Whole exome sequencing identifies mutational signatures of vitreoretinal lymphoma

Junwon Lee,[1] Borahm Kim,[2*] Hyeonah Lee,[3] Heejung Park,[4] Suk Ho Byeon,[1] Jong Rak Choi,[2] Sung Chul Lee,[1] Seung-Tae Lee[2] and Christopher Seungkyu Lee[1]*

[*]JL and BK contributed equally as co-first authors

[1]Department of Ophthalmology, Severance Hospital, Institute of Vision Research, Yonsei University College of Medicine; [2]Department of Laboratory Medicine, Yonsei University College of Medicine; [3]Brain Korea 21 PLUS Project for Medical Science, Yonsei University and [4]Department of pathology, Yonsei University College of medicine, Seoul, South Korea

Correspondence:
CHRISTOPHER SEUNGKYU LEE - SKLEE219@yuhs.ac
SEUNG-TAE LEE - LEE.ST@yuhs.ac

doi:10.3324/haematol.2019.233783

Supplemental Data

Supplemental Methods

Supplemental Table 1

Supplemental Figure 1-5

Supplementary Methods

Whole exome sequencing (WES)

Genomic DNA was extracted using a QIAamp DNA Blood Mini Kit (Qiagen). The sequencing libraries for Exome-sequencing were prepared using the Twist Human Core Exome Kit (Twist Bioscience). Paired-end 100 bp read sequencing was performed on a NovaSeq system (Illumina). The paired-end reads were mapped to the human genome (NCBI build 37) using BWA (version 0.7.12).[1] The alignment was further refined by the functions of local realignment, base quality recalibration and indel realignment provided by GATK software 3.8-0. In order to identify single nucleotide variations (SNVs) and indels, we used HaplotypeCaller and Mutect2 from the GATK package (3.8-0), and VarScan2 (2.4.0). The results of these three algorithms were compared and merged.[2-4] An R package, ExomeDepth (version 1.1.10), was used to detect exon- or gene-level copy number variation (CNV) in the target regions,[5] followed by visualization using a base-level read depth normalization algorithm implemented in the DxSeq Analyzer (Dxome).

In order to identify candidate somatic mutations from a large variant pool, we employed the following exclusion criteria: 1) variants identified in matched germline samples; 2) variants with population frequency >0.0001 using frequency data from the Exome Aggregation Consortium (ExAC, http://exac.broadinstitute.org/) and the Korean reference genome database (KRGDB, http://152.99.75.168/KRGDB/menuPages/firstInfo.jsp); 3) variants presumed to be artifacts generated either by the high throughput sequencing platform or due to errors in alignment.

All of the filtered variants were further examined by visual verification using the Integrative Genomic Viewer [6].

Meta-analysis of previous primary CNS lymphoma whole exome sequencing cohorts

The frequency of mutated genes in our VRL cohort was compared to results from the meta-analysis of four PCNSL cohorts.[7-10]

Ophthalmologic evaluation

All patients underwent a comprehensive ophthalmic examination at baseline and during each follow-up visit. These examinations included evaluation of best-corrected visual acuity (BCVA), slit-lamp biomicroscopy, ophthalmoscopy, and Optomap ultra-widefield imaging (Optos PLC, Dunfermline, Fife, Scotland, UK).

Diagnostic vitrectomy and cytology

All patients underwent diagnostic vitrectomy. Extreme caution was exercised when applying the vitreous sampling technique and during the subsequent processes to prevent cell degeneration or necrosis. A 23 or 25 gauge (G) three-port pars plana vitrectomy was gently performed (for vitreous sampling) with a cutting rate of 500-1,000 cuts/minute in order to minimize cell damage. The undiluted vitreous (1-2 ml) was first obtained for cytologic analysis and interleukin-6 and -10 examinations. The infusion was subsequently started, and a second diluted vitreous specimen was collected in a separate bottle using gentle vitreous cutting. The diluted samples were used for the following studies: WES; immunoglobulin clonality assays; bacterial cultures and staining; fungal cultures and staining; and polymerase chain reaction (PCR) for varicella zoster virus (VZV), herpes simplex virus (HSV) type 1 and 2, cytomegalovirus (CMV), toxoplasmosis, and tuberculosis. The samples were immediately delivered to the pathology laboratory without fixation.[11-13]

Interleukin measurements and immunoglobulin clonality assays

IL-6 and 10 levels were manually measured using the Human IL-6, 10 Quantikine ELISA (R&D Systems, Minneapolis, Minnesota, USA), according to the manufacturer's instructions.

B-cell heavy chain and kappa light chain immunoglobulin clonality assays were conducted using the LymphoTrack Dx IGH FR1 Assay Panel and LymphoTrack Dx IGK Assay Panel (Invivoscribe, Inc., San Diego, CA, USA) according to the manufacturer's instructions. The results were analyzed using LymphoTrack software (Invivoscribe).

References (Supplementary Methods)

1 Li H. Toward better understanding of artifacts in variant calling from high-coverage samples. *Bioinformatics* 2014; **30**: 2843-2851.

2 Cibulskis K, Lawrence MS, Carter SL, Sivachenko A, Jaffe D, Sougnez C *et al.* Sensitive detection of somatic point mutations in impure and heterogeneous cancer samples. *Nat Biotechnol* 2013; **31**: 213-219.

3 DePristo MA, Banks E, Poplin R, Garimella KV, Maguire JR, Hartl C *et al.* A framework for variation discovery and genotyping using next-generation DNA sequencing data. *Nat Genet* 2011; **43**: 491-498.

4 Koboldt DC, Zhang Q, Larson DE, Shen D, McLellan MD, Lin L *et al.* VarScan 2: somatic mutation and copy number alteration discovery in cancer by exome sequencing. *Genome Res* 2012; **22**: 568-576.

5 Plagnol V, Curtis J, Epstein M, Mok KY, Stebbings E, Grigoriadou S *et al.* A robust model for read count data in exome sequencing experiments and implications for copy number variant calling. *Bioinformatics* 2012; **28**: 2747-2754.

6 Robinson JT, Thorvaldsdottir H, Winckler W, Guttman M, Lander ES, Getz G *et al.* Integrative genomics viewer. *Nat Biotechnol* 2011; **29**: 24-26.

7 Bruno A, Boisselier B, Labreche K, Marie Y, Polivka M, Jouvet A *et al.* Mutational analysis of primary central nervous system lymphoma. *Oncotarget* 2014; **5**: 5065-5075.

8 Braggio E, Van Wier S, Ojha J, McPhail E, Asmann YW, Egan J *et al.* Genome-Wide Analysis Uncovers Novel Recurrent Alterations in Primary Central Nervous System Lymphomas. *Clin Cancer Res* 2015; **21**: 3986-3994.

9 Vater I, Montesinos-Rongen M, Schlesner M, Haake A, Purschke F, Sprute R *et al.* The mutational pattern of primary lymphoma of the central nervous system determined by whole-exome sequencing. *Leukemia* 2015; **29**: 677-685.

10 Nakamura T, Tateishi K, Niwa T, Matsushita Y, Tamura K, Kinoshita M *et al.* Recurrent mutations of CD79B and MYD88 are the hallmark of primary central nervous system lymphomas. *Neuropathol Appl Neurobiol* 2016; **42**: 279-290.

11 Gonzales JA, Chan CC. Biopsy techniques and yields in diagnosing primary intraocular lymphoma. *Int Ophthalmol* 2007; **27**: 241-250.

12 Margolis R, Brasil OF, Lowder CY, Singh RP, Kaiser PK, Smith SD *et al.* Vitrectomy for the diagnosis and management of uveitis of unknown cause. *Ophthalmology* 2007; **114**: 1893-1897.

13 Rajagopal R, Harbour JW. Diagnostic testing and treatment choices in primary vitreoretinal lymphoma. *Retina* 2011; **31**: 435-440.

