgtgc tatccctgta cgcctctggc cgtaccactg gcatcgtgat ggactccggt 660

gacggggtca cccacactgt gcccatctac gaggggtatg ccctccccca tgccatcctg 720
cgtctggacc tggctggccg ggacctgact gactacctca tgaagatcct caccgagcgc 780
ggctacagct tcaccaccac ggccgagcgg gaaatcgtgc gtgacattaa ggagaagctg 840
tgctacgtcg ccctggactt cgagcaagag atggccacgg ctgcttccag ctcctccctg 900
gagaagagct acgagctgcc tgacggccag gtcatcacca ttggcaatga gcggttccgc 960
tgccctgagg cactcttcca gccttccttc ctgggcatgg agtcctgtgg catccacgaa 1020
actaccttca actccatcat gaagtgtgac gtggacatcc gcaaagacct gtacgccaac 1080
acagtgctgt ctggcggcac caccatgtac cctggcattg ccgacaggat gcagaaggag 1140
atcactgccc tggcacccag cacaatgaag atcaagatca ttgctcctcc tgagcgcaag 1200
tactccgtgt ggatcggcgg ctccatcctg gcctcgctgt ccaccttcca gcagatgtgg 1260
atcagcaagc aggagtatga cgagtccggc ccctccatcg tccaccgcaa atgcttctag 1320
gcggactatg acttagttgc gttacaccct ttcttgacaa aacctaactt gcgcagaaaa 1380
caagatgaga ttggcatggc tttatttgtt tttttgtttt tgttttggtt ttttttttt 1440
ttttggcttg actcaggatt taaaaactgg aacggtgaag gtgacagcag tcggttggag 1500
cgagcatccc ccaaagttca caatgtggcc gaggactttg attgcacatt gttgtttttt 1560
taatagtcat tccaaatatg agatgcgttg ttacaggaag tcccttgcca tcctaaaagc 1620
caccccactt ctctctaagg agaatggccc agtcctctcc caagtccaca caggggaggt 1680
gatagcattg ctttcgtgta aattatgtaa tgcaaaattt ttttaatctt cgccttaata 1740
ctttttttatt ttgttttatt ttgaatgatg agccttcgtg ccccccccttc ccccttttt 1800
gtcccccaac ttgagatgta tgaaggcttt tggtctccct gggagtgggt ggaggcagcc 1860
agggcttacc tgtacactga cttgagacca gttgaataaa agtgcacacc ttaaaaatga 1920
ggaaaaaaaa aaaaaaaaaa 1940

<210> 52
<211> 1309
<212> DNA
[0070] <213> 智人
<400> 52

gctctctgct cctcctgttc gacagtcagc cgcatcttct tttgcgtcgc cagccgagcc 60
acatcgctca gacaccatgg ggaaggtgaa ggtcggagtc aacggatttg gtcgtattgg 120
gcgcctggtc accagggctg cttttaactc tggtaaagtg gatattgttg ccatcaatga 180
ccccttcatt gacctcaact acatggttta catgttccaa tatgattcca cccatggcaa 240
attccatggc accgtcaagg ctgagaacgg gaagcttgtc atcaatggaa atcccatcac 300
catcttccag gagcgagatc cctccaaaat caagtggggc gatgctggcg ctgagtacgt 360
cgtggagtcc actggcgtct tcaccaccat ggagaaggct ggggctcatt tgcaggggggg 420
agccaaaagg gtcatcatct ctgccccctc tgctgatgcc cccatgttcg tcatgggtgt 480
gaaccatgag aagtatgaca acagcctcaa gatcatcagc aatgcctcct gcaccaccaa 540
ctgcttagca cccctggcca aggtcatcca tgacaacttt ggtatcgtgg aaggactcat 600
gaccacagtc catgccatca ctgccaccca gaagactgtg gatggcccct ccgggaaact 660
gtggcgtgat ggccgcgggg ctctccagaa catcatccct gcctctactg gcgctgccaa 720
ggctgtgggc aaggtcatcc ctgagctgaa cgggaagctc actggcatgg ccttccgtgt 780
ccccactgcc aacgtgtcag tggtggacct gacctgccgt ctagaaaaac ctgccaaata 840
tgatgacatc aagaaggtgg tgaagcaggc gtcggagggc cccctcaagg gcatcctggg 900
ctacactgag caccaggtgg tctcctctga cttcaacagc gacacccact cctccacctt 960
tgacgctggg gctggcattg ccctcaacga ccactttgtc aagctcattt cctggtatga 1020
caacgaattt ggctacagca acagggtggt ggacctcatg gcccacatgg cctccaagga 1080
gtaagacccc tggaccacca gccccagcaa gagcacaaga ggaagagaga gaccctcact 1140
gctggggagt ccctgccaca ctcagtcccc caccacactg aatctcccct cctcacagtt 1200
gccatgtaga ccccttgaag aggggagggg cctagggagc cgcaccttgt catgtaccat 1260
caataaagta ccctgtgctc aaccagttaa aaaaaaaaaa aaaaaaaaa 1309

<210> 53
<211> 2321

<212> DNA
<213> 智人
<400> 53
gtcctcaacc aagatggcgc ggatggcttc aggcgcatca cgacaccggc gcgtcacgcg 60
acccgcccta cgggcacctc ccgcgctttt cttagcgccg cagacggtgg ccgagcgggg 120
gaccgggaag catggcccgg gggtcggcgg ttgcctgggc ggcgctcggg ccgttgttgt 180
ggggctgcgc gctggggctg cagggcggga tgctgtaccc ccaggagagc ccgtcgcggg 240
agtgcaagga gctggacggc ctctggagct tccgcgccga cttctctgac aaccgacgcc 300
ggggcttcga ggagcagtgg taccggcggc cgctgtggga gtcaggcccc accgtggaca 360
tgccagttcc ctccagcttc aatgacatca gccaggactg gcgtctgcgg cattttgtcg 420
gctgggtgtg gtacgaacgg gaggtgatcc tgccggagcg atggacccag gacctgcgca 480
caagagtggt gctgaggatt ggcagtgccc attcctatgc catcgtgtgg gtgaatgggg 540
tcgacacgct agagcatgag gggggctacc tccccttcga ggccgacatc agcaacctgg 600
tccaggtggg gcccctgccc tcccggctcc gaatcactat cgccatcaac aacacactca 660
cccccaccac cctgccacca gggaccatcc aatacctgac tgacacctcc aagtatccca 720
agggttactt tgtccagaac acatattttg acttttcaa ctacgctgga ctgcagcggt 780
ctgtacttct gtacacgaca cccaccacct acatcgatga catcaccgtc accaccagcg 840
tggagcaaga cagtgggctg gtgaattacc agatctctgt caagggcagt aacctgttca 900
agttggaagt gcgtcttttg gatgcagaaa acaaagtcgt ggcgaatggg actgggaccc 960
agggccaact taaggtgcca ggtgtcagcc tctggtggcc gtacctgatg cacgaacgcc 1020
ctgcctatct gtattcattg gaggtgcagc tgactgcaca gacgtcactg gggcctgtgt 1080
ctgacttcta cacactccct gtggggatcc gcactgtggc tgtcaccaag agccagttcc 1140
tcatcaatgg gaaacctttc tatttccacg gtgtcaacaa gcatgaggat gcggacatcc 1200
gagggaaggg cttcgactgg ccgctgctgg tgaaggactt caacctgctt cgctggcttg 1260
gtgccaacgc tttccgtacc agccactacc cctatgcaga ggaagtgatg cagatgtgtg 1320
[0071] accgctatgg gattgtggtc atcgatgagt gtcccggcgt gggcctggcg ctgccgcagt 1380
tcttcaacaa cgtttctctg catcaccaca tgcaggtgat ggaagaagtg gtgcgtaggg 1440
acaagaacca ccccgcggtc gtgatgtggt ctgtggccaa cgagcctgcg tcccacctag 1500
aatctgctgg ctactacttg aagatggtga tcgctcacac caaatccttg gacccctccc 1560
ggcctgtgac ctttgtgagc aactctaact atgcagcaga caaggggggct ccgtatgtgg 1620
atgtgatctg tttgaacagc tactactctt ggtatcacga ctacgggcac ctggagttga 1680
ttcagctgca gctggccacc cagtttgaga actggtataa gaagtatcag aagcccatta 1740
ttcagagcga gtatggagca gaaacgattg cagggtttca ccaggatcca cctctgatgt 1800
tcactgaaga gtaccagaaa agtctgctag agcagtacca tctgggtctg gatcaaaaac 1860
gcagaaaata cgtggttgga gagctcattt ggaattttgc cgatttcatg actgaacagt 1920
caccgacgag agtgctgggg aataaaaagg ggatcttcac tcggcagaga caaccaaaaa 1980
gtgcagcgtt ccttttgcga gagagatact ggaagattgc caatgaaacc aggtatcccc 2040
actcagtagc caagtcacaa tgtttggaaa acagcctgtt tacttgagca agactgatac 2100
cacctgcgtg tcccttcctc cccgagtcag ggcgacttcc acagcagcag aacaagtgcc 2160
tcctggactg ttcacggcag accagaacgt ttctggcctg ggttttgtgg tcatctattc 2220
tagcagggaa cactaaaggt ggaaataaaa gattttctat tatggaaata aagagttggc 2280
atgaaagtgg ctactgaaaa aaaaaaaaaa aaaaaaaaaa a 2321
<210> 54
<211> 1229
<212> DNA
<213> 智人
<400> 54
gtctgacggg cgatggcgca gccaatagac aggagcgcta tccgcggttt ctgattggct 60
actttgttcg cattataaaa ggcacgcgcg ggcgcgaggc ccttctctcg ccaggcgtcc 120
tcgtggaagt gacatcgtct ttaaaccctg cgtggcaatc cctgacgcac cgccgtgatg 180
cccagggaag acagggcgac ctggaagtcc aactacttcc ttaagatcat ccaactattg 240

gatgattatc cgaaatgttt cattgtggga gcagacaatg tgggctccaa gcagatgcag 300
cagatccgca tgtcccttcg cgggaaggct gtggtgctga tgggcaagaa caccatgatg 360
cgcaaggcca tccgagggca cctggaaaac aacccagctc tggagaaact gctgcctcat 420
atccgggggа atgtgggctt tgtgttcacc aaggaggacc tcactgagat cagggacatg 480
ttgctggcca ataaggtgcc agctgctgcc cgtgctggtg ccattgcccc atgtgaagtc 540
actgtgccag cccagaacac tggtctcggg cccgagaaga cctccttttt ccaggcttta 600
ggtatcacca ctaaaatctc caggggcacc attgaaatcc tgagtgatgt gcagctgatc 660
aagactggag acaaagtggg agccagcgaa gccacgctgc tgaacatgct caacatctcc 720
cccttctcct ttgggctggt catccagcag gtgttcgaca atggcagcat ctacaaccct 780
gaagtgcttg atatcacaga ggaaactctg cattctcgct tcctggaggg tgtccgcaat 840
gttgccagtg tctgtctgca gattggctac ccaactgttg catcagtacc ccattctatc 900
atcaacgggt acaaacgagt cctggccttg tctgtggaga cggattacac cttcccactt 960
gctgaaaagg tcaaggcctt cttggctgat ccatctgcct ttgtggctgc tgcccctgtg 1020
gctgctgcca ccacagctgc tcctgctgct gctgcagccc cagctaaggt tgaagccaag 1080
gaagagtcgg aggagtcgga cgaggatatg ggatttggtc tctttgacta atcaccaaaa 1140
agcaaccaac ttagccagtt ttatttgcaa aacaaggaaa taaaggctta cttctttaaa 1200
aagtaaaaaa aaaaaaaaaa aaaaaaaaa 1229