Supplemental Table 1. Identified nonsynonymous somatic mutations

ID	chrom.pos	*gene*	NM	HGVSc	HGVSp	VAF
7	chr11:64522792-64522792	*PYGM*	NM_005609.2	c.808C>T	p.Arg270Ter	0.43
7	chr1:149858886-149858886	*HIST2H2AC*	NM_003517.2	c.363delC	p.Glu122LysfsTer?	0.24
7	chr1:203274840-203274840	*BTG2*	NM_006763.2	c.106A>T	p.Lys36Ter	0.39
7	chr10:120354734-120354734	*PRLHR*	NM_004248.2	c.23delG	p.Gly8AlafsTer52	0.63
7	chr15:73735686-73735686	*REC114*	NM_001042367.1	c.159+1G>A		0.42
7	chr19:54974185-54974185	*LENG9*	NM_198988.1	c.591G>A	p.Trp197Ter	0.46
7	chr2:173850159-173850159	*RAPGEF4*	NM_007023.3	c.1090-2A>C		0.38
7	chr3:120424952-120424952	*RABL3*	NM_173825.3	c.278delT	p.Phe93SerfsTer5	0.57
7	chr4:22436941-22436941	*ADGRA3*	NM_145290.3	c.1436C>A	p.Ser479Ter	0.36
7	chr5:34004765-34004765	*AMACR*	NM_014324.5	c.465dupT	p.Gly156TrpfsTer15	0.46
7	chr6:34827059-34827059	*UHRF1BP1*	NM_017754.3	c.2926C>T	p.Gln976Ter	0.43
7	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>T	p.Glu135Ter	0.45
7	chr6:106552954-106552954	*PRDM1*	NM_001198.3	c.919G>T	p.Glu307Ter	0.86
7	chr1:156035898-156035898	*RAB25*	NM_020387.2	c.239+1G>A		0.55
7	chr10:135083399-135083399	*ADAM8*	NM_001109.4	c.1863+2T>C		0.31
7	chr19:22942297-22942297	*ZNF99*	NM_001080409.2	c.413dupC	p.Thr139AsnfsTer10	0.22
7	chr2:64199311-64199312	*VPS54*	NM_016516.2	c.445_446delTT	p.Leu149ThrfsTer4	0.57
7	chr4:15542617-15542617	*CC2D2A*	NM_001080522.2	c.2161C>A	p.Pro721Thr	0.47
7	chr7:117171037-117171037	*CFTR*	NM_000492.3	c.358G>C	p.Ala120Pro	0.47
7	chr10:55944907-55944907	*PCDH15*	NM_033056.3	c.1427C>T	p.Thr476Ile	0.46
7	chr18:53255701-53255701	*TCF4*	NM_001083962.1	c.-453G>C		0.46
7	chr3:121712209-121712209	*ILDR1*	NM_001199799.1	c.1387C>T	p.Arg463Cys	0.39
7	chr7:124503424-124503424	*POT1*	NM_015450.2	c.526G>A	p.Gly176Arg	0.44
7	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.48
7	chr9:103004944-103004944	*INVS*	NM_014425.3	c.889G>A	p.Ala297Thr	0.59
7	chr11:61727470-61727470	*BEST1*	NM_004183.3	c.1055C>G	p.Ala352Gly	0.45
7	chr1:216850419-216850419	*ESRRG*	NM_001134285.2	c.402A>T	p.Gln134His	0.46
7	chr10:50870727-50870727	*CHAT*	NM_020549.4	c.1876G>A	p.Ala626Thr	0.43
7	chr12:53587630-53587630	*ITGB7*	NM_000889.1	c.1364T>A	p.Leu455Gln	0.36
7	chr12:110221560-110221560	*TRPV4*	NM_021625.4	c.2482C>T	p.Arg828Cys	0.33
7	chr15:54592460-54592460	*UNC13C*	NM_001080534.1	c.4157C>T	p.Pro1386Leu	0.36
7	chr15:94927336-94927336	*MCTP2*	NM_018349.3	c.1668G>C	p.Trp556Cys	0.60
7	chr17:18055457-18055457	*MYO15A*	NM_016239.3	c.7925C>T	p.Pro2642Leu	0.53
7	chr2:170136099-170136099	*LRP2*	NM_004525.2	c.1348T>C	p.Ser450Pro	0.37
7	chr22:38512214-38512214	*PLA2G6*	NM_003560.2	c.1747A>C	p.Met583Leu	0.47
7	chr3:50289547-50289547	*GNAI2*	NM_002070.2	c.134G>A	p.Gly45Glu	0.36
7	chr3:74418441-74418441	*CNTN3*	NM_020872.1	c.845T>G	p.Leu282Arg	0.35
7	chr3:176756202-176756202	*TBL1XR1*	NM_024665.4	c.946T>C	p.Trp316Arg	0.35
7	chr4:89576400-89576400	*HERC3*	NM_014606.2	c.853C>T	p.Pro285Ser	0.39
7	chr4:146475134-146475134	*SMAD1*	NM_005900.2	c.1196G>T	p.Gly399Val	0.43
7	chr8:18457888-18457888	*PSD3*	NM_015310.3	c.2467C>A	p.Leu823Ile	0.61
7	chrX:18915321-18915321	*PHKA2*	NM_000292.2	c.3242C>T	p.Pro1081Leu	0.92
7	chr1:27878175-27878175	*AHDC1*	NM_001029882.2	c.452G>A	p.Arg151Gln	0.44
7	chr1:36788255-36788255	*EVA1B*	NM_018166.1	c.139C>T	p.Leu47Phe	0.42
7	chr1:38411988-38411988	*INPP5B*	NM_005540.2	c.-8G>T		0.36
7	chr1:53153768-53153768	*COA7*	NM_023077.2	c.320C>T	p.Ser107Leu	0.46
7	chr1:75038437-75038437	*ERICH3*	NM_001002912.4	c.2957A>T	p.Glu986Val	0.45
7	chr1:75699743-75699743	*SLC44A5*	NM_001130058.1	c.781A>T	p.Ile261Leu	0.58
7	chr1:145473945-145473945	*ANKRD34A*	NM_001039888.3	c.617A>G	p.Glu206Gly	0.42
7	chr1:151747239-151747239	*TDRKH*	NM_006862.3	c.1580C>A	p.Thr527Asn	0.54
7	chr1:152323428-152323428	*FLG2*	NM_001014342.2	c.6834A>C	p.Gln2278His	0.46
7	chr1:152883562-152883562	*IVL*	NM_005547.2	c.1289T>G	p.Leu430Arg	0.41
7	chr1:155294257-155294257	*RUSC1*	NM_001105205.1	c.49G>A	p.Gly17Arg	0.41
7	chr1:156011993-156011993	*UBQLN4*	NM_020131.3	c.1301C>G	p.Pro434Arg	0.48
7	chr1:175355177-175355177	*TNR*	NM_003285.2	c.1768T>C	p.Phe590Leu	0.67
7	chr1:203274817-203274817	*BTG2*	NM_006763.2	c.83G>A	p.Gly28Asp	0.39
7	chr1:228005118-228005118	*PRSS38*	NM_183062.2	c.520C>T	p.Pro174Ser	0.39
7	chr1:235336058-235336058	*ARID4B*	NM_016374.5	c.3686G>A	p.Ser1229Asn	0.45

7	chr10:17127712-17127712	*CUBN*	NM_001081.3	c.1994G>T	p.Cys665Phe	0.44
7	chr10:75562331-75562331	*NDST2*	NM_003635.3	c.2530C>T	p.Arg844Cys	0.47
7	chr10:102891569-102891569	*TLX1*	NM_005521.3	c.271G>C	p.Ala91Pro	0.43
7	chr11:1642764-1642764	*KRTAP5-4*	NM_001012709.1	c.560C>A	p.Ser187Tyr	0.33
7	chr11:62502968-62502968	*TTC9C*	NM_173810.3	c.353T>C	p.Phe118Ser	0.43
7	chr11:67018001-67018001	*KDM2A*	NM_012308.2	c.2500C>A	p.Arg834Ser	0.56
7	chr11:75115200-75115200	*RPS3*	NM_001005.4	c.487C>A	p.Pro163Thr	0.42
7	chr11:76751026-76751026	*B3GNT6*	NM_138706.4	c.431G>A	p.Arg144His	0.41
7	chr11:92531326-92531326	*FAT3*	NM_001008781.2	c.5147T>C	p.Ile1716Thr	0.40
7	chr11:128391823-128391823	*ETS1*	NM_001162422.1	c.67C>T	p.Leu23Phe	0.39
7	chr11:134253606-134253606	*B3GAT1*	NM_018644.3	c.589G>A	p.Asp197Asn	0.39
7	chr12:20523143-20523143	*PDE3A*	NM_000921.4	c.925C>T	p.Arg309Trp	0.42
7	chr12:38714575-38714575	*ALG10B*	NM_001013620.3	c.982G>T	p.Val328Leu	0.47
7	chr12:52908971-52908971	*KRT5*	NM_000424.3	c.1528G>A	p.Gly510Ser	0.36
7	chr12:64202700-64202700	*TMEM5*	NM_014254.2	c.1160A>G	p.Lys387Arg	0.30
7	chr12:78400777-78400777	*NAV3*	NM_014903.4	c.1459G>A	p.Glu487Lys	0.31
7	chr12:85277598-85277598	*SLC6A15*	NM_018057.6	c.796A>G	p.Ile266Val	0.32
7	chr12:89919662-89919662	*POC1B*	NM_172240.2	c.11C>T	p.Ala4Val	0.25
7	chr12:92538121-92538121	*BTG1*	NM_001731.2	c.251C>T	p.Ala84Val	0.26
7	chr12:92538122-92538122	*BTG1*	NM_001731.2	c.250G>A	p.Ala84Thr	0.26
7	chr12:111064199-111064199	*TCTN1*	NM_024549.5	c.374T>C	p.Val125Ala	0.62
7	chr12:124228350-124228350	*ATP6V0A2*	NM_012463.3	c.1057A>G	p.Ile353Val	0.62
7	chr12:126138457-126138457	*TMEM132B*	NM_052907.2	c.2438A>C	p.His813Pro	0.26
7	chr13:25946397-25946397	*ATP8A2*	NM_016529.4	c.47C>T	p.Pro16Leu	0.39
7	chr13:33684153-33684153	*STARD13*	NM_178006.3	c.2904C>G	p.Asn968Lys	0.43
7	chr13:36900812-36900812	*SPG20*	NM_001142294.1	c.1188A>C	p.Glu396Asp	0.42
7	chr13:53422076-53422076	*PCDH8*	NM_002590.3	c.496G>A	p.Ala166Thr	0.42
7	chr13:111358376-111358376	*CARS2*	NM_024537.2	c.65G>A	p.Gly22Glu	0.53
7	chr14:45620691-45620691	*FANCM*	NM_020937.2	c.1010C>T	p.Ala337Val	0.30
7	chr14:60928295-60928295	*C14orf39*	NM_174978.2	c.989C>T	p.Ala330Val	0.43
7	chr14:68252933-68252933	*ZFYVE26*	NM_015346.3	c.3037G>T	p.Val1013Leu	0.33
7	chr15:40764403-40764403	*CHST14*	NM_130468.3	c.991G>A	p.Ala331Thr	0.43
7	chr15:43940905-43940905	*CATSPER2*	NM_172095.1	c.-81G>A		0.45
7	chr15:62254644-62254644	*VPS13C*	NM_020821.2	c.3529G>A	p.Val1177Met	0.40
7	chr15:62360407-62360407	*C2CD4A*	NM_207322.2	c.595C>T	p.Arg199Cys	0.60
7	chr15:89386792-89386792	*ACAN*	NM_013227.3	c.964C>G	p.Leu322Val	0.52
7	chr16:735964-735964	*WDR24*	NM_032259.2	c.1478G>A	p.Gly493Glu	0.40
7	chr16:11348853-11348853	*SOCS1*	NM_003745.1	c.483G>A	p.Met161Ile	0.61
7	chr16:24800648-24800648	*TNRC6A*	NM_014494.2	c.685G>A	p.Val229Ile	0.41
7	chr16:24800889-24800889	*TNRC6A*	NM_014494.2	c.926G>A	p.Ser309Asn	0.37
7	chr16:24801009-24801009	*TNRC6A*	NM_014494.2	c.1046G>C	p.Ser349Thr	0.44
7	chr16:24801746-24801746	*TNRC6A*	NM_014494.2	c.1783G>A	p.Gly595Arg	0.37
7	chr16:24802433-24802433	*TNRC6A*	NM_014494.2	c.2470G>C	p.Glu824Gln	0.41
7	chr16:24802796-24802796	*TNRC6A*	NM_014494.2	c.2833G>A	p.Asp945Asn	0.44
7	chr16:24802982-24802982	*TNRC6A*	NM_014494.2	c.3019G>C	p.Ala1007Pro	0.45
7	chr16:24809285-24809285	*TNRC6A*	NM_014494.2	c.3692G>A	p.Gly1231Glu	0.44
7	chr16:69776425-69776425	*NOB1*	NM_014062.2	c.1049G>A	p.Arg350Gln	0.37
7	chr16:70501346-70501346	*FUK*	NM_145059.2	c.554A>T	p.Asn185Ile	0.45
7	chr16:70711759-70711759	*MTSS1L*	NM_138383.2	c.668G>A	p.Gly223Asp	0.47
7	chr16:70867854-70867854	*HYDIN*	NM_001270974.1	c.13615G>A	p.Val4539Met	0.45
7	chr16:74524915-74524915	*GLG1*	NM_012201.5	c.1433T>G	p.Met478Arg	0.47
7	chr17:4269587-4269587	*UBE2G1*	NM_003342.4	c.25C>G	p.Leu9Val	0.16
7	chr17:54981690-54981690	*TRIM25*	NM_005082.4	c.853A>G	p.Lys285Glu	0.40
7	chr17:62152600-62152600	*ERN1*	NM_001433.3	c.290C>A	p.Pro97His	0.17
7	chr17:62152604-62152604	*ERN1*	NM_001433.3	c.286C>A	p.Leu96Ile	0.27
7	chr19:3959367-3959367	*DAPK3*	NM_001348.1	c.1097G>T	p.Trp366Leu	0.41
7	chr19:9084881-9084881	*MUC16*	NM_024690.2	c.6934A>C	p.Thr2312Pro	0.45
7	chr19:22154945-22154945	*ZNF208*	NM_007153.3	c.2891A>C	p.Lys964Thr	0.40
7	chr19:22575731-22575731	*ZNF98*	NM_001098626.1	c.306T>A	p.Asn102Lys	0.31
7	chr19:33130308-33130308	*ANKRD27*	NM_032139.2	c.1070C>T	p.Ala357Val	0.28