<210> 55
<211> 5234
<212> DNA
<213> 智人
<400> 55

agagcgtcgg gatatcgggt ggcggctcgg gacggaggac gcgctagtgt gagtgcgggc 60
ttctagaact acaccgaccc tcgtgtcctc ccttcatcct gcggggctgg ctggagcggc 120
cgctccggtg ctgtccagca gccataggga gccgcacggg gagcgggaaa gcggtcgcgg 180
[0072] ccccaggcgg ggcggccggg atggagcggg gccgcgagcc tgtggggaag gggctgtggc 240
ggcgcctcga gcggctgcag gttcttctgt gtggcagttc agaatgatgg atcaagctag 300
atcagcattc tctaacttgt ttggtggaga accattgtca tatacccggt tcagcctggc 360
tcggcaagta gatggcgata acagtcatgt ggagatgaaa cttgctgtag atgaagaaga 420
aaatgctgac aataacacaa aggccaatgt cacaaaacca aaaaggtgta gtggaagtat 480
ctgctatggg actattgctg tgatcgtctt tttcttgatt ggatttatga ttggctactt 540
gggctattgt aaaggggtag aaccaaaaac tgagtgtgag agactggcag gaaccgagtc 600
tccagtgagg gaggagccag gagaggactt ccctgcagca cgtcgcttat attgggatga 660
cctgaagaga aagttgtcgg agaaactgga cagcacagac ttcaccggca ccatcaagct 720
gctgaatgaa aattcatatg tccctcgtga ggctggatct caaaaagatg aaaatcttgc 780
gttgtatgtt gaaaatcaat ttcgtgaatt taaactcagc aaagtctggc gtgatcaaca 840
ttttgttaag attcaggtca aagacagcgc tcaaaactcg gtgatcatag ttgataagaa 900
cggtagactt gtttacctgg tggagaatcc tgggggttat gtggcgtata gtaaggctgc 960
aacagttact ggtaaactgg tccatgctaa ttttggtact aaaaaaagatt ttgaggattt 1020
atacactcct gtgaatggat ctatagtgat tgtcagagca gggaaaatca cctttgcaga 1080
aaaggttgca aatgctgaaa gcttaaatgc aattggtgtg ttgatataca tggaccagac 1140
taaatttccc attgttaacg cagaactttc attctttgga catgctcatc tggggacagg 1200
tgacccttac acacctggat tcccttcctt caatcacact cagtttccac catctcggtc 1260
atcaggattg cctaatatac ctgtccagac aatctccaga gctgctgcag aaaagctgtt 1320
tgggaatatg gaaggagact gtccctctga ctggaaaaca gactctacat gtaggatggt 1380
aacctcagaa agcaagaatg tgaagctcac tgtgagcaat gtgctgaaag agataaaaat 1440
tcttaacatc tttggagtta ttaaaggctt tgtagaacca gatcactatg ttgtagttgg 1500
ggcccagaga gatgcatggg gccctggagc tgcaaaatcc ggtgtaggca cagctctcct 1560
attgaaactt gcccagatgt tctcagatat ggtcttaaaa gatgggtttc agcccagcag 1620
aagcattatc tttgccagtt ggagtgctgg agactttgga tcggttggtg ccactgaatg 1680
gctagaggga taccttтcgt ccctgcattt aaaggctttc acttatatta atctggataa 1740

agcggttctt ggtaccagca acttcaaggt ttctgccagc ccactgttgt atacgcttat 1800
tgagaaaaca atgcaaaatg tgaagcatcc ggttactggg caatttctat atcaggacag 1860
caactgggcc agcaaagttg agaaactcac tttagacaat gctgctttcc ctttccttgc 1920
atattctgga atcccagcag tttctttctg tttttgcgag gacacagatt atccttattt 1980
gggtaccacc atggacacct ataaggaact gattgagagg attcctgagt tgaacaaagt 2040
ggcacgagca gctgcagagg tcgctggtca gttcgtgatt aaactaaccc atgatgttga 2100
attgaacctg gactatgaga ggtacaacag ccaactgctt tcatttgtga gggatctgaa 2160
ccaatacaga gcagacataa aggaaatggg cctgagttta cagtggctgt attctgctcg 2220
tggagacttc ttccgtgcta cttccagact aacaacagat ttcgggaatg ctgagaaaac 2280
agacagattt gtcatgaaga aactcaatga tcgtgtcatg agagtggagt atcacttcct 2340
ctctccctac gtatctccaa aagagtctcc tttccgacat gtcttctggg gctccggctc 2400
tcacacgctg ccagctttac tggagaactt gaaactgcgt aaacaaaata acggtgcttt 2460
taatgaaacg ctgttcagaa accagttggc tctagctact tggactattc agggagctgc 2520
aaatgccctc tctggtgacg tttgggacat tgacaatgag ttttaaatgt gatacccata 2580
gcttccatga gaacagcagg gtagtctggt ttctagactt gtgctgatcg tgctaaattt 2640
tcagtagggc tacaaaacct gatgttaaaa ttccatccca tcatcttggt actactagat 2700
gtctttaggc agcagctttt aatacagggt agataacctg tacttcaagt taaagtgaat 2760
aaccacttaa aaaatgtcca tgatggaata ttcccctatc tctagaattt taagtgcttt 2820
gtaatgggaa ctgcctcttt cctgttgttg ttaatgaaaa tgtcagaaac cagttatgtg 2880
aatgatctct ctgaatccta agggctggtc tctgctgaag gttgtaagtg gtcgcttact 2940
ttgagtgatc ctccaacttc atttgatgct aaataggaga taccaggttg aaagaccttc 3000
tccaaatgag atctaagcct ttccataagg aatgtagctg gtttcctcat tcctgaaaga 3060
aacagttaac tttcagaaga gatgggcttg ttttcttgcc aatgaggtct gaaatggagg 3120
tccttctgct ggataaaatg aggttcaact gttgattgca ggaataaggc cttaatatgt 3180
taacctcagt gtcatttatg aaaagagggg accagaagcc aaagacttag tatattttct 3240
[0073] tttcctctgt cccttccccc ataagcctcc atttagttct ttgttatttt tgtttcttcc 3300
aaagcacatt gaaagagaac cagtttcagg tgtttagttg cagactcagt ttgtcagact 3360
ttaaagaata atatgctgcc aaattttggc caaagtgtta atcttagggg agagctttct 3420
gtccttttgg cactgagata tttattgttt atttatcagt gacagagttc actataaatg 3480
gtgttttttt aatagaatat aattatcgga agcagtgcct tccataatta tgacagttat 3540
actgtcggtt ttttttaaat aaaagcagca tctgctaata aaacccaaca gatactggaa 3600
gttttgcatt tatggtcaac acttaagggt tttagaaaac agccgtcagc caaatgtaat 3660
tgaataaagt tgaagctaag atttagagat gaattaaatt taattagggg ttgctaagaa 3720
gcgagcactg accagataag aatgctggtt ttcctaaatg cagtgaattg tgaccaagtt 3780
ataaatcaat gtcacttaaa ggctgtggta gtactcctgc aaaattttat agctcagttt 3840
atccaaggtg taactctaat tcccattttg caaaatttcc agtacctttg tcacaatcct 3900
aacacattat cgggagcagt gtcttccata atgtataaag aacaaggtag tttttaccta 3960
ccacagtgtc tgtatcggag acagtgatct ccatatgtta cactaagggt gtaagtaatt 4020
atcgggaaca gtgtttccca taattttctt catgcaatga catcttcaaa gcttgaagat 4080
cgttagtatc taacatgtat cccaactcct ataattccct atcttttagt tttagttgca 4140
gaaacatttt gtggtcatta agcattgggt gggtaaattc aaccactgta aaatgaaatt 4200
actacaaaat ttgaaattta gcttgggttt ttgttacctt tatggtttct ccaggtcctc 4260
tacttaatga gatagtagca tacatttata atgtttgcta ttgacaagtc attttaactt 4320
tatcacatta tttgcatgtt acctcctata aacttagtgc ggacaagttt taatccagaa 4380
ttgacctttt gacttaaagc agagggactt tgtatagaag gtttgggggc tgtggggaag 4440
gagagtcccc tgaaggtctg acacgtctgc ctacccattc gtggtgatca attaaatgta 4500
ggtatgaata agttcgaagc tccgtgagtg aaccatcatt ataaacgtga tgatcagctg 4560
tttgtcatag ggcagttgga aacggcctcc tagggaaaag ttcatagggt ctcttcaggt 4620
tcttagtgtc acttacctag atttacagcc tcacttgaat gtgtcactac tcacagtctc 4680
tttaatcttc agttttatct ttaatctcct cttttatctt ggactgacat ttagcgtagc 4740
taagtgaaaa ggtcatagct gagattcctg gttcgggtgt tacgcacacg tacttaaatg 4800

aaagcatgtg gcatgttcat cgtataacac aatatgaata cagggcatgc attttgcagc 4860
agtgagtctc ttcagaaaac ccttttctac agttagggtt gagttacttc ctatcaagcc 4920
agtacgtgct aacaggctca atattcctga atgaaatatc agactagtga caagctcctg 4980
gtcttgagat gtcttctcgt taaggagatg ggccttttgg aggtaaagga taaaatgaat 5040
gagttctgtc atgattcact attctagaac ttgcatgacc tttactgtgt tagctctttg 5100
aatgttcttg aaattttaga ctttctttgt aaacaaatga tatgtcctta tcattgtata 5160
aaagctgtta tgtgcaacag tgtggagatt ccttgtctga tttaataaaa tacttaaaca 5220
ctgaaaaaaa aaaa 5234

<210> 56
<211> 1869
<212> DNA
<213> 智人
<400> 56

tacctggttg atcctgccag tagcatatgc ttgtctcaaa gattaagcca tgcatgtcta 60
agtacgcacg gccggtacag tgaaactgcg aatggctcat taaatcagtt atggttcctt 120
tggtcgctcg ctcctctccc acttggataa ctgtggtaat tctagagcta atacatgccg 180
acgggcgctg acccccttcg cgggggggat gcgtgcattt atcagatcaa aaccaacccg 240
gtcagcccct ctccggcccc ggccgggggg cgggcgccgg cggctttggt gactctagat 300
aacctcgggc cgatcgcacg ccccccgtgg cggcgacgac ccattcgaac gtctgcccta 360
tcaactttcg atggtagtcg ccgtgcctac catggtgacc acgggtgacg gggaatcagg 420
gttcgattcc ggagagggag cctgagaaac ggctaccaca tccaaggaag gcagcaggcg 480
cgcaaattac ccactcccga cccggggagg tagtgacgaa aaataacaat acaggactct 540
ttcgaggccc tgtaattgga atgagtccac tttaaatcct ttaacgagga tccattggag 600
ggcaagtctg gtgccagcag ccgcggtaat tccagctcca atagcgtata ttaaagttgc 660
tgcagttaaa aagctcgtag ttggatcttg ggagcgggcg ggcggtccgc cgcgaggcga 720
[0074] gccaccgccc gtccccgccc cttgcctctc ggcgcccccc cgatgctctt agctgagtgt 780
cccgcggggc ccgaagcgtt tactttgaaa aaattagagt gttcaaagca ggcccgagcc 840
gcctggatac cgcagctagg aataatggaa taggaccgcg gttctatttt gttggttttc 900
ggaactgagg ccatgattaa gagggacggc cgggggcatt cgtattgcgc cgctagaggt 960
gaaattcttg gaccggcgca agacggacca gagcgaaagc atttgccaag aatgttttca 1020
ttaatcaaga acgaaagtcg gaggttcgaa gacgatcaga taccgtcgta gttccgacca 1080
taaacgatgc cgaccggcga tgcggcggcg ttattcccat gacccgccgg gcagcttccg 1140
ggaaaccaaa gtctttgggt tccgggggga gtatggttgc aaagctgaaa cttaaaggaa 1200
ttgacggaag ggcaccacca ggagtggagc ctgcggctta atttgactca acacgggaaa 1260
cctcacccgg cccggacacg gacaggattg acagattgat agctctttct cgattccgtg 1320
ggtggtggtg catggccgtt cttagttggt ggagcgattt gtctggttaa ttccgataac 1380
gaacgagact ctggcatgct aactagttac gcgacccccg agcggtcggc gtcccccaac 1440
ttcttagagg gacaagtggc gttcagccac ccgagattga gcaataacag gtctgtgatg 1500
cccttagatg tccggggctg cacgcgcgct acactgactg gctcagcgtg tgcctaccct 1560
acgccggcag gcgcgggtaa cccgttgaac cccattcgtg atggggatcg gggattgcaa 1620
ttattcccca tgaacgagga attcccagta agtgcgggtc ataagcttgc gttgattaag 1680
tccctgccct ttgtacacac cgcccgtcgc tactaccgat tggatggttt agtgaggccc 1740
tcggatcggc cccgccgggg tcggcccacg gccctggcgg agcgctgaga agacggtcga 1800
acttgactat ctagaggaag taaaagtcgt aacaaggttt ccgtaggtga acctgcggaa 1860
ggatcatta 1869

<210> 57
<211> 2288
<212> DNA
<213> 智人
<400> 57

ggggccgaac gtggtataaa aggggcggga ggccaggctc gtgccgtttt gcagacgcca 60

ccgccgagga aaaccgtgta ctattagcca tggtcaaccc caccgtgttc ttcgacattg 120
ccgtcgacgg cgagcccttg ggccgcgtct cctttgagct gtttgcagac aaggtcccaa 180
agacagcaga aaattttcgt gctctgagca ctggagagaa aggatttggt tataagggtt 240
cctgctttca cagaattatt ccagggttta tgtgtcaggg tggtgacttc acacgccata 300
atggcactgg tggcaagtcc atctatgggg agaaatttga agatgagaac ttcatcctaa 360
agcatacggg tcctggcatc ttgtccatgg caaatgctgg acccaacaca aatggttccc 420
agtttttcat ctgcactgcc aagactgagt ggttggatgg caagcatgtg gtgtttggca 480
aagtgaaaga aggcatgaat attgtggagg ccatggagcg ctttgggtcc aggaatggca 540
agaccagcaa gaagatcacc attgctgact gtggacaact cgaataagtt tgacttgtgt 600
tttatcttaa ccaccagatc attccttctg tagctcagga gagcacccct ccaccccatt 660
tgctcgcagt atcctagaat ctttgtgctc tcgctgcagt tccctttggg ttccatgttt 720
tccttgttcc ctcccatgcc tagctggatt gcagagttaa gtttatgatt atgaaataaa 780
aactaaataa caattgtcct cgtttgagtt aagagtgttg atgtaggctt tattttaagc 840
agtaatgggt tacttctgaa acatcacttg tttgcttaat tctacacagt acttagattt 900
tttttacttt ccagtcccag gaagtgtcaa tgtttgttga gtggaatatt gaaaatgtag 960
gcagcaactg ggcatggtgg ctcactgtct gtaatgtatt acctgaggca gaagaccacc 1020
tgagggtagg agtcaagatc agcctgggca acatagtgag acgctgtctc tacaaaaaat 1080
aattagcctg gcctggtggt gcatgcctag tcctagctga tctggaggct gacgtgggag 1140
gattgcttga gcctagagtg agctattatc atgccactgt acagcctggg tgttcacaga 1200
tcttgtgtct caaaggtagg cagaggcagg aaaagcaagg agccagaatt aagaggttgg 1260
gtcagtctgc agtgagttca tgcatttaga ggtgttcttc aagatgacta atgtcaaaaa 1320
ttgagacatc tgttgcggtt ttttttttt ttttttcccc tggaatgcag tggcgtgatc 1380
tcagctcact gcagcctccg cctcctgggt tcaagtgatt ctagtgcctc agcctcctga 1440
gtagctggga taatgggcgt gtgccaccat gcccagctaa tttttgtatt tttagtatag 1500
atggggtttc atcattttga ccaggctggt ctcaaactct tgacctcagc tgatgcgcct 1560
[0075] gccttggcct cccaaactgc tgagattaca gatgtgagcc accgcaccct acctcatttt 1620
ctgtaacaaa gctaagcttg aacactgttg atgttcttga gggaagcata ttgggcttta 1680
ggctgtaggt caagtttata catcttaatt atggtggaat tcctatgtag agtctaaaaa 1740
gccaggtact tggtgctaca gtcagtctcc ctgcagaggg ttaaggcgca gactacctgc 1800
agtgaggagg tactgcttgt agcatataga gcctctccct agctttggtt atggaggctt 1860
tgaggttttg caaacctgac caatttaagc cataagatct ggtcaaaggg atacccttcc 1920
cactaaggac ttggtttctc aggaaattat atgtacagtg cttgctggca gttagatgtc 1980
aggacaatct aagctgagaa aaccccttct ctgcccacct taacagacct ctagggttct 2040
taacccagca atcaagtttg cctatcctag aggtggcgga tttgatcatt tggtgtgttg 2100
ggcaattttt gttttactgt ctggttcctt ctgcgtgaat taccaccacc accacttgtg 2160
catctcagtc ttgtgtgttg tctggttacg tattccctgg gtgataccat tcaatgtctt 2220
aatgtacttg tggctcagac ctgagtgcaa ggtggaaata aacatcaaac atcttttcat 2280
tatcccta 2288

<210> 58
<211> 2439
<212> DNA
<213> 智人
<400> 58

gagagcagcg gccgggaagg ggcggtgcgg gaggcggggt gtggggcggt agtgtgggcc 60
ctgttcctgc ccgcgcggtg ttccgcattc tgcaagcctc cggagcgcac gtcggcagtc 120
ggctccctcg ttgaccgaat caccgacctc tctccccagc tgtatttcca aaatgtcgct 180
ttctaacaag ctgacgctgg acaagctgga cgttaaaggg aagcgggtcg ttatgagagt 240
cgacttcaat gttcctatga agaacaacca gataacaaac aaccagagga ttaaggctgc 300
tgtcccaagc atcaaattct gcttggacaa tggagccaag tcggtagtcc ttatgagcca 360
cctaggccgg cctgatggtg tgcccatgcc tgacaagtac tccttagagc cagttgctgt 420
agaactcaaa tctctgctgg gcaaggatgt tctgttcttg aaggactgtg taggcccaga 480

agtggagaaa gcctgtgcca acccagctgc tgggtctgtc atcctgctgg agaacctccg 540
ctttcatgtg gaggaagaag ggaagggaaa agatgcttct gggaacaagg ttaaagccga 600
gccagccaaa atagaagctt tccgagcttc actttccaag ctaggggatg tctatgtcaa 660
tgatgctttt ggcactgctc acagagccca cagctccatg gtaggagtca atctgccaca 720
gaaggctggt gggtttttga tgaagaagga gctgaactac tttgcaaagg ccttggagag 780
cccagagcga cccttcctgg ccatcctggg cggagctaaa gttgcagaca agatccagct 840
catcaataat atgctggaca aagtcaatga gatgattatt ggtggtggaa tggcttttac 900
cttccttaag gtgctcaaca acatggagat tggcacttct ctgtttgatg aagagggagc 960
caagattgtc aaagacctaa tgtccaaagc tgagaagaat ggtgtgaaga ttaccttgcc 1020
tgttgacttt gtcactgctg acaagtttga tgagaatgcc aagactggcc aagccactgt 1080
ggcttctggc atacctgctg gctggatggg cttggactgt ggtcctgaaa gcagcaagaa 1140
gtatgctgag gctgtcactc gggctaagca gattgtgtgg aatggtcctg tgggggtatt 1200
tgaatgggaa gcttttgccc ggggaaccaa agctctcatg gatgaggtgg tgaaagccac 1260
ttctaggggc tgcatcacca tcataggtgg tggagacact gccacttgct gtgccaaatg 1320
gaacacggag gataaagtca gccatgtgag cactgggggt ggtgccagtt tggagctcct 1380
ggaaggtaaa gtccttcctg gggtggatgc tctcagcaat atttagtact ttcctgcctt 1440
ttagttcctg tgcacagccc ctaagtcaac ttagcatttt ctgcatctcc acttggcatt 1500
agctaaaacc ttccatgtca agattcagct agtggccaag agatgcagtg ccaggaaccc 1560
ttaaacagtt gcacagcatc tcagctcatc ttcactgcac cctggatttg catacattct 1620
tcaagatccc atttgaattt tttagtgact aaaccattgt gcattctaga gtgcatatat 1680
ttatattttg cctgttaaaa agaaagtgag cagtgttagc ttagttctct tttgatgtag 1740
gttattatga ttagctttgt cactgtttca ctactcagca tggaaacaag atgaaattcc 1800
atttgtaggt agtgagacaa aattgatgat ccattaagta aacaataaaa gtgtccattg 1860
aaaccgtgat ttttttttt ttcctgtcat actttgttag gaagggtgag aatagaatct 1920
tgaggaacgg atcagatgtc tatattgctg aatgcaagaa gtggggcagc agcagtggag 1980
[0076] agatgggaca attagataaa tgtccattct ttatcaaggg cctactttat ggcagacatt 2040
gtgctagtgc ttttattcta acttttattt ttatcagtta cacatgatca taatttaaaa 2100
agtcaaggct tataacaaaa aagccccagc ccattcctcc cattcaagat tcccactccc 2160
cagaggtgac cactttcaac tcttgagttt ttcaggtata tacctccatg tttctaagta 2220
atatgcttat attgttcact tctttttttt ttatttttta aagaaatcta tttcatacca 2280
tggaggaagg ctctgttcca catatatttc cacttcttca ttctctcggt atagttttgt 2340
cacaattata gattagatca aaagtctaca taactaatac agctgagcta tgtagtatgc 2400
tatgattaaa tttacttatg taaaaaaaaa aaaaaaaaa 2439

<210> 59
<211> 1196
<212> DNA
<213> 智人
<400> 59

cacttctgcc gcccctgttt caagggataa gaaaccctgc gacaaaacct cctccttttc 60
caagcggctg ccgaagatgg cggaggtgca ggtcctggtg cttgatggtc gaggccatct 120
cctgggccgc ctggcggcca tcgtggctaa acaggtactg ctgggccgga aggtggtggt 180
cgtacgctgt gaaggcatca acatttctgg caatttctac agaaacaagt tgaagtacct 240
ggctttcctc cgcaagcgga tgaacaccaa cccttcccga ggcccctacc acttccgggc 300
ccccagccgc atcttctggc ggaccgtgcg aggtatgctg ccccacaaaa ccaagcgagg 360
ccaggccgct ctggaccgtc tcaaggtgtt tgacggcatc ccaccgccct acgacaagaa 420
aaagcggatg gtggttcctg ctgccctcaa ggtcgtgcgt ctgaagccta caagaaagtt 480
tgcctatctg gggcgcctgg ctcacgaggt tggctggaag taccaggcag tgacagccac 540
cctggaggag aagaggaaag agaaagccaa gatccactac cggaagaaga aacagctcat 600
gaggctacgg aaacaggccg agaagaacgt ggagaagaaa attgacaaat acacagaggt 660
cctcaagacc cacggactcc tggtctgagc ccaataaaga ctgttaattc ctcatgcgtt 720
gcctgccctt cctccattgt tgccctggaa tgtacgggac ccaggggcag cagcagtcca 780

ggtgccacag gcagccctgg gacataggaa gctgggagca aggaaagggt cttagtcact 840
gcctcccgaa gttgcttgaa agcactcgga gaattgtgca ggtgtcattt atctatgacc 900
aataggaaga gcaaccagtt actatgagtg aaagggagcc agaagactga ttggagggcc 960
ctatcttgtg agtggggcat ctgttggact ttccacctgg tcatatactc tgcagctgtt 1020
agaatgtgca agcacttggg gacagcatga gcttgctgtt gtacacaggg tatttctaga 1080
agcagaaata gactgggaag atgcacaacc aaggggttac aggcatcgcc catgctcctc 1140
acctgtattt tgtaatcaga aataaattgc ttttaaagaa aaaaaaaaaa aaaaaa 1196

<210> 60
<211> 987
<212> DNA
<213> 智人
<400> 60

aatataagtg gaggcgtcgc gctggcgggc attcctgaag ctgacagcat tcgggccgag 60
atgtctcgct ccgtggcctt agctgtgctc gcgctactct ctctttctgg cctggaggct 120
atccagcgta ctccaaagat tcaggtttac tcacgtcatc cagcagagaa tggaaagtca 180
aatttcctga attgctatgt gtctgggttt catccatccg acattgaagt tgacttactg 240
aagaatggag agagaattga aaaagtggag cattcagact tgtctttcag caaggactgg 300
tctttctatc tcttgtacta cactgaattc acccccactg aaaaagatga gtatgcctgc 360
cgtgtgaacc atgtgacttt gtcacagccc aagatagtta agtgggatcg agacatgtaa 420
gcagcatcat ggaggtttga agatgccgca tttggattgg atgaattcca aattctgctt 480
gcttgctttt taatattgat atgcttatac acttacactt tatgcacaaa atgtagggtt 540
ataataatgt taacatggac atgatcttct ttataattct actttgagtg ctgtctccat 600
gtttgatgta tctgagcagg ttgctccaca ggtagctcta ggagggctgg caacttagag 660
gtggggagca gagaattctc ttatccaaca tcaacatctt ggtcagattt gaactcttca 720
atctcttgca ctcaaagctt gttaagatag ttaagcgtgc ataagttaac ttccaattta 780
[0077] catactctgc ttagaatttg ggggaaaatt tagaaatata attgacagga ttattggaaa 840
tttgttataa tgaatgaaac attttgtcat ataagattca tatttacttc ttatacattt 900
gataaagtaa ggcatggttg tggttaatct ggtttatttt tgttccacaa gttaaataaa 960
tcataaaact tgatgtgtta tctctta 987