7	chr19:47249585-47249585	*STRN4*	NM_001039877.1	c.103T>C	p.Ser35Pro	0.37
7	chr19:48946631-48946631	*GRIN2D*	NM_000836.2	c.3448G>A	p.Gly1150Ser	0.44
7	chr19:54485526-54485526	*CACNG8*	NM_031895.5	c.701C>T	p.Ala234Val	0.45
7	chr19:56467237-56467237	*NLRP8*	NM_176811.2	c.1813G>A	p.Gly605Arg	0.45
7	chr19:57088864-57088864	*ZNF470*	NM_001001668.3	c.1067C>A	p.Ala356Asp	0.42
7	chr2:264969-264969	*ACP1*	NM_004300.3	c.5C>T	p.Ala2Val	0.36
7	chr2:29092672-29092672	*TRMT61B*	NM_017910.3	c.472T>G	p.Leu158Val	0.48
7	chr2:44207073-44207073	*LRPPRC*	NM_133259.3	c.361A>G	p.Ser121Gly	0.43
7	chr2:63264757-63264757	*EHBP1*	NM_001142615.2	c.3191A>T	p.Gln1064Leu	0.65
7	chr2:64139699-64139699	*VPS54*	NM_016516.2	c.2519T>G	p.Leu840Arg	0.22
7	chr2:120005409-120005409	*STEAP3*	NM_182915.2	c.677C>A	p.Thr226Asn	0.44
7	chr2:141986881-141986881	*LRP1B*	NM_018557.2	c.721A>G	p.Ile241Val	0.42
7	chr2:159922475-159922475	*TANC1*	NM_033394.2	c.53A>C	p.Lys18Thr	0.40
7	chr2:166535742-166535742	*CSRNP3*	NM_001172173.1	c.1237T>C	p.Ser413Pro	0.48
7	chr2:210557814-210557814	*MAP2*	NM_002374.3	c.920A>G	p.Lys307Arg	0.45
7	chr2:228860327-228860327	*SPHKAP*	NM_001142644.1	c.4532G>T	p.Ser1511Ile	0.38
7	chr2:234668930-234668930	*UGT1A1*	NM_000463.2	c.-4C>T		0.41
7	chr20:9318695-9318695	*PLCB4*	NM_001172646.1	c.206G>T	p.Arg69Leu	0.43
7	chr20:32251356-32251356	*C20orf144*	NM_080825.3	c.145C>A	p.Leu49Ile	0.47
7	chr20:32251635-32251635	*C20orf144*	NM_080825.3	c.424C>T	p.Pro142Ser	0.58
7	chr20:37524274-37524274	*PPP1R16B*	NM_015568.2	c.388A>C	p.Lys130Gln	0.45
7	chr20:45700881-45700881	*EYA2*	NM_005244.4	c.473G>A	p.Ser158Asn	0.44
7	chr20:47845317-47845317	*DDX27*	NM_017895.7	c.865G>C	p.Val289Leu	0.46
7	chr20:57042182-57042182	*APCDD1L*	NM_153360.1	c.721C>T	p.Arg241Cys	0.43
7	chr21:18933059-18933059	*CXADR*	NM_001207066.1	c.611C>A	p.Ser204Tyr	0.53
7	chr21:43161377-43161377	*RIPK4*	NM_020639.2	c.1976G>A	p.Arg659Gln	0.45
7	chr22:23230270-23230270	*IGLL5*	NM_001178126.1	c.37C>G	p.Pro13Ala	0.66
7	chr22:23230394-23230394	*IGLL5*	NM_001178126.1	c.161C>T	p.Ala54Val	0.74
7	chr22:23230439-23230439	*IGLL5*	NM_001178126.1	c.206G>C	p.Arg69Thr	0.81
7	chr22:23237722-23237722	*IGLL5*	NM_001178126.1	c.493A>G	p.Lys165Glu	0.79
7	chr22:31591527-31591527	*RNF185*	NM_152267.3	c.268C>G	p.Pro90Ala	0.47
7	chr22:37467072-37467072	*TMPRSS6*	NM_153609.2	c.1583G>T	p.Gly528Val	0.45
7	chr3:32022573-32022573	*OSBPL10*	NM_017784.4	c.99C>G	p.Cys33Trp	0.47
7	chr3:52011905-52011905	*ABHD14A*	NM_015407.4	c.88A>T	p.Met30Leu	0.47
7	chr3:122287487-122287487	*DTX3L*	NM_138287.3	c.551T>C	p.Ile184Thr	0.47
7	chr3:122419508-122419508	*PARP14*	NM_017554.2	c.2107C>A	p.Gln703Lys	0.52
7	chr3:176750842-176750842	*TBL1XR1*	NM_024665.4	c.1333G>C	p.Val445Leu	0.47
7	chr4:1305788-1305788	*MAEA*	NM_001017405.1	c.91A>G	p.Lys31Glu	0.44
7	chr4:39864671-39864671	*PDS5A*	NM_001100399.1	c.2789A>T	p.Gln930Leu	0.18
7	chr4:71510201-71510201	*ENAM*	NM_031889.2	c.3058G>T	p.Val1020Phe	0.41
7	chr4:72897637-72897637	*NPFFR2*	NM_004885.2	c.19A>G	p.Thr7Ala	0.45
7	chr4:83821981-83821981	*THAP9*	NM_024672.4	c.26G>A	p.Gly9Asp	0.45
7	chr4:162680649-162680649	*FSTL5*	NM_001128427.2	c.638T>G	p.Phe213Cys	0.43
7	chr5:42801342-42801342	*SEPP1*	NM_005410.2	c.626A>G	p.His209Arg	0.52
7	chr5:82807952-82807952	*VCAN*	NM_004385.4	c.779A>C	p.Lys260Thr	0.47
7	chr5:140516469-140516469	*PCDHB5*	NM_015669.2	c.1453G>A	p.Val485Ile	0.41
7	chr5:154092519-154092519	*LARP1*	NM_015315.4	c.34C>T	p.Pro12Ser	0.43
7	chr5:171766365-171766365	*SH3PXD2B*	NM_001017995.2	c.1744C>T	p.Pro582Ser	0.44
7	chr5:178564886-178564886	*ADAMTS2*	NM_014244.4	c.1835G>A	p.Arg612His	0.44
7	chr6:26285427-26285427	*HIST1H4H*	NM_003543.3	c.301T>C	p.Phe101Leu	0.44
7	chr6:27114460-27114460	*HIST1H2BK*	NM_080593.2	c.118G>T	p.Val40Leu	0.16
7	chr6:27834833-27834833	*HIST1H1B*	NM_005322.2	c.475G>C	p.Ala159Pro	0.42
7	chr6:29394773-29394773	*OR11A1*	NM_013937.2	c.646C>A	p.Leu216Met	0.41
7	chr6:36807104-36807104	*CPNE5*	NM_020939.1	c.50C>T	p.Ala17Val	0.44
7	chr6:37138804-37138804	*PIM1*	NM_002648.3	c.237G>C	p.Glu79Asp	0.54
7	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>A	p.Glu135Lys	0.45
7	chr6:37139097-37139097	*PIM1*	NM_002648.3	c.437G>C	p.Ser146Thr	0.48
7	chr6:44134537-44134537	*CAPN11*	NM_007058.3	c.59A>C	p.Gln20Pro	0.55
7	chr6:50682940-50682940	*TFAP2D*	NM_172238.3	c.151A>G	p.Thr51Ala	0.42
7	chr6:86328599-86328599	*SYNCRIP*	NM_001159677.1	c.1217C>T	p.Ala406Val	0.42