<210> 61
<211> 3003
<212> DNA
<213> 智人
<400> 61

ctttctcctt ccccttcttc cgggctcccg tcccggctca tcacccggcc tgtggcccac 60
tcccaccgcc agctggaacc ctggggacta cgacgtccct caaaccttgc ttctaggaga 120
taaaaagaac atccagtcat ggataaaaat gagctggttc agaaggccaa actggccgag 180
caggctgagc gatatgatga catggcagcc tgcatgaagt ctgtaactga gcaaggagct 240
gaattatcca atgaggagag gaatcttctc tcagttgctt ataaaaatgt tgtaggagcc 300
cgtaggtcat cttggagggt cgtctcaagt attgaacaaa agacggaagg tgctgagaaa 360
aaacagcaga tggctcgaga atacagagag aaaattgaga cggagctaag agatatctgc 420
aatgatgtac tgtctctttt ggaaaagttc ttgatcccca atgcttcaca agcagagagc 480
aaagtcttct atttgaaaat gaaaggagat tactaccgtt acttggctga ggttgccgct 540
ggtgatgaca agaaagggat tgtcgatcag tcacaacaag cataccaaga agcttttgaa 600
atcagcaaaa aggaaatgca accaacacat cctatcagac tgggtctggc ccttaacttc 660
tctgtgttct attatgagat tctgaactcc ccagagaaag cctgctctct tgcaaagaca 720
gcttttgatg aagccattgc tgaacttgat acattaagtg aagagtcata caaagacagc 780
acgctaataa tgcaattact gagagacaac ttgacattgt ggacatcgga tacccaagga 840
gacgaagctg aagcaggaga aggaggggaa aattaaccgg ccttccaact tttgtctgcc 900
tcattctaaa atttacacag tagaccattt gtcatccatg ctgtcccaca aatagttttt 960
tgtttacgat ttatgacagg tttatgttac ttctatttga atttctatat ttcccatgtg 1020

gtttttatgt ttaatattag gggagtagag ccagttaaca tttagggagt tatctgtttt 1080
catcttgagg tggccaatat ggggatgtgg aatttttata caagttataa gtgtttggca 1140
tagtactttt ggtacattgt ggcttcaaaa gggccagtgt aaaactgctt ccatgtctaa 1200
gcaaagaaaa ctgcctacat actggtttgt cctggcgggg aataaaaggg atcattggtt 1260
ccagtcacag gtgtagtaat tgtgggtact ttaaggtttg gagcacttac aaggctgtgg 1320
tagaatcata ccccatggat accacatatt aaaccatgta tatctgtgga atactcaatg 1380
tgtacacctt tgactacagc tgcagaagtg ttcctttaga caaagttgtg acccatttta 1440
ctctggataa gggcagaaac ggttcacatt ccattatttg taaagttacc tgctgttagc 1500
tttcattatt tttgctacac tcattttatt tgtatttaaa tgttttaggc aacctaagaa 1560
caaatgtaaa agtaaagatg caggaaaaat gaattgcttg gtattcatta cttcatgtat 1620
atcaagcaca gcagtaaaac aaaaacccat gtatttaact tttttttagg atttttgctt 1680
ttgtgatttt ttttttttg atacttgcct aacatgcatg tgctgtaaaa atagttaaca 1740
gggaaataac ttgagatgat ggctagcttt gtttaatgtc ttatgaaatt ttcatgaaca 1800
atccaagcat aattgttaag aacacgtgta ttaaattcat gtaagtggaa taaaagtttt 1860
atgaatggac ttttcaacta ctttctctac agcttttcat gtaaattagt cttggttctg 1920
aaacttctct aaaggaaatt gtacattttt tgaaatttat tccttattcc ctcttggcag 1980
ctaatgggct cttaccaagt ttaaacacaa aatttatcat aacaaaaata ctactaatat 2040
aactactgtt tccatgtccc atgatcccct ctcttcctcc ccaccctgaa aaaaatgagt 2100
tcctattttt tctgggagag ggggggattg attagaaaaa aatgtagtgt gttccattta 2160
aaattttggc atatggcatt ttctaactta ggaagccaca atgttcttgg cccatcatga 2220
cattgggtag cattaactgt aagttttgtg cttccaaatc acttttggt ttttaagaat 2280
ttcttgatac tcttatagcc tgccttcaat tttgatcctt tattctttct atttgtcagg 2340
tgcacaagat taccttcctg ttttagcctt ctgtcttgtc accaaccatt cttacttggt 2400
ggccatgtac ttggaaaaag gccgcatgat ctttctggct ccactcagtg tctaaggcac 2460
cctgcttcct ttgcttgcat cccacagact atttccctca tcctatttac tgcagcaaat 2520
[0078] ctctccttag ttgatgagac tgtgtttatc tccctttaaa accctaccta tcctgaatgg 2580
tctgtcattg tctgccttta aaatccttcc tctttcttcc tcctctattc tctaaataat 2640
gatggggcta agttataccc aaagctcact ttacaaaata tttcctcagt actttgcaga 2700
aaacaccaaa caaaaatgcc attttaaaaa aggtgtattt tttcttttag aatgtaagct 2760
cctcaagagc agggacaatg ttttctgtat gttctattgt gcctagtaca ctgtaaatgc 2820
tcaataaata ttgatgatgg gaggcagtga gtcttgatga taagggtgag aaactgaaat 2880
cccaaacact gttttgttgc ttgttttatt atgacctcag attaaattgg gaaatattgg 2940
ccctttgaa taattgtccc aaatattaca ttcaaataaa agtgcaatgg agaaaaaaaa 3000
aaa 3003

<210> 62
<211> 2803
<212> DNA
<213> 智人
<400> 62

actgcagccc cgctcgactc cggcgtggtg cgcaggcgcg gtatcccccc tcccccgcca 60
gctcgacccc ggtgtggtgc gcaggcgcag tctgcgcagg gactggcggg actgcgcggc 120
ggcaacagca gacatgtcgg gggtccgggg cctgtcgcgg ctgctgagcg ctcggcgcct 180
ggcgctggcc aaggcgtggc caacagtgtt gcaaacagga acccgaggtt ttcacttcac 240
tgttgatggg aacaagaggg catctgctaa agtttcagat tccatttctg ctcagtatcc 300
agtagtggat catgaatttg atgcagtggt ggtaggcgct ggaggggcag gcttgcgagc 360
tgcatttggc ctttctgagg cagggtttaa tacagcatgt gttaccaagc tgtttcctac 420
caggtcacac actgttgcag cacagggagg aatcaatgct gctctgggga acatggagga 480
ggacaactgg aggtggcatt tctacgacac cgtgaagggc tccgactggc tgggggacca 540
ggatgccatc cactacatga cggagcaggc ccccgccgcc gtggtcgagc tagaaaatta 600
tggcatgccg tttagcagaa ctgaagatgg gaagatttat cagcgtgcat ttggtggaca 660
gagcctcaag tttggaaagg gcgggcaggc ccatcggtgc tgctgtgtgg ctgatcggac 720

tggccactcg ctattgcaca ccttatatgg aaggtctctg cgatatgata ccagctattt 780
tgtggagtat tttgccttgg atctcctgat ggagaatggg gagtgccgtg gtgtcatcgc 840
actgtgcata gaggacgggt ccatccatcg cataagagca aagaacactg ttgttgccac 900
aggaggctac gggcgcacct acttcagctg cacgtctgcc cacaccagca ctggcgacgg 960
cacggccatg atcaccaggg caggccttcc ttgccaggac ctagagtttg ttcagttcca 1020
ccctacaggc atatatggtg ctggttgtct cattacggaa ggatgtcgtg gagagggagg 1080
cattctcatt aacagtcaag gcgaaaggtt tatggagcga tacgcccctg tcgcgaagga 1140
cctggcgtct agagatgtgg tgtctcggtc catgactctg gagatccgag aaggaagagg 1200
ctgtggccct gagaaagatc acgtctacct gcagctgcac cacctacctc cagagcagct 1260
ggccacgcgc ctgcctggca tttcagagac agccatgatc ttcgctggcg tggacgtcac 1320
gaaggagccg atccctgtcc tccccaccgt gcattataac atgggcggca ttcccaccaa 1380
ctacaagggg caggtcctga ggcacgtgaa tggccaggat cagattgtgc ccggcctgta 1440
cgcctgtggg gaggccgcct gtgcctcggt acatggtgcc aaccgcctcg gggcaaactc 1500
gctcttggac ctggttgtct ttggtcgggc atgtgccctg agcatcgaag agtcatgcag 1560
gcctggagat aaagtccctc caattaaacc aaacgctggg gaagaatctg tcatgaatct 1620
tgacaaattg agatttgctg atggaagcat aagaacatcg gaactgcgac tcagcatgca 1680
gaagtcaatg caaaatcatg ctgccgtgtt ccgtgtggga agcgtgttgc aagaaggttg 1740
tgggaaaatc agcaagctct atggagacct aaagcacctg aagacgttcg accggggaat 1800
ggtctggaac acggacctgg tggagaccct ggagctgcag aacctgatgc tgtgtgcgct 1860
gcagaccatc tacggagcag aggcacggaa ggagtcacgg ggcgcgcatg ccagggaaga 1920
ctacaaggtg cggattgatg agtacgatta ctccaagccc atccaggggc aacagaagaa 1980
gcccctttgag gagcactgga ggaagcacac cctgtcctat gtggacgttg gcactgggaa 2040
ggtcactctg gaatatagac ccgtgatcga caaaactttg aacgaggctg actgtgccac 2100
cgtcccgcca gccattcgct cctactgatg agacaagatg tggtgatgac agaatcagct 2160
tttgtaatta tgtataatag ctcatgcatg tgtccatgtc ataactgtct tcatacgctt 2220
[0079] ctgcactctg gggaagaagg agtacattga agggagattg gcacctagtg gctgggagct 2280
tgccaggaac ccagtggcca gggagcgtgg cacttacctt tgtcccttgc ttcattcttg 2340
tgagatgata aaactgggca cagctcttaa ataaaatata aatgaacaaa ctttctttta 2400
tttccaaatc catttgaaat attttactgt tgtgacttta gtcatatttg ttgacctaaa 2460
aatcaaatgt aatctttgta ttgtgttaca tcaaaatcca gatattttgt atagtttctt 2520
ttttcttttt cttttctttt tttttttga gacaggatcg gtgcagtagt acaatcacag 2580
ctcactgcag cctcaaactc ctgggcagct caggtgatct tcctgactca gccttctgag 2640
tagttggggc tacaggtgtg caccaccatg cccagctcat ttattttgta attgtaggga 2700
cagggtctca ctgtgttgcc taggctggtc tcaagtgatc ctccctcctt ggcctcccaa 2760
ggtgctggaa ttataggtgt gaacaaacca aaaaaaaaaa aaa 2803

<210> 63
<211> 1435
<212> DNA
<213> 智人
<400> 63

ggcggggcct gcttctcctc agcttcaggc ggctgcgacg agccctcagg cgaacctctc 60
ggctttcccg cgcggcgccg cctcttgctg cgcctccgcc tcctcctctg ctccgccacc 120
ggcttcctcc tcctgagcag tcagcccgcg cgccggccgg ctccgttatg gcgacccgca 180
gccctggcgt cgtgattagt gatgatgaac caggttatga ccttgattta ttttgcatac 240
ctaatcatta tgctgaggat ttggaaaggg tgtttattcc tcatggacta attatggaca 300
ggactgaacg tcttgctcga gatgtgatga aggagatggg aggccatcac attgtagccc 360
tctgtgtgct caaggggggc tataaattct ttgctgacct gctggattac atcaaagcac 420
tgaatagaaa tagtgataga tccattccta tgactgtaga ttttatcaga ctgaagagct 480
attgtaatga ccagtcaaca ggggacataa aagtaattgg tggagatgat ctctcaactt 540
taactggaaa gaatgtcttg attgtggaag atataattga cactggcaaa acaatgcaga 600
ctttgctttc cttggtcagg cagtataatc caaagatggt caaggtcgca agcttgctgg 660

tgaaaaggac cccacgaagt gttggatata agccagactt tgttggattt gaaattccag 720
acaagtttgt tgtaggatat gcccttgact ataatgaata cttcagggat ttgaatcatg 780
tttgtgtcat tagtgaaact ggaaaagcaa aatacaaagc ctaagatgag agttcaagtt 840
gagtttggaa acatctggag tcctattgac atcgccagta aaattatcaa tgttctagtt 900
ctgtggccat ctgcttagta gagctttttg catgtatctt ctaagaattt tatctgtttt 960
gtactttaga aatgtcagtt gctgcattcc taaactgttt atttgcacta tgagcctata 1020
gactatcagt tccctttggg cggattgttg tttaacttgt aaatgaaaaa attctcttaa 1080
accacagcac tattgagtga aacattgaac tcatatctgt aagaaataaa gagaagatat 1140
attagttttt taattggtat tttaattttt atatatgcag gaaagaatag aagtgattga 1200
atattgttaa ttataccacc gtgtgttaga aaagtaagaa gcagtcaatt ttcacatcaa 1260
agacagcatc taagaagttt tgttctgtcc tggaattatt ttagtagtgt ttcagtaatg 1320
ttgactgtat tttccaactt gttcaaatta ttaccagtga atctttgtca gcagttccct 1380
tttaaatgca aatcaataaa ttcccaaaaa tttaaaaaaa aaaaaaaaaa aaaaa 1435