7	chr6:106534459-106534459	*PRDM1*	NM_001198.3	c.31G>A	p.Gly11Ser	0.85
7	chr6:106534460-106534460	*PRDM1*	NM_001198.3	c.32G>A	p.Gly11Asp	0.86
7	chr6:106536151-106536151	*PRDM1*	NM_001198.3	c.118G>A	p.Asp40Asn	0.26
7	chr6:133136208-133136208	*RPS12*	NM_001016.3	c.112G>A	p.Ala38Thr	0.39
7	chr6:142409488-142409488	*NMBR*	NM_002511.2	c.308G>A	p.Arg103His	0.82
7	chr6:146056369-146056369	*EPM2A*	NM_005670.3	c.266T>C	p.Leu89Pro	0.47
7	chr7:82584700-82584700	*PCLO*	NM_033026.5	c.5569T>A	p.Ser1857Thr	0.46
7	chr7:98256543-98256543	*NPTX2*	NM_002523.2	c.955C>G	p.Arg319Gly	0.43
7	chr7:111517110-111517110	*DOCK4*	NM_014705.3	c.1720T>A	p.Cys574Ser	0.45
7	chr7:134678334-134678334	*AGBL3*	NM_178563.3	c.215C>T	p.Pro72Leu	0.56
7	chr8:6669325-6669325	*XKR5*	NM_207411.4	c.1456A>G	p.Lys486Glu	0.46
7	chr8:19701733-19701733	*INTS10*	NM_018142.2	c.1866T>A	p.Phe622Leu	0.54
7	chr8:39666958-39666958	*ADAM2*	NM_001464.4	c.541G>C	p.Glu181Gln	0.37
7	chr8:55542317-55542317	*RP1*	NM_006269.1	c.5875T>G	p.Leu1959Val	0.39
7	chr8:74529675-74529675	*STAU2*	NM_001164380.1	c.422C>G	p.Pro141Arg	0.42
7	chr8:113678579-113678579	*CSMD3*	NM_198123.1	c.2743T>C	p.Tyr915His	0.52
7	chr8:145748182-145748182	*LRRC24*	NM_001024678.3	c.1219A>G	p.Ile407Val	0.47
7	chr9:39132991-39132991	*CNTNAP3*	NM_033655.3	c.2018C>T	p.Ala673Val	0.47
7	chr9:40705193-40705193	*SPATA31A3*	NM_001083124.1	c.2850G>C	p.Glu950Asp	0.35
7	chr9:103348633-103348633	*MURC*	NM_001018116.2	c.995G>A	p.Arg332Lys	0.40
7	chrX:104512096-104512096	*IL1RAPL2*	NM_017416.1	c.569G>T	p.Ser190Ile	0.93
7	chr1:120306950-120306950	*HMGCS2*	NM_005518.3	c.404T>C	p.Ile135Thr	0.46
7	chr14:31354777-31354777	*COCH*	NM_004086.2	c.911C>T	p.Pro304Leu	0.23
7	chr8:110467057-110467057	*PKHD1L1*	NM_177531.4	c.6850C>T	p.Arg2284Trp	0.45
7	chr1:156347239-156347239	*RHBG*	NM_001256395.1	c.128A>C	p.His43Pro	0.43
7	chr1:204971826-204971826	*NFASC*	NM_001005388.2	c.3239G>A	p.Arg1080Gln	0.39
7	chr10:60588627-60588627	*BICC1*	NM_001080512.1	c.2901T>G	p.Ile967Met	0.45
7	chr10:75301401-75301401	*USP54*	NM_152586.3	c.668G>A	p.Arg223Gln	0.40
7	chr10:75552191-75552191	*ZSWIM8*	NM_001242487.1	c.1894G>A	p.Ala632Thr	0.44
7	chr10:94215389-94215389	*IDE*	NM_004969.3	c.2908G>A	p.Gly970Arg	0.48
7	chr11:16838711-16838711	*PLEKHA7*	NM_175058.4	c.1502G>A	p.Arg501Gln	0.46
7	chr11:59560875-59560875	*STX3*	NM_004177.4	c.563A>G	p.Lys188Arg	0.52
7	chr11:96117437-96117437	*CCDC82*	NM_024725.3	c.475G>A	p.Asp159Asn	0.46
7	chr12:1702080-1702080	*FBXL14*	NM_152441.2	c.1153G>A	p.Val385Ile	0.45
7	chr12:57573889-57573889	*LRP1*	NM_002332.2	c.5201G>A	p.Arg1734His	0.67
7	chr12:72274376-72274376	*TBC1D15*	NM_001146214.1	c.356A>G	p.His119Arg	0.70
7	chr12:73015432-73015432	*TRHDE*	NM_013381.2	c.2441G>A	p.Arg814His	0.58
7	chr12:85434313-85434313	*LRRIQ1*	NM_001079910.1	c.178A>G	p.Ile60Val	0.28
7	chr15:75970122-75970122	*CSPG4*	NM_001897.4	c.5056G>A	p.Val1686Met	0.42
7	chr16:767098-767098	*METRN*	NM_024042.2	c.593C>T	p.Thr198Ile	0.44
7	chr16:1033868-1033868	*SOX8*	NM_014587.3	c.563C>T	p.Ser188Leu	0.44
7	chr16:15127180-15127180	*PDXDC1*	NM_015027.2	c.1736C>T	p.Ala579Val	0.48
7	chr16:71706165-71706165	*PHLPP2*	NM_015020.2	c.1532G>A	p.Arg511Gln	0.40
7	chr17:34076140-34076140	*GAS2L2*	NM_139285.3	c.724A>G	p.Ile242Val	0.48
7	chr17:48918213-48918213	*WFIKKN2*	NM_175575.5	c.1564G>A	p.Val522Met	0.46
7	chr17:66430713-66430713	*WIPI1*	NM_017983.5	c.676C>T	p.Arg226Trp	0.40
7	chr17:73830568-73830568	*UNC13D*	NM_199242.2	c.2136C>G	p.Ile712Met	0.44
7	chr17:73987677-73987677	*TEN1*	NM_001113324.2	c.223G>A	p.Val75Ile	0.40
7	chr18:60052263-60052263	*TNFRSF11A*	NM_003839.3	c.1847C>T	p.Ala616Val	0.54
7	chr19:15562668-15562668	*RASAL3*	NM_022904.1	c.2974C>T	p.Arg992Trp	0.43
7	chr19:57328240-57328240	*PEG3*	NM_006210.2	c.1570C>T	p.Arg524Trp	0.38
7	chr19:57642738-57642738	*USP29*	NM_020903.2	c.2695C>T	p.Arg899Trp	0.44
7	chr19:57911139-57911139	*ZNF548*	NM_001172773.1	c.1520A>G	p.His507Arg	0.47
7	chr2:127453534-127453534	*GYPC*	NM_002101.4	c.203C>T	p.Ala68Val	0.43
7	chr2:158152985-158152985	*GALNT5*	NM_014568.1	c.1957G>A	p.Val653Ile	0.43
7	chr2:160176918-160176918	*BAZ2B*	NM_013450.2	c.6365T>C	p.Leu2122Pro	0.60
7	chr20:20585932-20585932	*RALGAPA2*	NM_020343.3	c.1925A>G	p.Asn642Ser	0.48
7	chr20:33329670-33329670	*NCOA6*	NM_014071.3	c.4390C>G	p.Pro1464Ala	0.39
7	chr20:44511793-44511793	*ZSWIM1*	NM_080603.4	c.562C>T	p.Arg188Trp	0.48
7	chr22:23235921-23235921	*IGLL5*	NM_001178126.1	c.248G>A	p.Cys83Tyr	0.31

7	chr3:8809671-8809671	*OXTR*	NM_000916.3	c.203G>A	p.Arg68His	0.53
7	chr3:49149481-49149481	*USP19*	NM_001199161.1	c.2766G>T	p.Gln922His	0.54
7	chr3:150932049-150932049	*P2RY14*	NM_014879.3	c.56T>G	p.Leu19Arg	0.42
7	chr3:184588573-184588573	*VPS8*	NM_001009921.2	c.1714G>C	p.Val572Leu	0.47
7	chr3:190374317-190374317	*IL1RAP*	NM_001167931.1	c.1985C>T	p.Pro662Leu	0.47
7	chr5:68412416-68412416	*SLC30A5*	NM_022902.4	c.1268T>C	p.Leu423Ser	0.62
7	chr5:71492289-71492289	*MAP1B*	NM_005909.3	c.3107C>T	p.Pro1036Leu	0.40
7	chr5:140023765-140023765	*TMCO6*	NM_018502.3	c.1186G>A	p.Val396Met	0.54
7	chr6:158485637-158485637	*SYNJ2*	NM_003898.3	c.1214T>C	p.Leu405Pro	0.46
7	chr6:158923609-158923609	*TULP4*	NM_020245.4	c.2914C>T	p.Arg972Trp	0.47
7	chr7:2749277-2749277	*AMZ1*	NM_133463.1	c.775A>G	p.Thr259Ala	0.45
7	chr7:64864227-64864227	*ZNF92*	NM_007139.2	c.993A>T	p.Glu331Asp	0.28
7	chr7:143826389-143826389	*OR2A14*	NM_001001659.1	c.184C>T	p.Leu62Phe	0.47
7	chr8:59547913-59547913	*NSMAF*	NM_001144772.1	c.340A>G	p.Ile114Val	0.55
7	chr8:145948096-145948096	*ZNF251*	NM_138367.1	c.949G>A	p.Gly317Arg	0.45
7	chr9:124535341-124535341	*DAB2IP*	NM_032552.2	c.2450G>T	p.Gly817Val	0.46
7	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>T	p.Glu135Ter	0.45
7	chr22:23230403-23230403	*IGLL5*	NM_001178126.1	c.170G>A	p.Gly57Glu	0.74
7	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>A	p.Glu135Lys	0.45
7	chr22:23230235-23230235	*IGLL5*	NM_001178126.1	c.2T>A	p.Met1?	0.18
2	chr6:393303-393303	*IRF4*	NM_002460.3	c.151C>T	p.Arg51Cys	0.23
2	chr1:12952784-12952784	*PRAMEF10*	NM_001039361.3	c.1388G>A	p.Trp463Ter	0.31
2	chr11:30033967-30033967	*KCNA4*	NM_002233.3	c.259C>T	p.Arg87Ter	0.34
2	chr11:46388535-46388535	*DGKZ*	NM_001105540.1	c.728+1G>A		0.33
2	chr16:85954865-85954865	*IRF8*	NM_002163.2	c.1258G>T	p.Glu420Ter	0.29
2	chr17:6941765-6941765	*SLC16A13*	NM_201566.2	c.639_640dupTG	p.Gly214ValfsTer13	0.40
2	chr17:39973365-39973365	*FKBP10*	NM_021939.3	c.302delG	p.Gly101AlafsTer58	0.33
2	chr17:66891019-66891019	*ABCA8*	NM_007168.2	c.2778+2T>C		0.37
2	chr17:73316502-73316502	*GRB2*	NM_203506.2	c.478C>T	p.Gln160Ter	0.18
2	chr17:73317751-73317751	*GRB2*	NM_203506.2	c.334C>T	p.Gln112Ter	0.39
2	chr19:13397782-13397782	*CACNA1A*	NM_001127221.1	c.3093-2A>T		0.20
2	chr19:42840969-42840969	*MEGF8*	NM_001410.2	c.1255C>T	p.Arg419Ter	0.37
2	chr2:185463798-185463798	*ZNF804A*	NM_194250.1	c.111+1G>C		0.36
2	chr4:25864410-25864410	*SEL1L3*	NM_015187.3	c.49C>T	p.Gln17Ter	0.37
2	chr5:78981027-78981027	*PAPD4*	NM_173797.3	c.1386G>A	p.Trp462Ter	0.38
2	chr6:37138354-37138354	*PIM1*	NM_002648.3	c.3G>T	p.Met1?	0.68
2	chr6:37138554-37138554	*PIM1*	NM_002648.3	c.88G>T	p.Glu30Ter	0.23
2	chr6:93967815-93967815	*EPHA7*	NM_004440.3	c.2110+2T>A		0.39
2	chr8:97285533-97285534	*PTDSS1*	NM_014754.1	c.188_189delCT	p.Ser63CysfsTer64	0.25
2	chr9:128064317-128064317	*GAPVD1*	NM_015635.2	c.241C>T	p.Gln81Ter	0.45
2	chrX:1464208-1464208	*IL3RA*	NM_002183.3	c.65-1G>C		0.40
2	chrX:12994450-12994450	*TMSB4X*	NM_021109.3	c.70C>T	p.Gln24Ter	0.34
2	chrX:48791982-48791982	*OTUD5*	NM_001136158.1	c.910+2T>C		0.35
2	chrX:77086300-77086300	*MAGT1*	NM_032121.5	c.1088+2T>C		0.29
2	chr12:113496202-113496202	*DTX1*	NM_004416.2	c.205C>G	p.Leu69Val	0.33
2	chr8:100396517-100396517	*VPS13B*	NM_017890.4	c.2906A>C	p.Gln969Pro	0.43
2	chr11:68183910-68183910	*LRP5*	NM_002335.2	c.2942C>A	p.Ala981Asp	0.32
2	chr14:23886137-23886137	*MYH7*	NM_000257.2	c.4584G>T	p.Lys1528Asn	0.28
2	chr5:180047965-180047965	*FLT4*	NM_182925.4	c.2210G>A	p.Arg737His	0.35
2	chr1:8385982-8385982	*SLC45A1*	NM_001080397.1	c.595G>A	p.Gly199Ser	0.38
2	chr11:63979181-63979181	*FERMT3*	NM_178443.2	c.748C>T	p.Arg250Cys	0.37
2	chr11:64627466-64627466	*EHD1*	NM_006795.2	c.845T>G	p.Ile282Ser	0.39
2	chr12:53003065-53003065	*KRT73*	NM_175068.2	c.1332G>T	p.Arg444Ser	0.42
2	chr18:30350139-30350139	*KLHL14*	NM_020805.1	c.416T>A	p.Leu139His	0.36
2	chr19:6427410-6427410	*SLC25A41*	NM_173637.3	c.727C>T	p.Arg243Cys	0.34
2	chr19:15311616-15311616	*NOTCH3*	NM_000435.2	c.101C>T	p.Ala34Val	0.30
2	chr19:42600030-42600030	*POU2F2*	NM_001207025.2	c.715A>G	p.Thr239Ala	0.29
2	chr2:1481041-1481041	*TPO*	NM_000547.5	c.1003G>A	p.Ala335Thr	0.32
2	chr2:11053096-11053096	*KCNF1*	NM_002236.4	c.544C>T	p.Arg182Trp	0.32
2	chr2:26683590-26683590	*OTOF*	NM_194248.2	c.5738T>C	p.Leu1913Ser	0.30