<210> 64
<211> 4476
<212> DNA
<213> 智人
<400> 64

agcagagaga acacacgtcc ttgcggaagt gacggcagtt ccgagtccag tgggggcggt 60
gggagcgatg agggtctgag acggtgggag cggttgtgtg aagatggaga cattccatac 120
accaagcttg ggtgatgagg aatttgaaat cccacctatc tccttggatt ctgatccctc 180
attggctgtc tcagatgtgg ttggccactt tgatgacctg gcagaccctt cctcttcaca 240
ggatggcagt ttttcagccc agtatggggt ccagacattg gacatgcctg tgggcatgac 300
ccatggcttg atggagcagg gcgggggggct cctgagtggg ggcttgacca tggacttgga 360
ccactctata ggaactcagt atagtgccaa cccacctgtt acaattgatg taccaatgac 420
[0080] agacatgaca tctggcttga tggggcatag ccagttgacc accattgatc agtcagaact 480
gagttcccag ctgggtttga gcctaggggg tggcaccatc ctgccacctg cccagtcacc 540
tgaagatcgt ctttcaacca ccccttcacc tactagttca cttcacgagg atggtgttga 600
ggatttccgg aggcaacttc ccagccagaa gacagtcgtg gtggaagcag ggaaaaagca 660
gaaggcccca aagaagagaa aaaagaaaga tcctaatgaa cctcagaaac cagtttcagc 720
atatgcttta ttctttcgtg atacacaggc tgccatcaag ggacagaatc ctaatgccac 780
ttttggtgag gtttcaaaaa ttgtggcctc catgtgggat agtcttggag aggagcaaaa 840
acaggtatat aagaggaaaa ctgaggctgc caagaaagag tatctgaagg cactggctgc 900
ttacaaagac aaccaggagt gtcaggccac tgtggaaaca gtggaattgg atccagcacc 960
accatcacaa actccttctc cacctcctat ggctactgtt gacccagcat ctccagcacc 1020
agcttcaata gagcccccctg ccctgtcccc atccattgtt gttaactcca ccctttcatc 1080
ctatgtggca aaccaggcat cttctggagc tgggggtcag cccaatatca ccaagttgat 1140
tattaccaaa caaatgttgc cctcttctat tactatgtct caaggaggga tggttactgt 1200
tatcccagcc acagtggtga cctcccgggg gctccaacta ggccaaacca gtacagctac 1260
tatccagccc agtcaacaag cccagattgt cactcggtca gtgttgcagg cagcagcagc 1320
tgctgctgct gctgcttcta tgcaactgcc tccaccccga ctacagcccc ctccattaca 1380
acagatgcca cagcccccga ctcagcagca agttaccatt ctgcagcagc ctcctccact 1440
ccaggccatg caacagcctc cacctcagaa agttcgaatc aatttacagc aacagcctcc 1500
tcctctgcag atcaagagtg tgcctctacc cactttgaaa atgcagacta ccttagtccc 1560
accaactgtg gaaagtagtc ctgagcggcc tatgaacaac agccctgagg cccatacagt 1620
ggaggcacct tctcctgaga ctatctgtga gatgatcaca gatgtagttc ctgaggttga 1680
gtctccttct cagatggatg ttgaattggt gagtgggtct cctgtggcac tctcacccca 1740
gcctcgatgt gtgaggtctg gttgtgagaa ccctcccatt gtgagtaagg actgggacaa 1800
tgaatactgc agcaatgagt gtgtggtgaa gcactgcagg gatgtattct tggcctgggt 1860
agcctctaga aattcaaaca cagtggtgtt tgtgaaatag tccttcctgt tctccaagcc 1920
agtgaagagt tatctgctgg gaaagtgtcc aagagcctgt ttttgaaaca caagctgggc 1980

ttctggtagt gcctcatcac aacccatgat ggctgttcat gtttcacccc ttttcttcct 2040
tcagcagagg ccaggctatg gagcagggcc actgaatttg ctgtaatctg gagatgcttt 2100
ttactttcaa ccataagcgg taatagcaga ggaaagggtg aagggagtct gggcaagcaa 2160
agcatagaga tggtggggtg gtggtggggt tgaagaaact tgttggtata attgtcatag 2220
gacttgccta aaatattatt aaaattacgg gagtgtactc agctttgagc ctaggagaaa 2280
atgccactgt gtgcatccat tttaaagggt tccctcataa aaaaatgtta ttccccatta 2340
tcacatcagt acactgcttt gaaaacaaaa cttttcaaca tgggcatact gggctacatg 2400
gaaaatgaca tcacccagga gtgatttctc tttatatata ttatttctgc agttaccatc 2460
cttatctgag ttatcacagt tcatgaatct aagaggcgga actctacatc attagtaaga 2520
ggttccacca aagtctaaag ttgtattcac ttgtgtttga tgaactatct ttaaaagacc 2580
ataggtctat cattatttct tagacataat ctaaagaaaa acagactaga gaagccacct 2640
ggttgtaaca gaataagcag aagtttacag catgatagtc caagtggtga taactttaaa 2700
taaaactcaa atttttactg tttgtagaca ggaatgctgt cctagagaac ctcctcctca 2760
accagctacg tacatagttt tatcctatgc attcctgttt tctgtgtgtt ttttgttttt 2820
ttttttttttt ttttttttttg agacagagtc tcgctctgtc acccaggctg gagtgcagtg 2880
gtgcgacctc agctcactga aacctctgcc tcccgggttc aagcgattct cctgcatcag 2940
cctcccgagt agctaggatt acaggcgccc gccactacgc ccagctaatt tgtggtattt 3000
ttagtagaga cagggtttca ccatgttggc caggctggtc tcgaactcct gacctcatga 3060
tccgcccgcc ttgacctccc aaagtgctgg gattacaggc atgagccacc gcacccagcc 3120
tgcattcctg tttttttaat ggttttggag ggtagcagta gagatggggt ctcactatgt 3180
tgcccagtct agtcttgaac tcctgggcta cagttaccct cctacctcgg cttcccaaag 3240
tgctcggatt acaggtgtga gccactgtgc ctagcctata atgatcattt taatgtttcc 3300
catgcactca tttagtttga accttcacag caacccaatg aggtaatact cccatttcac 3360
atataatact gagagatgag ttgcacaaga ttatacactg ttaagtagca gagccagaat 3420
ggacttcaga atcccaacta caatacaaat gtttatttaa ataaagaaga aagctattgt 3480
[0081] acaaatatca ctcttcaggt ttagcttaca gagccatggc tatggattct tagctctgta 3540
aggaagtgct tctataaatt cttaggttta gagatgatac catctgggta cctttgcttg 3600
aaccgtgcaa ccacatctgg gtctagtagg tggatcccat ccagttggtt tccaagggtg 3660
atcctgaaac agtgtaaaag gaggggcaaa ccagaaatcc tggaattaga gggtttaata 3720
ttgttaaaaa atgcatacca aatgaagact gcctatcatc atatcaaata tgccaattct 3780
aaaaagagct taacattaga atagtatatg gtagaattac tagttcagaa ttggcataga 3840
ttctggtgtt aaaatagact ggatctgtat tatctgaggg ttagtaacta atgcttagcc 3900
aggcctgctt cacagagttg ctaccaggga gtattctttg gataagcaaa atgctagcag 3960
catgtgtttt aagctctgtt aaggggtgaa agatgtaatt attgacagat taaatagata 4020
acttcgtaac caccaggggg cagattcaat acatcacaga atggctgagg aagatccttg 4080
ggttgtgaag agagtagaaa ccctagggag cagtgctttt gggtcctaga acctgttgag 4140
tttctaatga atatttgtag aatctcataa aacagtttaa atacaagctt aagtggctta 4200
tgaatcctgt gaagctcatt tatggactag tgtaaaacaa tgtgaagctc tactaagttc 4260
tgtccttaat cataaataat agccccttga ggactagcct gttctctggt caccttacca 4320
gttgggttgc acattgtgtg gtcgtccaaa taactcaatc ttgcgagtgc caggagatag 4380
tctttcaatc atgccataga tttcatctgg tttatgactg gtggaacgaa cctaggaaat 4440
aaaaactagc tgctttttaa gttacacaag aaaaaa 4476

<210> 65
<211> 4814
<212> DNA
<213> 智人
<400> 65

cttcgtgcca cgtcaccgcc tgcgtcgctt ccggaggcgc agcgggcgat gacgtagagg 60
gacgtgccct ctatatgagg ttggggagcg gctgagtcgg ccttttccgc ccgctccccc 120
ctcccccccga gcgccgctcc ggctgcaccg cgctcgctcc gagtttcagg ctcgtgctaa 180
gctagcgccg tcgtcgtctc ccttcagtcg ccatcatgat tatctaccgg gacctcatca 240

gccacgatga gatgttctcc gacatctaca agatccggga gatcgcggac gggttgtgcc 300
tggaggtgga ggggaagatg gtcagtagga cagaaggtaa cattgatgac tcgctcattg 360
gtggaaatgc ctccgctgaa ggccccgagg gcgaaggtac cgaaagcaca gtaatcactg 420
gtgtcgatat tgtcatgaac catcacctgc aggaaacaag tttcacaaaa gaagcctaca 480
agaagtacat caaagattac atgaaatcaa tcaaagggaa acttgaagaa cagagaccag 540
aaagagtaaa acctttatg acaggggctg cagaacaaat caagcacatc cttgctaatt 600
tcaaaaacta ccagttcttt attggtgaaa acatgaatcc agatggcatg gttgctctat 660
tggactaccg tgaggatggt gtgaccccat atatgatttt ctttaaggat ggtttagaaa 720
tggaaaaatg tgatgcaaaa gaaagaaatc cctgcgcttt ctgtctgtct ttgtggcggc 780
ccagattgaa ttggggaata catctttagc ctggaaatgt aggctgcatg ttaatggtaa 840
tgtaactttt gcagtgtaat gtttgaaaaa tattaatgta gtttttgctt ttacagtaac 900
aaatgtggca attattttgg atctatcacc tgtcatcata actggcttct gcttgtcatc 960
cacacaacac caggacttaa gacaaatggg actgatgtca tcttgagctc ttcatttatt 1020
ttgactgtga tttatttgga gtggaggcat tgtttttaag aaaaacatgt catgtaggtt 1080
gtctaaaaat aaaatgcatt taaactcatt tgagagaatg ccttttagtt taatgcatat 1140
ttaaactaaa ttgatcctgt agtgttcctg gagaagctag agcctgattg taggctacta 1200
ctcatcaatt aacttctaca gtggagacta cttctgggac tggaatataa aaaagaatca 1260
aaggttctga ttttgagttg caataaaggg aaagaccatg ctcatagcag tgccaacatc 1320
tgaagtgtgg agccttaccc atttcatcac ctacaacgga agtagttaac tggaagagat 1380
taccaagaga ataaaaagag actcattcag tggaagcaac tttgtctcag cttatttcac 1440
ataaagagag cgaagtcttt tgggatgaat gttaattaaa ctccctggta actagaacag 1500
ggactggcaa actagcctat ctgaccacct gttttgtaca ctttaaggtg gttggttgcc 1560
tttttaaatg gttgagggga aaagaatacc ttgtgggata tggaatttaa gttcgagtcc 1620
agttttattg gaacgtggct atgcttattc atttatggat tgactgtggc tgttgtcagt 1680
gcatgagcag agttgtgtct aacagactag agcctgcaag tttgccagcc cctgatttaa 1740
[0082] aagatgaagg tacacagaat gtgggctggc tggtgggcaa aggggtaaaa atgttctcta 1800
tattgtatct gaaaagatgg ggtgtctgaa taagaaaatg catctatttg acagacctgg 1860
agcagttgct atctgctgct atggtttcca ccacagatgc aagaagaaca tgtccttgcg 1920
ctttccgtct gtctaattgt ggcagctgag attgaataga ggaatacagg aggaaaaaaa 1980
gcgggaagag tttttgaggc aggtcggtca cccaggcttg tagtgcagtg gcacaagcaa 2040
ctcactgcat tctctgcatc ctgtgctcaa gccattttcc cacctcagtc tcactagttg 2100
ctgggactgc aggcatgcac ccctatgccc agctaatttt tgtagagacc gagtatcgct 2160
tagttgccca gggtggtctc aactcctggg ctcaaggaga tctgcccacc tcagcctccc 2220
aaagtgcagg cctagcctgg gaggggaatt ttcaaaacgt gagttttggg aaatagtcta 2280
tcagccttac ctggttgatt acacttgtaa aagaaagatt aaaagcaggc cagtgactct 2340
ggtctgcttg aacatgtgaa tgtagtggtt tgagcaatct ggagtttgcc ctagtgtcaa 2400
attccagact gtccatagtg tccaaaacct gaggcagata ctaatgttaa cccccagcac 2460
cccgtgattg gaaacaaacc taaatacgta ttgggaactt aatagcaatt ttaagcattc 2520
tgatagattt tttgtaggga tggggtcatg ccatgtggcc caggctggtc tgaaaactct 2580
ggcctcaagt gatctcaagc tttggccttc taaagtgttg ggattacagg tgtgaggcat 2640
tgcacctggc ttagcgttct gatttgacat tgtaatgaaa agtgtgagtc tcatctacag 2700
ggccttttgt cctctgaaat gatagcagga agggaatttt caggcagtgg tcaaagctgg 2760
ggaaaccagg atagtgaaga aggccttgag gtgagagatg gaagctaatt ggtgaactag 2820
ccttggaagc ctgaaacaga caagtagcaa ttcagagact ttgtgggctc cactgctcca 2880
acttgttttg aagattttca gttctgcaga agaggtattt ccccagttgt cctttcagtg 2940
ctcttagctg ttttcccaac atccagatcc aatcaaggct gggacatagc attttatcat 3000
gtctatttaa gtcagaagtg atgaacccca gctgtttacc tcatggtaaa cctttgaaga 3060
ttccaggtag aatcttctca gactttgaag actgtctcat tttatatctt tttctcgtta 3120
ttcctagggt caagacgttt tgggcaagaa taaggatgtg aacatcagaa agctcataac 3180
attttgtttt tgatgctaag tttaacaaag gcatgcttta gtagcctgtg ggccctaggg 3240
tttgttaaag tgtggagaac aactgagtgg agcaagagga cttttctagg aaggtccttg 3300