2	chr4:13543933-13543933	*NKX3-2*	NM_001189.3	c.686G>A	p.Arg229His	0.36
2	chr4:176561947-176561947	*GPM6A*	NM_005277.4	c.575G>T	p.Cys192Phe	0.34
2	chr6:393318-393318	*IRF4*	NM_002460.3	c.166C>T	p.His56Tyr	0.18
2	chr8:57025772-57025772	*MOS*	NM_005372.1	c.770C>T	p.Thr257Met	0.37
2	chr8:121357694-121357694	*COL14A1*	NM_021110.2	c.4969G>A	p.Gly1657Arg	0.36
2	chr9:37424873-37424873	*GRHPR*	NM_012203.1	c.115C>T	p.Pro39Ser	0.30
2	chr9:136305557-136305557	*ADAMTS13*	NM_139025.4	c.1879G>A	p.Glu627Lys	0.36
2	chr1:16385011-16385011	*FAM131C*	NM_182623.2	c.764G>A	p.Gly255Asp	0.24
2	chr1:22156531-22156531	*HSPG2*	NM_005529.5	c.11725A>G	p.Thr3909Ala	0.42
2	chr1:33354785-33354785	*HPCA*	NM_002143.2	c.286C>T	p.Arg96Cys	0.34
2	chr1:37291324-37291324	*GRIK3*	NM_000831.3	c.1634G>A	p.Arg545Gln	0.33
2	chr1:55638072-55638072	*USP24*	NM_015306.2	c.680G>A	p.Gly227Asp	0.43
2	chr1:55638073-55638073	*USP24*	NM_015306.2	c.679G>A	p.Gly227Ser	0.43
2	chr1:89618417-89618417	*GBP7*	NM_207398.2	c.362T>G	p.Leu121Arg	0.33
2	chr1:156675247-156675247	*CRABP2*	NM_001199723.1	c.-9G>A		0.33
2	chr1:157508983-157508983	*FCRL5*	NM_031281.2	c.1295T>C	p.Val432Ala	0.37
2	chr1:167815050-167815050	*ADCY10*	NM_018417.4	c.2758G>T	p.Val920Leu	0.27
2	chr1:183617176-183617176	*APOBEC4*	NM_203454.2	c.741A>T	p.Lys247Asn	0.24
2	chr1:228345979-228345979	*GJC2*	NM_020435.3	c.520G>A	p.Ala174Thr	0.38
2	chr10:5042607-5042607	*AKR1C2*	NM_001135241.2	c.415T>C	p.Ser139Pro	0.40
2	chr10:83635677-83635677	*NRG3*	NM_001010848.3	c.581C>T	p.Pro194Leu	0.32
2	chr10:125650965-125650965	*CPXM2*	NM_198148.2	c.211C>T	p.Arg71Trp	0.36
2	chr11:19077156-19077156	*MRGPRX2*	NM_054030.2	c.794T>G	p.Val265Gly	0.33
2	chr11:64480760-64480760	*NRXN2*	NM_015080.3	c.412C>T	p.Arg138Cys	0.41
2	chr11:92715329-92715329	*MTNR1B*	NM_005959.3	c.940A>T	p.Asn314Tyr	0.26
2	chr11:115102202-115102202	*CADM1*	NM_014333.3	c.433C>T	p.Arg145Cys	0.37
2	chr11:119002353-119002353	*HINFP*	NM_015517.4	c.520A>G	p.Lys174Glu	0.34
2	chr11:123848215-123848215	*OR10S1*	NM_001004474.1	c.184G>A	p.Val62Met	0.32
2	chr11:124908391-124908391	*CCDC15*	NM_025004.2	c.2476C>A	p.His826Asn	0.42
2	chr12:936234-936234	*WNK1*	NM_018979.3	c.959A>C	p.Lys320Thr	0.44
2	chr12:18876421-18876421	*PLCZ1*	NM_033123.3	c.191A>G	p.Tyr64Cys	0.33
2	chr12:60098632-60098632	*SLC16A7*	NM_001270623.1	c.50G>A	p.Gly17Glu	0.45
2	chr12:77427783-77427783	*E2F7*	NM_203394.2	c.1163A>G	p.Glu388Gly	0.21
2	chr12:85466855-85466855	*LRRIQ1*	NM_001079910.1	c.2866A>G	p.Ile956Val	0.25
2	chr12:101776987-101776987	*UTP20*	NM_014503.2	c.7825G>A	p.Val2609Met	0.49
2	chr12:113496076-113496076	*DTX1*	NM_004416.2	c.79G>A	p.Val27Met	0.31
2	chr12:113496162-113496162	*DTX1*	NM_004416.2	c.165C>A	p.Asp55Glu	0.32
2	chr13:32653148-32653148	*FRY*	NM_023037.2	c.248G>A	p.Arg83His	0.32
2	chr13:33306262-33306262	*PDS5B*	NM_015032.3	c.2148C>G	p.His716Gln	0.29
2	chr14:21542661-21542661	*ARHGEF40*	NM_018071.4	c.772G>A	p.Asp258Asn	0.35
2	chr14:31354713-31354713	*COCH*	NM_004086.2	c.847G>A	p.Glu283Lys	0.38
2	chr14:68048796-68048796	*PLEKHH1*	NM_020715.2	c.3295C>T	p.Arg1099Cys	0.37
2	chr14:69259610-69259610	*ZFP36L1*	NM_004926.3	c.46G>C	p.Val16Leu	0.41
2	chr15:77906898-77906898	*LINGO1*	NM_032808.5	c.1351G>A	p.Asp451Asn	0.38
2	chr16:1836933-1836933	*NUBP2*	NM_012225.2	c.311T>C	p.Val104Ala	0.38
2	chr16:24373024-24373024	*CACNG3*	NM_006539.3	c.788C>T	p.Ser263Leu	0.31
2	chr16:28489159-28489159	*CLN3*	NM_000086.2	c.1096G>A	p.Gly366Ser	0.35
2	chr16:67190472-67190472	*TRADD*	NM_003789.3	c.92C>T	p.Ala31Val	0.32
2	chr17:11461436-11461436	*SHISA6*	NM_207386.3	c.1471C>T	p.Arg491Cys	0.42
2	chr17:29718883-29718883	*RAB11FIP4*	NM_032932.3	c.13G>A	p.Ala5Thr	0.45
2	chr17:55187398-55187398	*AKAP1*	NM_003488.3	c.1727A>C	p.Asn576Thr	0.35
2	chr17:61877903-61877903	*DDX42*	NM_007372.3	c.547T>C	p.Tyr183His	0.39
2	chr17:74208558-74208558	*RNF157*	NM_052916.2	c.94T>A	p.Tyr32Asn	0.45
2	chr17:78450058-78450058	*NPTX1*	NM_002522.3	c.189G>C	p.Glu63Asp	0.38
2	chr17:79478620-79478620	*ACTG1*	NM_001614.3	c.396G>A	p.Met132Ile	0.37
2	chr18:12325270-12325270	*TUBB6*	NM_032525.1	c.482A>G	p.Asp161Gly	0.34
2	chr18:30349955-30349955	*KLHL14*	NM_020805.1	c.600G>C	p.Glu200Asp	0.37
2	chr18:30350140-30350140	*KLHL14*	NM_020805.1	c.415C>A	p.Leu139Ile	0.37
2	chr19:47878805-47878805	*DHX34*	NM_014681.5	c.2147G>A	p.Arg716Gln	0.34
2	chr19:55672717-55672717	*DNAAF3*	NM_178837.4	c.874T>C	p.Ser292Pro	0.35

2	chr2:21239316-21239316	*APOB*	NM_000384.2	c.3327C>A	p.His1109Gln	0.23
2	chr2:74741932-74741932	*TLX2*	NM_016170.4	c.-2C>T		0.34
2	chr2:141116461-141116461	*LRP1B*	NM_018557.2	c.11186G>T	p.Cys3729Phe	0.32
2	chr20:9449313-9449313	*PLCB4*	NM_001172646.1	c.3344G>A	p.Arg1115Gln	0.32
2	chr20:56284646-56284646	*PMEPA1*	NM_020182.4	c.-8C>T		0.37
2	chr20:61951439-61951439	*COL20A1*	NM_020882.2	c.2965C>T	p.Arg989Trp	0.37
2	chr20:62407079-62407079	*ZBTB46*	NM_025224.3	c.1174G>A	p.Gly392Ser	0.33
2	chr22:23230239-23230239	*IGLL5*	NM_001178126.1	c.6A>C	p.Arg2Ser	0.34
2	chr22:23230439-23230439	*IGLL5*	NM_001178126.1	c.206G>C	p.Arg69Thr	0.43
2	chr22:23235956-23235956	*IGLL5*	NM_001178126.1	c.283C>A	p.Leu95Met	0.24
2	chr22:23235963-23235963	*IGLL5*	NM_001178126.1	c.290A>G	p.Tyr97Cys	0.24
2	chr22:23235965-23235965	*IGLL5*	NM_001178126.1	c.292G>C	p.Val98Leu	0.23
2	chr22:23237725-23237725	*IGLL5*	NM_001178126.1	c.496C>T	p.Pro166Ser	0.39
2	chr3:3886413-3886413	*LRRN1*	NM_020873.5	c.88A>C	p.Ser30Arg	0.34
2	chr3:50602913-50602913	*C3orf18*	NM_016210.4	c.218G>A	p.Gly73Asp	0.32
2	chr3:65607693-65607693	*MAGI1*	NM_015520.1	c.384G>C	p.Glu128Asp	0.27
2	chr3:99568948-99568948	*FILIP1L*	NM_182909.2	c.1572G>C	p.Gln524His	0.29
2	chr3:101568624-101568624	*NFKBIZ*	NM_031419.3	c.152G>C	p.Ser51Thr	0.37
2	chr3:180359793-180359793	*CCDC39*	NM_181426.1	c.1862G>A	p.Arg621Gln	0.33
2	chr3:187463199-187463199	*BCL6*	NM_001706.4	c.-51A>C		0.42
2	chr3:195512914-195512914	*MUC4*	NM_018406.6	c.5537C>T	p.Pro1846Leu	0.17
2	chr4:8307726-8307726	*HTRA3*	NM_053044.3	c.1225G>A	p.Val409Ile	0.13
2	chr4:25032242-25032242	*LGI2*	NM_018176.3	c.74C>T	p.Pro25Leu	0.38
2	chr4:62542550-62542550	*ADGRL3*	NM_015236.4	c.276T>A	p.Asn92Lys	0.28
2	chr4:69185913-69185913	*YTHDC1*	NM_001031732.2	c.1612G>A	p.Glu538Lys	0.30
2	chr4:126242211-126242211	*FAT4*	NM_024582.4	c.4645A>G	p.Thr1549Ala	0.23
2	chr5:60183335-60183335	*ERCC8*	NM_000082.3	c.1054G>A	p.Gly352Ser	0.42
2	chr5:140256667-140256667	*PCDHA12*	NM_018903.2	c.1610C>T	p.Ala537Val	0.37
2	chr6:26124009-26124009	*HIST1H2BC*	NM_003526.2	c.124G>A	p.Val42Met	0.62
2	chr6:27834917-27834917	*HIST1H1B*	NM_005322.2	c.391G>A	p.Ala131Thr	0.64
2	chr6:31324149-31324149	*HLA-B*	NM_005514.6	c.414C>G	p.Asp138Glu	0.48
2	chr6:31324486-31324486	*HLA-B*	NM_005514.6	c.322T>G	p.Tyr108Asp	0.72
2	chr6:37138322-37138322	*PIM1*	NM_001243186.1	c.244C>T	p.Arg82Cys	0.13
2	chr6:37138354-37138354	*PIM1*	NM_001243186.1	c.276G>T	p.Met92Ile	0.68
2	chr6:37138916-37138916	*PIM1*	NM_002648.3	c.256G>T	p.Val86Leu	0.35
2	chr6:37138975-37138975	*PIM1*	NM_002648.3	c.315G>C	p.Arg105Ser	0.72
2	chr6:80516974-80516974	*LINC01621*	NM_001243308.1	c.143T>C	p.Phe48Ser	0.47
2	chr6:151161892-151161892	*PLEKHG1*	NM_001029884.1	c.4018C>T	p.Leu1340Phe	0.40
2	chr7:2966418-2966418	*CARD11*	NM_032415.4	c.1762G>A	p.Glu588Lys	0.30
2	chr7:2977605-2977605	*CARD11*	NM_032415.4	c.1079T>A	p.Met360Lys	0.36
2	chr7:4874578-4874578	*RADIL*	NM_018059.4	c.1076C>T	p.Ala359Val	0.39
2	chr7:5568876-5568876	*ACTB*	NM_001101.3	c.279G>C	p.Glu93Asp	0.31
2	chr7:6731551-6731551	*ZNF12*	NM_006956.2	c.908T>C	p.Ile303Thr	0.35
2	chr7:57528876-57528876	*ZNF716*	NM_001159279.1	c.709G>A	p.Gly237Arg	0.25
2	chr7:77764395-77764395	*MAGI2*	NM_012301.3	c.2974G>A	p.Val992Met	0.28
2	chr7:82476545-82476545	*PCLO*	NM_033026.5	c.13673G>T	p.Trp4558Leu	0.34
2	chr7:92861785-92861785	*VPS50*	NM_024553.2	c.5A>G	p.Gln2Arg	0.45
2	chr7:98515126-98515126	*TRRAP*	NM_001244580.1	c.2446C>T	p.Arg816Trp	0.26
2	chr7:110763427-110763427	*LRRN3*	NM_001099660.1	c.599T>C	p.Ile200Thr	0.38
2	chr7:119915140-119915140	*KCND2*	NM_012281.2	c.454G>A	p.Ala152Thr	0.35
2	chr7:123332877-123332877	*WASL*	NM_003941.3	c.871C>T	p.Pro291Ser	0.31
2	chr7:127999642-127999642	*PRRT4*	NM_001114726.2	c.404G>A	p.Arg135His	0.34
2	chr7:134252932-134252932	*AKR1B15*	NM_001080538.2	c.173A>G	p.Glu58Gly	0.30
2	chr7:135080532-135080532	*CNOT4*	NM_001190850.1	c.983G>A	p.Gly328Glu	0.23
2	chr8:3019739-3019739	*CSMD1*	NM_033225.5	c.5786A>C	p.Asp1929Ala	0.29
2	chr8:3019740-3019740	*CSMD1*	NM_033225.5	c.5785G>T	p.Asp1929Tyr	0.29
2	chr8:28654117-28654117	*INTS9*	NM_018250.3	c.800C>T	p.Thr267Ile	0.26
2	chr8:30013896-30013896	*DCTN6*	NM_006571.3	c.-4T>C		0.32
2	chr8:87616397-87616397	*CNGB3*	NM_019098.4	c.1705G>A	p.Val569Ile	0.22
2	chr8:117950703-117950703	*AARD*	NM_001025357.2	c.221C>T	p.Ala74Val	0.36

2	chr9:2829887-2829887	*PUM3*	NM_014878.4	c.739C>T	p.Arg247Trp	0.36
2	chrX:48775090-48775090	*PIM2*	NM_006875.3	c.190C>T	p.Pro64Ser	0.14
2	chrX:50341316-50341316	*SHROOM4*	NM_020717.3	c.4162C>T	p.Arg1388Trp	0.35
2	chrX:91133004-91133004	*PCDH11X*	NM_032968.3	c.1765G>T	p.Val589Leu	0.37
2	chrX:106185820-106185820	*MORC4*	NM_001085354.2	c.2301A>C	p.Arg767Ser	0.34
2	chrX:114384465-114384465	*LRCH2*	NM_020871.3	c.1620G>T	p.Trp540Cys	0.19
2	chrX:114384477-114384477	*LRCH2*	NM_020871.3	c.1608T>A	p.Asp536Glu	0.18
2	chrX:118708904-118708904	*UBE2A*	NM_003336.2	c.85T>C	p.Ser29Pro	0.30
2	chrX:122748040-122748040	*THOC2*	NM_001081550.1	c.4312C>T	p.Leu1438Phe	0.25
2	chrX:148035175-148035175	*AFF2*	NM_002025.3	c.1463G>T	p.Ser488Ile	0.26
2	chrX:150348373-150348373	*GPR50*	NM_004224.3	c.318C>A	p.Phe106Leu	0.36
2	chr19:13423526-13423526	*CACNA1A*	NM_001127221.1	c.1628C>T	p.Thr543Met	0.27
2	chr1:203276525-203276525	*BTG2*	NM_006763.2	c.436A>G	p.Ser146Gly	0.55
2	chr13:31205258-31205258	*USPL1*	NM_005800.4	c.515A>C	p.Asn172Thr	0.37
2	chr13:32313834-32313834	*RXFP2*	NM_130806.3	c.85A>G	p.Asn29Asp	0.42
2	chr13:38320391-38320391	*TRPC4*	NM_016179.2	c.580C>T	p.Arg194Cys	0.28
2	chr19:17758133-17758133	*UNC13A*	NM_001080421.2	c.1985C>T	p.Ala662Val	0.30
2	chr21:37664438-37664438	*DOPEY2*	NM_005128.2	c.6552G>C	p.Glu2184Asp	0.28
2	chr3:38182025-38182025	*MYD88*	NM_002468.4	c.649G>T	p.Val217Phe	0.28
2	chr3:184045057-184045057	*EIF4G1*	NM_198241.2	c.3482T>C	p.Leu1161Pro	0.38
2	chr22:23230348-23230348	*IGLL5*	NM_001178126.1	c.115C>G	p.Leu39Val	0.37
2	chr22:23230442-23230442	*IGLL5*	NM_001178126.1	c.206+3A>C		0.19
2	chr22:23235998-23235998	*IGLL5*	NM_001178126.1	c.325G>C	p.Gly109Arg	0.27
9	chr16:3790512-3790512	*CREBBP*	NM_004380.2	c.4021C>T	p.Arg1341Ter	0.39
9	chr1:36437814-36437814	*AGO3*	NM_024852.3	c.502C>T	p.Arg168Ter	0.36
9	chr1:151751483-151751483	*TDRKH*	NM_006862.3	c.562-1G>A		0.37
9	chr1:240351505-240351505	*FMN2*	NM_020066.4	c.1931-2A>G		0.33
9	chr10:134650320-134650320	*CFAP46*	NM_001200049.2	c.6536+1G>A		0.38
9	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.32
9	chr11:18320369-18320369	*HPS5*	NM_181507.1	c.1134T>A	p.Cys378Ter	0.46
9	chr12:6782592-6782592	*ZNF384*	NM_001135734.2	c.701C>G	p.Ser234Ter	0.24
9	chr14:44975438-44975438	*FSCB*	NM_032135.3	c.753delA	p.Val252TrpfsTer6	0.34
9	chr16:29989660-29989660	*TAOK2*	NM_004783.3	c.292G>T	p.Glu98Ter	0.40
9	chr17:37933903-37933903	*IKZF3*	NM_012481.4	c.826+1G>C		0.35
9	chr19:41019460-41019460	*SPTBN4*	NM_020971.2	c.2764C>T	p.Arg922Ter	0.40
9	chr2:108863653-108863653	*SULT1C3*	NM_001008743.1	c.3G>A	p.Met1?	0.39
9	chr2:118577224-118577224	*DDX18*	NM_006773.3	c.371-1G>T		0.37
9	chr2:136873462-136873462	*CXCR4*	NM_003467.2	c.36C>A	p.Tyr12Ter	0.45
9	chr2:206364755-206364755	*PARD3B*	NM_152526.5	c.2994G>A	p.Trp998Ter	0.56
9	chr2:225378243-225378243	*CUL3*	NM_003590.4	c.652C>T	p.Gln218Ter	0.45
9	chr3:176743302-176743302	*TBL1XR1*	NM_024665.4	c.1529T>G	p.Leu510Ter	0.36
9	chr3:183754188-183754188	*HTR3D*	NM_182537.2	c.1A>C	p.Met1?	0.45
9	chr4:84374709-84374709	*HELQ*	NM_133636.2	c.686dupA	p.Asn229LysfsTer5	0.58
9	chr5:178408856-178408856	*GRM6*	NM_000843.3	c.2437-1G>T		0.37
9	chr6:31239495-31239495	*HLA-C*	NM_002117.5	c.224G>A	p.Trp75Ter	0.77
9	chr8:401455-401455	*FBXO25*	NM_183421.1	c.660+2T>C		0.31
9	chr8:11640711-11640711	*NEIL2*	NM_145043.2	c.492-1G>A		0.82
9	chr9:72895768-72895768	*SMC5*	NM_015110.3	c.772C>T	p.Arg258Ter	0.44
9	chrX:32632568-32632568	*DMD*	NM_004006.2	c.1334delT	p.Leu445TyrfsTer5	0.30
9	chrX:152226429-152226430	*PNMA3*	NM_013364.4	c.1018_1019delTT	p.Leu340ArgfsTer4	0.45
9	chrX:154014637-154014637	*MPP1*	NM_002436.3	c.518dupA	p.Asp174GlyfsTer26	0.41
9	chr13:88329381-88329381	*SLITRK5*	NM_015567.1	c.1738C>T	p.Gln580Ter	0.36
9	chr6:1610926-1610926	*FOXC1*	NM_001453.2	c.246C>A	p.Ser82Arg	0.77
9	chr2:71801410-71801410	*DYSF*	NM_003494.3	c.3257C>T	p.Thr1086Ile	0.44
9	chr4:55593623-55593623	*KIT*	NM_000222.2	c.1689A>G	p.Ile563Met	0.47
9	chr2:179486605-179486605	*TTN*	NM_001267550.1	c.45044T>A	p.Val15015Glu	0.46
9	chr6:29911264-29911264	*HLA-A*	NM_001242758.1	c.563G>C	p.Cys188Ser	0.47
9	chr2:217311816-217311816	*SMARCAL1*	NM_014140.3	c.1786G>A	p.Ala596Thr	0.42
9	chr11:112088503-112088505	*BCO2*	NM_001256397.1	c.1527_1529delAGT	p.Val510del	0.40
9	chr12:125478392-125478392	*BRI3BP*	NM_080626.5	c.58_59insCGC	p.Leu19_Leu20insPro	0.27