[0083]

```
taatgtgaca tttgaaaaca aatgaaggtg tggaagtagg ccatgtggat atcaggacaa 3360
accattccag gccaagacaa cagcagttag tctggagtgt gatgtgttct gggaaaaaag 3420
tggccacttt gctaacccaa gaagacagga agggttgtaa agcagtggga gtgtgcaagg 3480
aaggaagacc agacctcaag gaaaccacag gcgctctgag cagaagagtt acatgatatg 3540
actcaaattt ttaaaggatc actttggctg ccaggtggca gggtaaaagc atagaataat 3600
tgtgtataat gtgtttttaa ggcaaagata gtggcttagt ctagggtagt agactgaggt 3660
ggtaggaaat gaagatagag acaacaggat atgctggtgg gtgaggatgg atttaatgtt 3720
gatacaagta ttttggtctg agcgtttgga agaaagttgg cactgaggtg ggaagtcgag 3780
tttagttttg ttagttttgg atgtgttaag tttgagatgc tgattcttca gagaagtcta 3840
agctggagaa ctatatagag agtggaaaga taacaataga cattgaaagc catgatacag 3900
gataaggtca tttggagaga ggatagactg cattccaaca tgagattggt tgacaaagag 3960
aaaccaacaa aggtaattaa gaggtgctcc cactgcactt gtactcagaa ggctgaggta 4020
ggattgttag aggccagcct gggcaccaca gggagacccc atctctaaaa tttagccagg 4080
aaccatggct catgcctgta gccccaggaa tttgggaggc tgagtgggga ggatcgcttg 4140
aggtcaggag tttgagacca gcctgggcaa catagggaga cctaaaaaaa ttaattgggc 4200
atctgtagtc ccagctactc aggcggctga gctgagagga tggcttgagt ccgagagatt 4260
gagggtgcag tgagctgtga tcataccact gcactccagc ctgggcggca gtgagacact 4320
atctgaaaaa agtttaaaaa ttttaaaaaa gaaggaactg cccctgaggt aagaaccaag 4380
ggagggcctc ccagaggtca ggtggaaaaa gttttaggaa ggaggaagta gtcaacaggg 4440
ttacctgttg caaagtactt aagtaatatg aggcctgata gtggtaaact tgactaccgt 4500
tggatttcac tagtgggaaa ggaagtctaa ttaaaatgca ctcaagagac taacagtcgc 4560
aggcatgaaa tacaatacag gtacatggtt ttttattatg tgtgcatctg cttcagtaat 4620
aggtgtgaat tactcatttg gatcattagg agtttcaaaa tctagttaaa tgactagatt 4680
tttgttgatg taaattctgt cattctgaac tgcagggatt gtcagtaact taactgcaaa 4740
ctaaactggt gataattatg gtaaaattgc aagacgagca ataaatctca accaacttga 4800
gagaacactg ataa                                                   4814
```

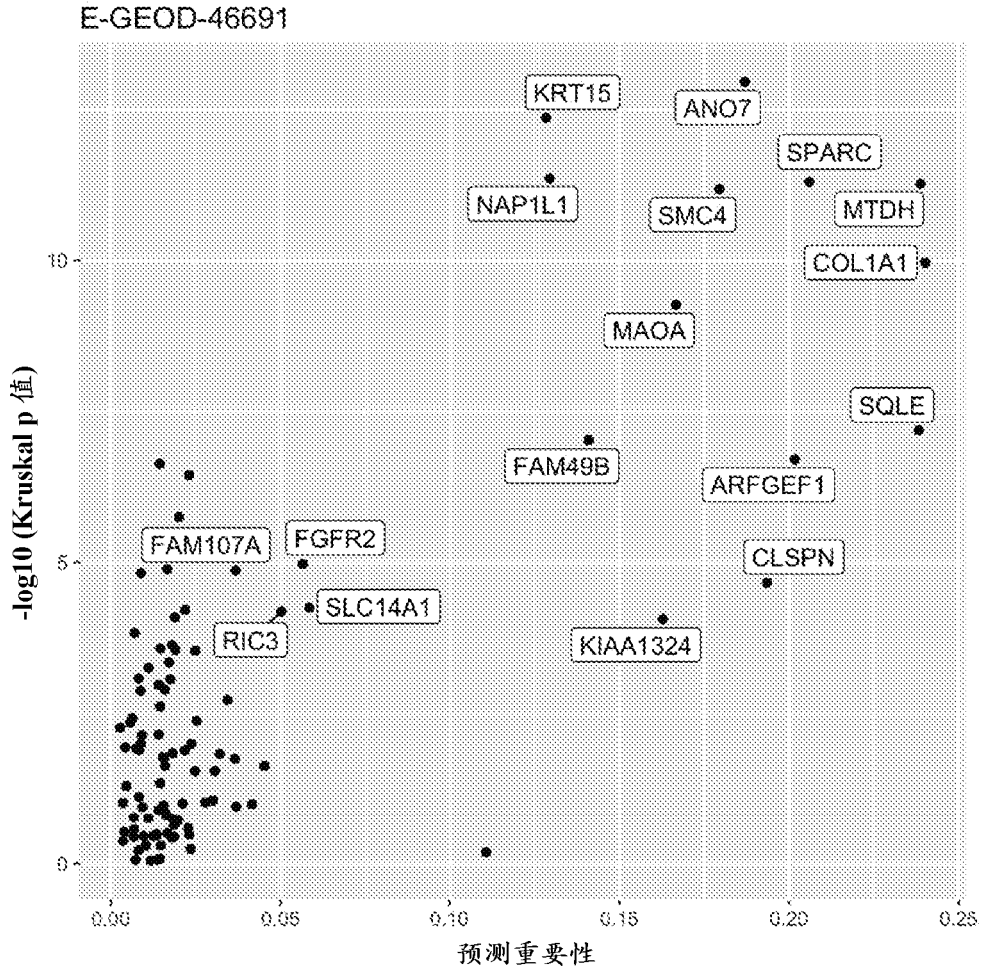

E-GEOD-46691
KRT15
ANO7
SPARC
NAP1L1
SMC4
MTDH
COL1A1
MAOA
SQLE
FAM49B
ARFGEF1
FAM107A
FGFR2
CLSPN
SLC14A1
RIC3
KIAA1324
10
5
0
0.00
0.05
0.10
0.15
0.20
0.25
-log10 (Kruskal p 值)
预测重要性

图 1A

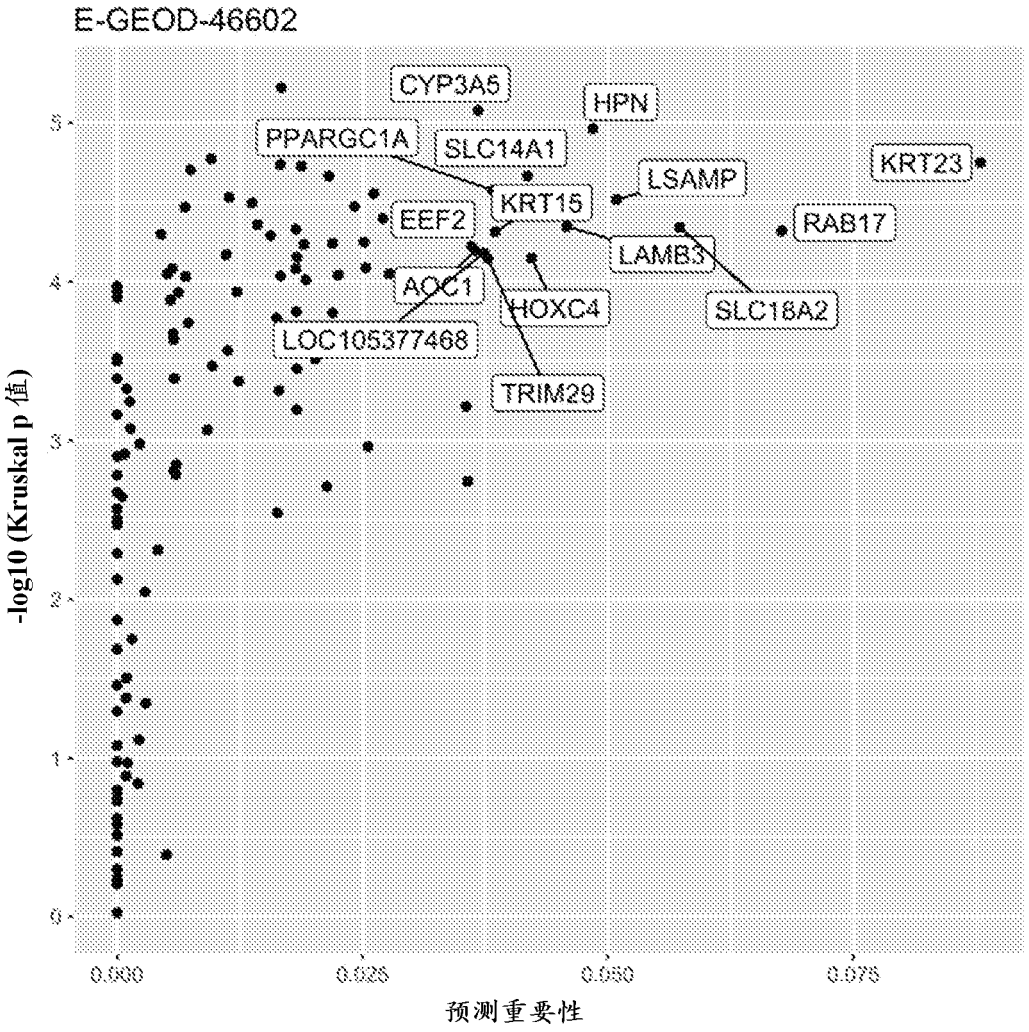

E-GEOD-46602
CYP3A5
HPN
PPARGC1A
SLC14A1
KRT23
LSAMP
KRT15
EEF2
RAB17
LAMB3
ACC1
HOXC4
SLC18A2
LOC105377468
TRIM29
-log10 (Kruskal p 值)
预测重要性