9	chr2:219825646-219825646	*CDK5R2*	NM_003936.4	c.1104G>T	p.Ter368TyrextTer14	0.55
9	chr1:43783062-43783062	*TIE1*	NM_005424.4	c.2602G>A	p.Ala868Thr	0.40
9	chr1:94508444-94508444	*ABCA4*	NM_000350.2	c.3201G>T	p.Gln1067His	0.42
9	chr11:46465088-46465088	*AMBRA1*	NM_001267782.1	c.2591G>T	p.Arg864Leu	0.38
9	chr11:134147727-134147727	*GLB1L3*	NM_001080407.2	c.283C>A	p.His95Asn	0.37
9	chr12:2602406-2602406	*CACNA1C*	NM_000719.6	c.967G>A	p.Gly323Arg	0.45
9	chr12:103238161-103238161	*PAH*	NM_000277.1	c.1018A>G	p.Ile340Val	0.36
9	chr14:71267460-71267460	*MAP3K9*	NM_033141.2	c.744G>T	p.Gln248His	0.45
9	chr16:48209199-48209199	*ABCC11*	NM_032583.3	c.3668A>T	p.Gln1223Leu	0.42
9	chr16:67876477-67876477	*THAP11*	NM_020457.2	c.20G>A	p.Cys7Tyr	0.45
9	chr17:4047244-4047244	*CYB5D2*	NM_144611.3	c.195T>A	p.Asp65Glu	0.45
9	chr17:10405134-10405134	*MYH1*	NM_005963.3	c.3206C>A	p.Ser1069Tyr	0.31
9	chr17:39680687-39680687	*KRT19*	NM_002276.4	c.766T>A	p.Tyr256Asn	0.40
9	chr2:96809990-96809990	*DUSP2*	NM_004418.3	c.633C>G	p.Asn211Lys	0.38
9	chr2:141201947-141201947	*LRP1B*	NM_018557.2	c.10246T>C	p.Cys3416Arg	0.34
9	chr3:53909982-53909982	*ACTR8*	NM_022899.4	c.904A>T	p.Asn302Tyr	0.43
9	chr4:170190272-170190272	*SH3RF1*	NM_020870.3	c.92C>T	p.Thr31Met	0.37
9	chr6:121768893-121768893	*GJA1*	NM_000165.3	c.900T>G	p.Asn300Lys	0.42
9	chr6:170592534-170592534	*DLL1*	NM_005618.3	c.1833G>T	p.Gln611His	0.40
9	chr8:65493742-65493742	*BHLHE22*	NM_152414.4	c.395G>T	p.Ser132Ile	0.39
9	chr8:126091008-126091008	*KIAA0196*	NM_014846.3	c.683G>A	p.Arg228Gln	0.41
9	chr9:2058388-2058388	*SMARCA2*	NM_003070.3	c.1445C>G	p.Thr482Ser	0.46
9	chrX:48825804-48825804	*KCND1*	NM_004979.4	c.875T>C	p.Val292Ala	0.17
9	chrX:152990878-152990878	*ABCD1*	NM_000033.3	c.157C>T	p.Pro53Ser	0.40
9	chrX:153588822-153588822	*FLNA*	NM_001110556.1	c.3341G>A	p.Cys1114Tyr	0.37
9	chr1:3160667-3160667	*PRDM16*	NM_022114.3	c.404T>C	p.Val135Ala	0.39
9	chr1:3394996-3394996	*ARHGEF16*	NM_014448.3	c.1634G>A	p.Ser545Asn	0.45
9	chr1:22313124-22313124	*CELA3B*	NM_007352.2	c.743G>A	p.Arg248Lys	0.38
9	chr1:36437814-36437814	*AGO3*	NM_177422.2	c.-64C>T		0.36
9	chr1:37948964-37948964	*ZC3H12A*	NM_025079.2	c.1552C>T	p.Pro518Ser	0.28
9	chr1:40126756-40126756	*NT5C1A*	NM_032526.1	c.736G>C	p.Ala246Pro	0.43
9	chr1:86048117-86048117	*CYR61*	NM_001554.4	c.653G>A	p.Arg218His	0.40
9	chr1:110717473-110717473	*SLC6A17*	NM_001010898.2	c.644A>T	p.Asp215Val	0.40
9	chr1:112998557-112998557	*CTTNBP2NL*	NM_018704.2	c.443A>C	p.Glu148Ala	0.53
9	chr1:158590174-158590174	*SPTA1*	NM_003126.2	c.6203A>G	p.Glu2068Gly	0.46
9	chr1:183913346-183913346	*COLGALT2*	NM_015101.2	c.1381C>A	p.Leu461Met	0.36
9	chr1:196967421-196967421	*CFHR5*	NM_030787.3	c.1134A>C	p.Glu378Asp	0.32
9	chr1:201287803-201287803	*PKP1*	NM_000299.3	c.1112C>A	p.Ala371Asp	0.44
9	chr1:203276325-203276325	*BTG2*	NM_006763.2	c.236G>A	p.Ser79Asn	0.44
9	chr1:204115855-204115855	*ETNK2*	NM_018208.2	c.556C>T	p.His186Tyr	0.39
9	chr1:214170108-214170108	*PROX1*	NM_001270616.1	c.230C>T	p.Ala77Val	0.33
9	chr1:216373401-216373401	*USH2A*	NM_206933.2	c.3379A>G	p.Thr1127Ala	0.43
9	chr1:227935895-227935895	*SNAP47*	NM_053052.3	c.593G>A	p.Gly198Asp	0.41
9	chr1:236732406-236732406	*HEATR1*	NM_018072.5	c.3967A>G	p.Ile1323Val	0.34
9	chr1:237024545-237024545	*MTR*	NM_000254.2	c.2164C>G	p.Leu722Val	0.28
9	chr1:237693803-237693803	*RYR2*	NM_001035.2	c.2899C>T	p.Pro967Ser	0.36
9	chr1:240371707-240371707	*FMN2*	NM_020066.4	c.3595C>A	p.Pro1199Thr	0.54
9	chr1:248801925-248801925	*OR2T35*	NM_001001827.1	c.635C>G	p.Ser212Cys	0.69
9	chr1:248813503-248813503	*OR2T27*	NM_001001824.1	c.683T>A	p.Met228Lys	0.15
9	chr10:13043402-13043402	*CCDC3*	NM_031455.3	c.169G>A	p.Gly57Ser	0.42
9	chr10:21805829-21805829	*SKIDA1*	NM_207371.3	c.923C>G	p.Ala308Gly	0.43
9	chr10:43089583-43089583	*ZNF33B*	NM_006955.1	c.815A>C	p.Asp272Ala	0.37
9	chr10:50121476-50121476	*LRRC18*	NM_001006939.3	c.725C>T	p.Ser242Leu	0.35
9	chr10:55945022-55945022	*PCDH15*	NM_033056.3	c.1312G>T	p.Asp438Tyr	0.27
9	chr10:104176434-104176434	*PSD*	NM_001270965.1	c.362G>A	p.Gly121Glu	0.37
9	chr10:117607392-117607392	*ATRNL1*	NM_207303.2	c.3908C>A	p.Ala1303Glu	0.29
9	chr11:703725-703725	*TMEM80*	NM_001276253.1	c.380T>G	p.Leu127Arg	0.42
9	chr11:4673799-4673799	*OR51E1*	NM_152430.3	c.43T>G	p.Phe15Val	0.43
9	chr11:5906394-5906394	*OR52E4*	NM_001005165.1	c.872T>C	p.Val291Ala	0.33
9	chr11:7111073-7111073	*RBMXL2*	NM_014469.4	c.722G>A	p.Arg241His	0.40