图 1B

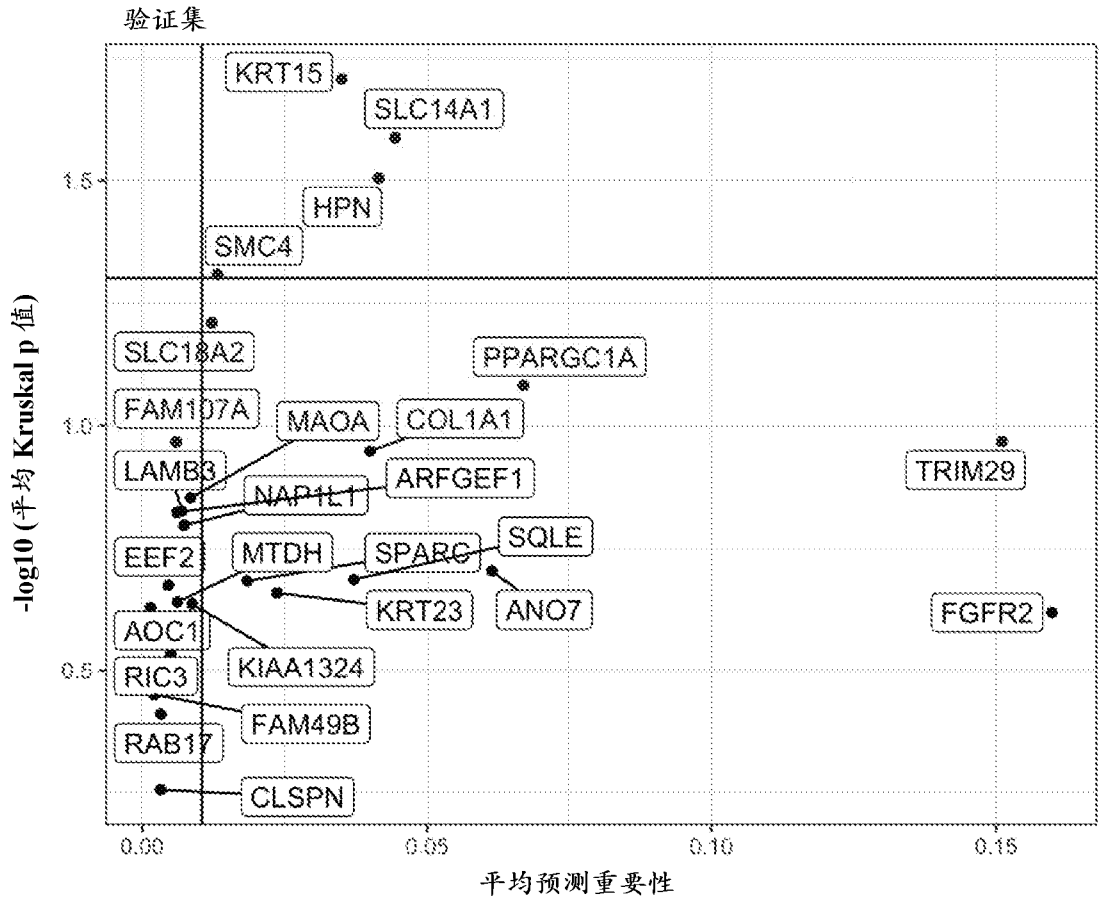

验证集
KRT15
SLC14A1
HPN
SMC4
SLC18A2
PPARGC1A
FAM107A
MAOA
COL1A1
LAMB3
ARFGEF1
TRIM29
NAP1L1
SQLE
EEF2
MTDH
SPARC
KRT23
ANO7
FGFR2
AOC1
KIAA1324
RIC3
FAM49B
RAB17
CLSPN
1.5
1.0
0.5
0.00
0.05
0.10
0.15
-log10 (平均 Kruskal p 值)
平均预测重要性

图 2

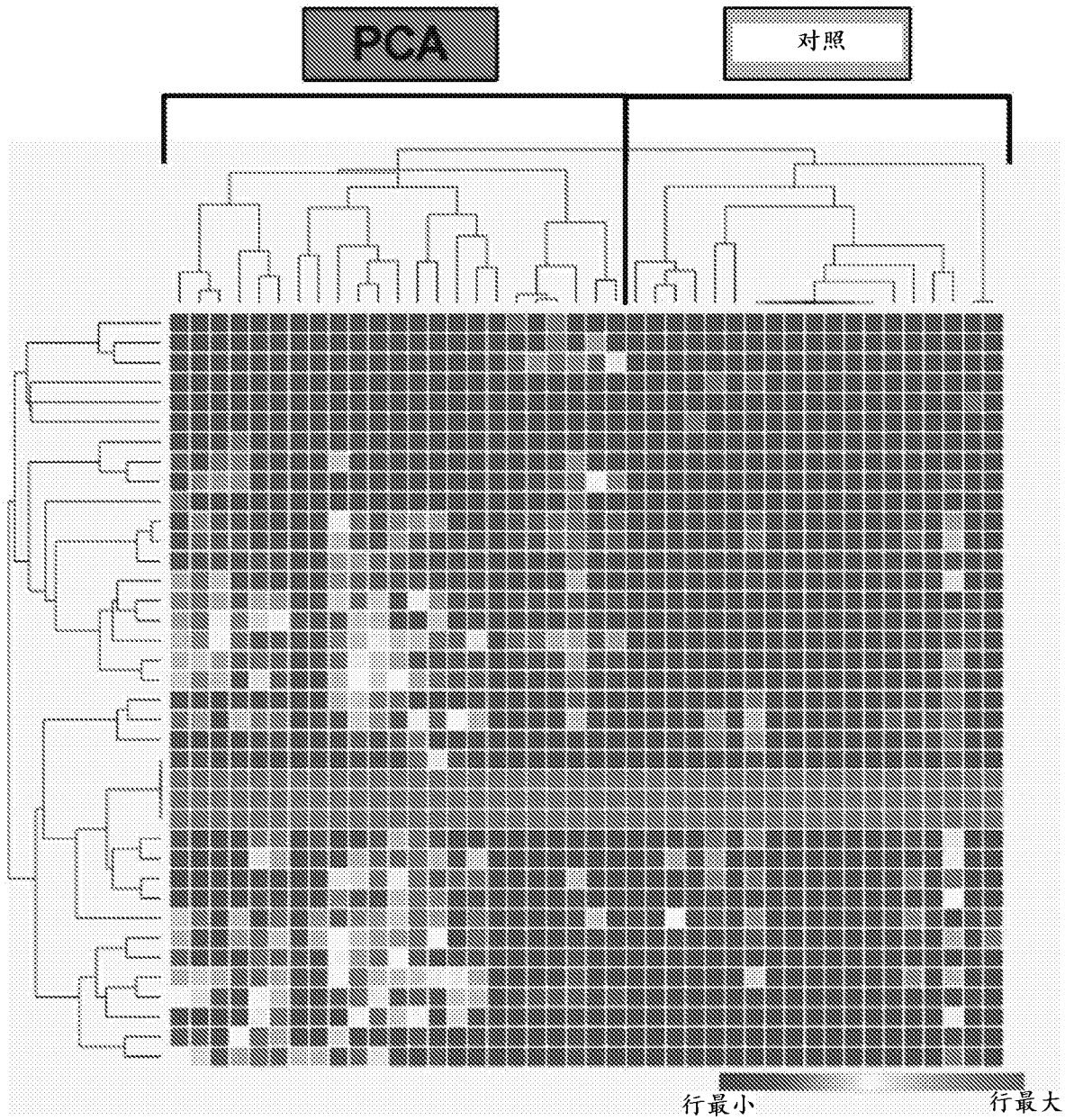


图 3

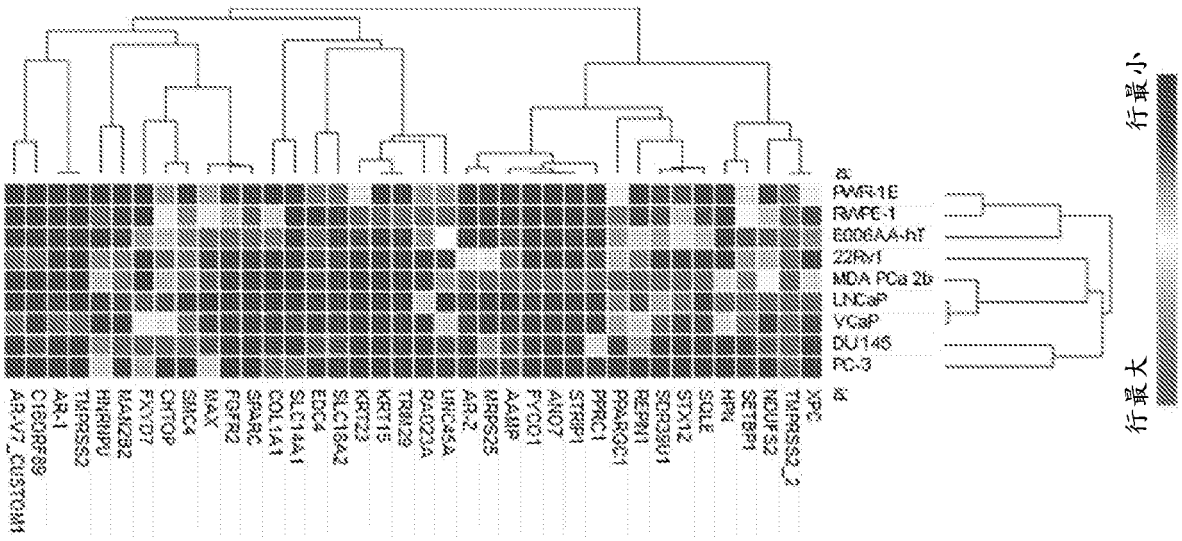

行最小
行最大
PWR-1E
RWPE-1
E006AA-hT
22Rv1
MDA PCa 2b
LNCaP
VCaP
DU145
PC-3
AR-V7_CR3TCRM1
AR-1
C16ORF89
TMPRSS2
HNRNPU
MAK2B2
FXYD7
CHTOP
SMC4
MAX
FGFR2
SPARC
COL14A1
SLC14A1
EDC4
SLC18A2
KRT23
KRT15
TRIM29
RAD23A
UBC45A
AR-2
RPS23
AAMP
FYCO1
AKO7
STRP1
PPIC1
PRAROZ1
REPIN1
SER39B1
STX12
SCUL
HPK
SETBP1
NDUFS2
TMPRSS2_2
VPS

图 4

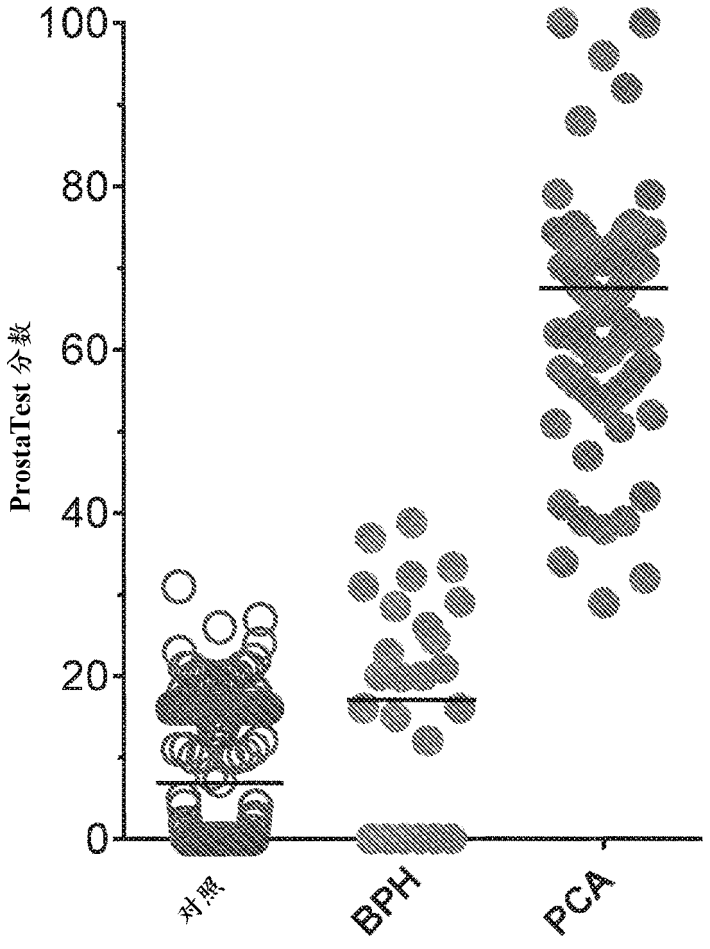

ProstaTest 分数
100
80
60
40
20
0
对照
BPH
PCA

图 5

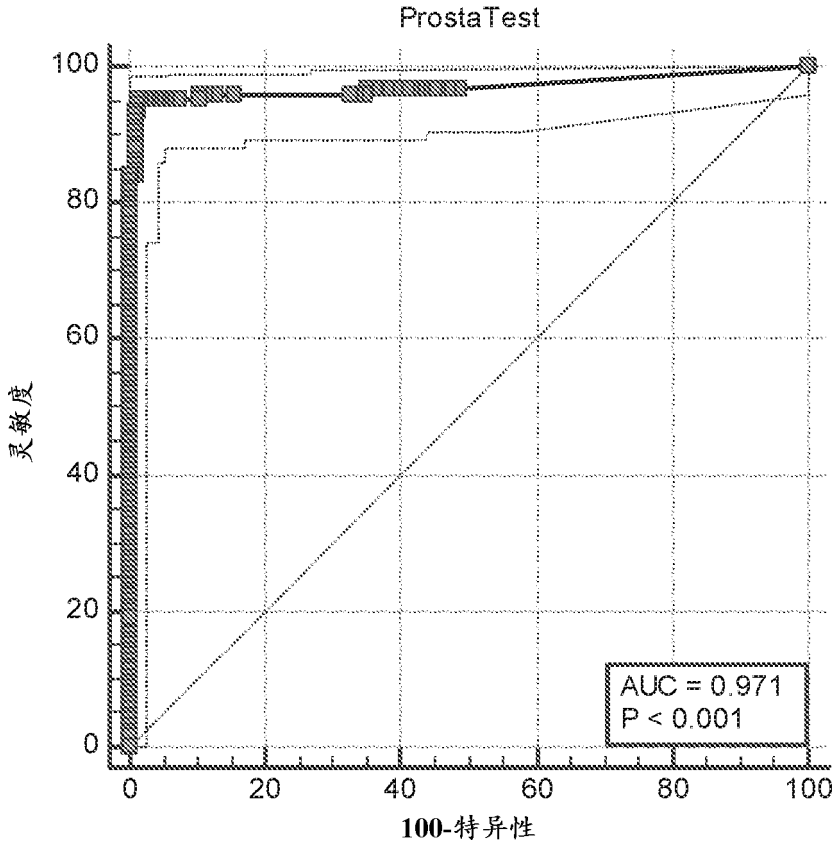

ProstaTest
100
80
60
40
20
0
灵敏度
0
20
40
60
80
100
100-特异性
AUC = 0.971
P < 0.001

图 6

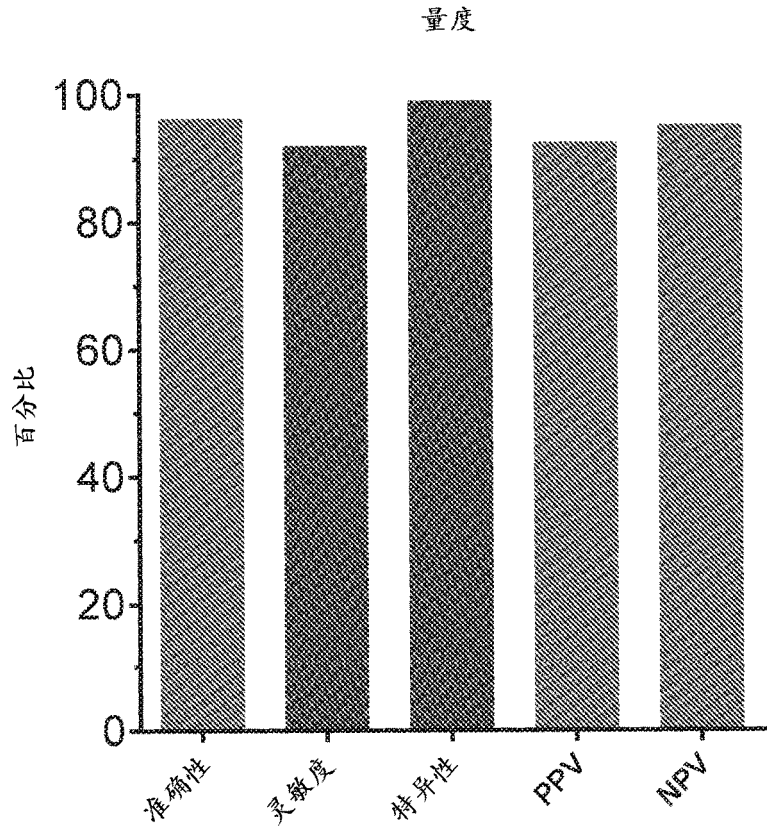


图 7

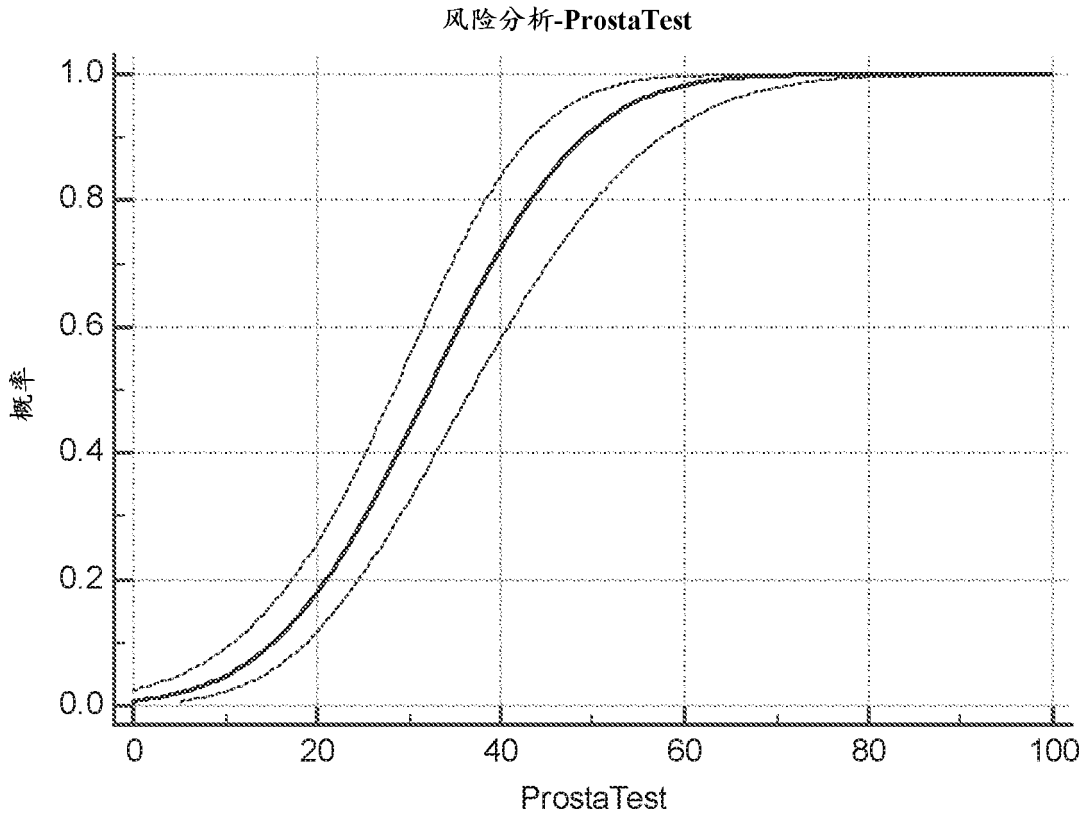

风险分析-ProstaTest
概率
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
ProstaTest

图 8

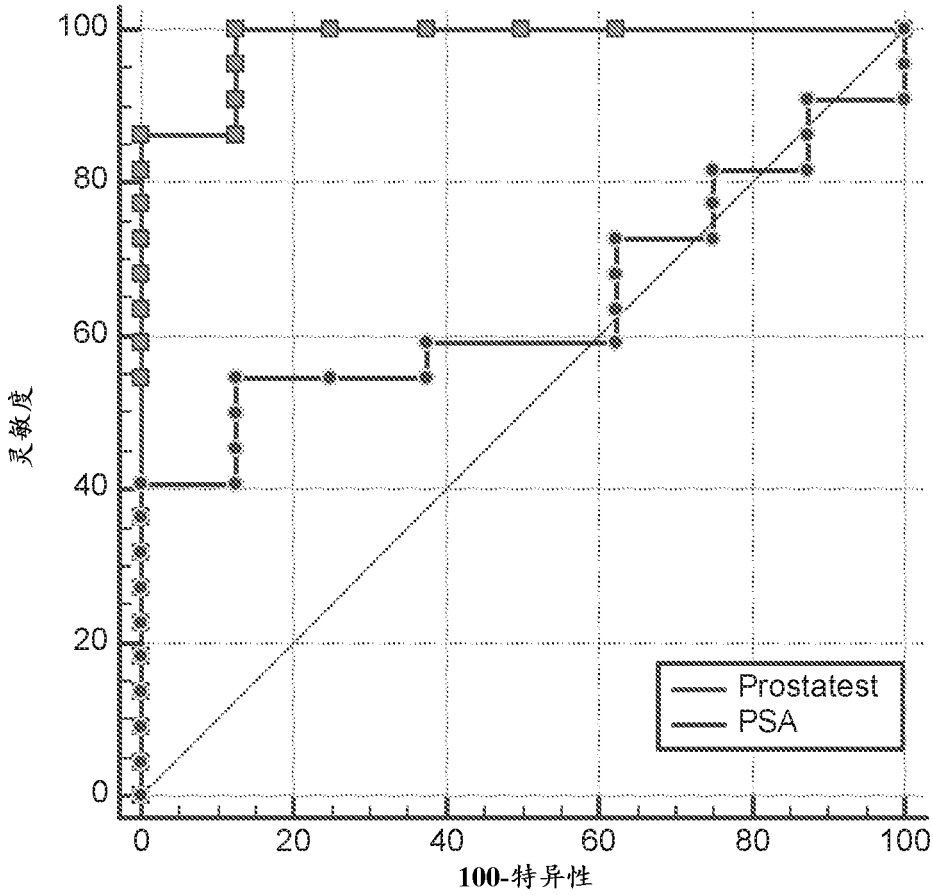


图 9

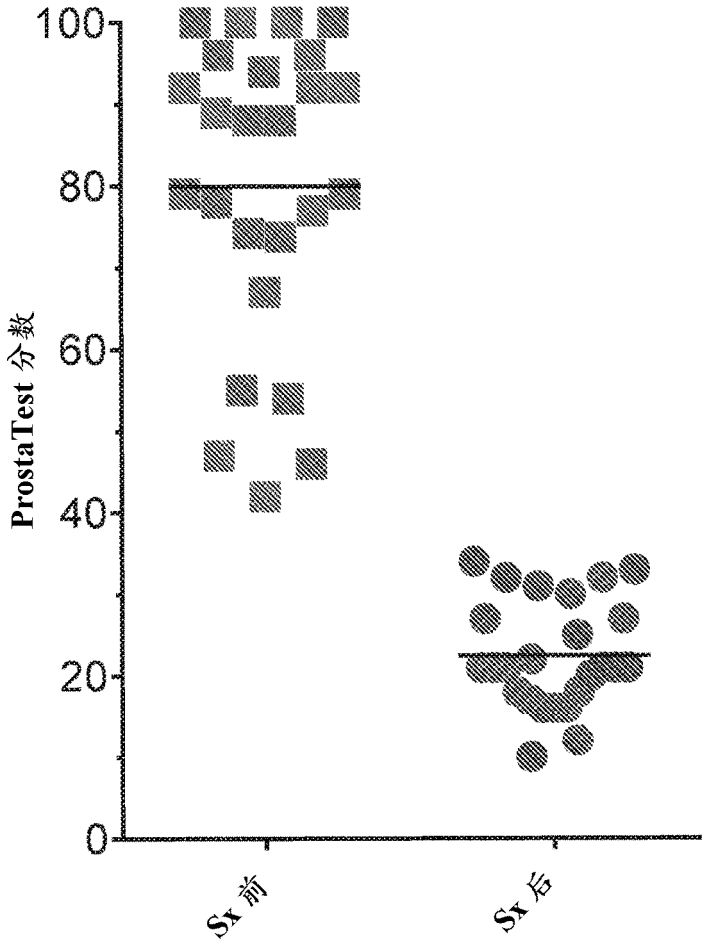


图 10

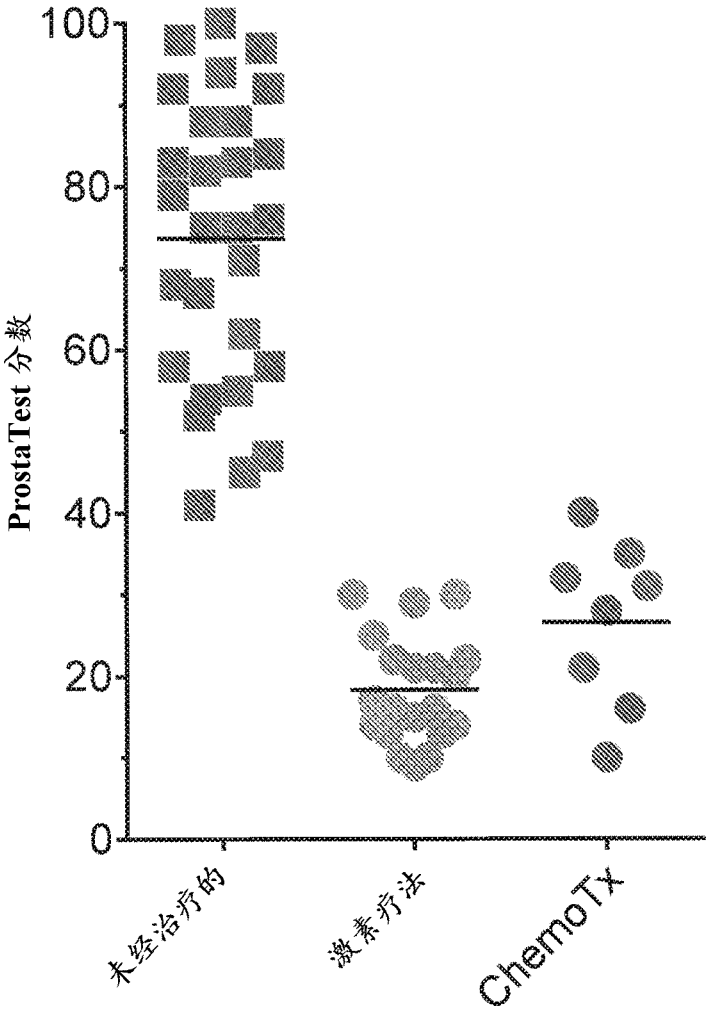


图 11