9	chr11:56310192-56310192	*OR5M11*	NM_001005245.1	c.542C>A	p.Pro181Gln	0.46
9	chr11:57886799-57886799	*OR9I1*	NM_001005211.1	c.118C>A	p.Leu40Ile	0.39
9	chr11:60775325-60775325	*CD6*	NM_006725.4	c.412G>A	p.Glu138Lys	0.42
9	chr11:65306835-65306835	*LTBP3*	NM_001130144.2	c.3724G>A	p.Gly1242Ser	0.40
9	chr11:93583602-93583602	*VSTM5*	NM_001144871.1	c.67C>G	p.Leu23Val	0.42
9	chr11:103908704-103908704	*DDI1*	NM_001001711.2	c.1154C>T	p.Thr385Ile	0.41
9	chr11:108788657-108788657	*DDX10*	NM_004398.2	c.2362G>A	p.Asp788Asn	0.37
9	chr11:114401002-114401002	*NXPE1*	NM_152315.2	c.302A>G	p.Tyr101Cys	0.39
9	chr11:118769503-118769503	*BCL9L*	NM_182557.2	c.4121C>G	p.Pro1374Arg	0.43
9	chr11:122931917-122931917	*HSPA8*	NM_006597.5	c.116C>T	p.Pro39Leu	0.37
9	chr12:6618922-6618922	*NCAPD2*	NM_014865.3	c.167T>A	p.Met56Lys	0.30
9	chr12:14923711-14923711	*HIST4H4*	NM_175054.2	c.308G>A	p.Gly103Asp	0.26
9	chr12:14923763-14923763	*HIST4H4*	NM_175054.2	c.256G>T	p.Asp86Tyr	0.27
9	chr12:14923793-14923793	*HIST4H4*	NM_175054.2	c.226C>T	p.His76Tyr	0.27
9	chr12:14959460-14959460	*SMCO3*	NM_001013698.2	c.155C>T	p.Ala52Val	0.31
9	chr12:18242317-18242317	*RERGL*	NM_024730.2	c.-100C>A		0.20
9	chr12:27934081-27934081	*KLHL42*	NM_020782.1	c.818C>T	p.Ser273Phe	0.24
9	chr12:75897776-75897776	*KRR1*	NM_007043.6	c.739A>C	p.Lys247Gln	0.32
9	chr12:81762562-81762562	*PPFIA2*	NM_003625.3	c.1424A>T	p.Glu475Val	0.24
9	chr12:82147814-82147814	*PPFIA2*	NM_003625.3	c.187C>G	p.Leu63Val	0.31
9	chr12:85459066-85459066	*LRRIQ1*	NM_001079910.1	c.2418G>T	p.Leu806Phe	0.24
9	chr12:92538212-92538212	*BTG1*	NM_001731.2	c.160C>T	p.His54Tyr	0.31
9	chr12:110468485-110468485	*ANKRD13A*	NM_033121.1	c.1270A>G	p.Thr424Ala	0.32
9	chr12:111319007-111319007	*CCDC63*	NM_152591.1	c.760C>T	p.Arg254Cys	0.26
9	chr12:113515854-113515854	*DTX1*	NM_004416.2	c.885C>G	p.Asn295Lys	0.20
9	chr12:130846070-130846070	*PIWIL1*	NM_004764.4	c.1894G>A	p.Asp632Asn	0.38
9	chr13:25745531-25745531	*AMER2*	NM_199138.1	c.227C>T	p.Ser76Leu	0.45
9	chr13:41331043-41331043	*MRPS31*	NM_005830.3	c.706C>T	p.Pro236Ser	0.36
9	chr13:58207407-58207407	*PCDH17*	NM_001040429.2	c.727T>G	p.Phe243Val	0.34
9	chr13:114144994-114144994	*DCUN1D2*	NM_001014283.1	c.-10C>T		0.55
9	chr13:115091440-115091440	*CHAMP1*	NM_001164144.1	c.2123A>G	p.Lys708Arg	0.62
9	chr14:23390124-23390124	*PRMT5*	NM_001039619.1	c.1852A>T	p.Ile618Phe	0.35
9	chr14:50713882-50713882	*L2HGDH*	NM_024884.2	c.1286G>A	p.Gly429Glu	0.38
9	chr14:60592413-60592413	*PCNX4*	NM_022495.5	c.2437G>A	p.Glu813Lys	0.40
9	chr14:75513355-75513355	*MLH3*	NM_001040108.1	c.3004A>G	p.Ser1002Gly	0.36
9	chr14:81743329-81743329	*STON2*	NM_001256430.1	c.2326A>G	p.Arg776Gly	0.42
9	chr14:95080902-95080902	*SERPINA3*	NM_001085.4	c.124G>A	p.Gly42Arg	0.43
9	chr15:44792006-44792006	*CTDSPL2*	NM_016396.2	c.964T>C	p.Tyr322His	0.44
9	chr15:55611566-55611566	*PIGB*	NM_004855.4	c.118A>T	p.Thr40Ser	0.39
9	chr15:69561348-69561348	*GLCE*	NM_015554.1	c.1619G>A	p.Arg540His	0.62
9	chr15:73345119-73345119	*NEO1*	NM_002499.3	c.103A>G	p.Arg35Gly	0.56
9	chr15:74426305-74426305	*ISLR2*	NM_001130138.1	c.1210C>T	p.Arg404Trp	0.56
9	chr15:80743266-80743266	*ARNT2*	NM_014862.3	c.77C>A	p.Pro26His	0.63
9	chr15:90208848-90208848	*PLIN1*	NM_002666.4	c.1535G>A	p.Arg512His	0.73
9	chr15:101447368-101447368	*ALDH1A3*	NM_000693.2	c.1276G>A	p.Glu426Lys	0.84
9	chr16:11001727-11001727	*CIITA*	NM_000246.3	c.2378T>C	p.Leu793Pro	0.43
9	chr16:18823118-18823118	*SMG1*	NM_015092.4	c.10873G>A	p.Val3625Ile	0.39
9	chr16:57318370-57318370	*PLLP*	NM_015993.2	c.83C>G	p.Pro28Arg	0.43
9	chr16:67292340-67292340	*SLC9A5*	NM_004594.2	c.1616T>C	p.Phe539Ser	0.47
9	chr16:69221160-69221160	*SNTB2*	NM_006750.3	c.91C>T	p.Leu31Phe	0.42
9	chr17:3653731-3653731	*ITGAE*	NM_002208.4	c.1939A>G	p.Met647Val	0.40
9	chr17:18181366-18181366	*TOP3A*	NM_004618.3	c.2450A>C	p.Gln817Pro	0.41
9	chr17:27010731-27010731	*SUPT6H*	NM_003170.3	c.2126G>A	p.Arg709His	0.39
9	chr17:27017242-27017242	*SUPT6H*	NM_003170.3	c.3485A>G	p.Tyr1162Cys	0.37
9	chr17:36636008-36636008	*ARHGAP23*	NM_001199417.1	c.2513C>T	p.Pro838Leu	0.18
9	chr17:57915679-57915679	*VMP1*	NM_030938.3	c.998C>T	p.Ser333Phe	0.45
9	chr18:3188931-3188931	*MYOM1*	NM_003803.3	c.586T>C	p.Ser196Pro	0.27
9	chr18:30350122-30350122	*KLHL14*	NM_020805.1	c.433G>A	p.Ala145Thr	0.59
9	chr18:50705432-50705432	*DCC*	NM_005215.3	c.1519G>A	p.Glu507Lys	0.27
9	chr18:56050549-56050549	*NEDD4L*	NM_001144967.2	c.2424C>G	p.Ile808Met	0.29

9	chr19:8182082-8182082	*FBN3*	NM_032447.3	c.3557C>T	p.Ser1186Leu	0.44
9	chr19:9012869-9012869	*MUC16*	NM_024690.2	c.38575C>T	p.Leu12859Phe	0.16
9	chr19:9768716-9768716	*ZNF562*	NM_001130031.1	c.210G>A	p.Met70Ile	0.39
9	chr19:11515834-11515834	*RGL3*	NM_001035223.2	c.1174A>T	p.Ile392Phe	0.42
9	chr19:15366309-15366309	*BRD4*	NM_058243.2	c.1846C>T	p.Arg616Trp	0.42
9	chr19:24309156-24309156	*ZNF254*	NM_001278677.1	c.231G>T	p.Glu77Asp	0.34
9	chr19:33422441-33422441	*CEP89*	NM_032816.3	c.923C>A	p.Ala308Asp	0.42
9	chr19:37100890-37100890	*ZNF382*	NM_001256838.1	c.71A>G	p.Asp24Gly	0.44
9	chr19:37487936-37487936	*ZNF568*	NM_001204838.1	c.1343A>G	p.Glu448Gly	0.42
9	chr19:48258114-48258114	*GLTSCR2*	NM_015710.4	c.1019A>G	p.Gln340Arg	0.46
9	chr19:53793029-53793029	*BIRC8*	NM_033341.4	c.599T>A	p.Val200Asp	0.45
9	chr19:55363657-55363657	*KIR3DL2*	NM_006737.3	c.275C>A	p.Thr92Asn	0.19
9	chr19:57839794-57839794	*ZNF543*	NM_213598.3	c.964G>A	p.Asp322Asn	0.38
9	chr19:57840597-57840597	*ZNF543*	NM_213598.3	c.1767G>C	p.Glu589Asp	0.34
9	chr2:1915852-1915852	*MYT1L*	NM_015025.2	c.1643G>T	p.Cys548Phe	0.39
9	chr2:39178242-39178242	*ARHGEF33*	NM_001145451.2	c.1033C>T	p.Leu345Phe	0.39
9	chr2:87016858-87016858	*CD8A*	NM_001768.6	c.419C>T	p.Thr140Met	0.37
9	chr2:96810513-96810513	*DUSP2*	NM_004418.3	c.497C>T	p.Pro166Leu	0.42
9	chr2:96810591-96810591	*DUSP2*	NM_004418.3	c.419C>T	p.Pro140Leu	0.44
9	chr2:97475185-97475185	*CNNM4*	NM_020184.3	c.2259C>A	p.Asp753Glu	0.39
9	chr2:98340869-98340869	*ZAP70*	NM_001079.3	c.370C>T	p.Arg124Cys	0.39
9	chr2:121104182-121104182	*INHBB*	NM_002193.2	c.418G>A	p.Val140Ile	0.43
9	chr2:136873267-136873267	*CXCR4*	NM_003467.2	c.231G>C	p.Arg77Ser	0.38
9	chr2:210856971-210856971	*UNC80*	NM_032504.1	c.9198G>T	p.Gln3066His	0.38
9	chr2:225265908-225265908	*FAM124B*	NM_024785.2	c.578C>T	p.Pro193Leu	0.37
9	chr2:238275650-238275650	*COL6A3*	NM_004369.3	c.5180G>A	p.Arg1727Gln	0.42
9	chr20:5963647-5963647	*MCM8*	NM_032485.5	c.1569G>A	p.Met523Ile	0.41
9	chr20:7866366-7866366	*HAO1*	NM_017545.2	c.959G>C	p.Gly320Ala	0.41
9	chr20:34022053-34022053	*GDF5*	NM_000557.2	c.1160G>A	p.Arg387His	0.43
9	chr20:36766537-36766537	*TGM2*	NM_004613.2	c.1593C>A	p.Asn531Lys	0.38
9	chr21:43298814-43298814	*PRDM15*	NM_022115.3	c.403G>C	p.Ala135Pro	0.42
9	chr21:45741660-45741660	*PFKL*	NM_002626.4	c.1240A>C	p.Met414Leu	0.44
9	chr21:45948464-45948464	*TSPEAR*	NM_144991.2	c.793A>G	p.Thr265Ala	0.43
9	chr22:25264466-25264466	*SGSM1*	NM_001039948.2	c.1118A>T	p.His373Leu	0.46
9	chr22:40038868-40038868	*CACNA1I*	NM_021096.3	c.1123T>C	p.Phe375Leu	0.39
9	chr22:51159629-51159629	*SHANK3*	NM_033517.1	c.3331C>T	p.Arg1111Cys	0.44
9	chr3:16419502-16419502	*RFTN1*	NM_015150.1	c.549C>G	p.Ser183Arg	0.40
9	chr3:32022481-32022481	*OSBPL10*	NM_017784.4	c.191G>A	p.Ser64Asn	0.43
9	chr3:32022625-32022625	*OSBPL10*	NM_017784.4	c.47G>A	p.Ser16Asn	0.36
9	chr3:32022631-32022631	*OSBPL10*	NM_017784.4	c.41G>C	p.Ser14Thr	0.35
9	chr3:53226239-53226239	*PRKCD*	NM_006254.3	c.1988T>C	p.Phe663Ser	0.44
9	chr3:183754188-183754188	*HTR3D*	NM_001163646.1	c.406A>C	p.Met136Leu	0.45
9	chr4:5570367-5570367	*EVC2*	NM_147127.4	c.3361G>A	p.Glu1121Lys	0.40
9	chr4:23815692-23815692	*PPARGC1A*	NM_013261.3	c.1414G>T	p.Ala472Ser	0.38
9	chr4:66467751-66467751	*EPHA5*	NM_004439.5	c.518A>G	p.Lys173Arg	0.38
9	chr4:85661377-85661377	*WDFY3*	NM_014991.4	c.6427T>C	p.Cys2143Arg	0.41
9	chr4:122732811-122732811	*EXOSC9*	NM_001034194.1	c.812A>G	p.Asn271Ser	0.36
9	chr4:125599848-125599848	*ANKRD50*	NM_001167882.1	c.188T>C	p.Val63Ala	0.30
9	chr4:156696136-156696136	*GUCY1B3*	NM_000857.2	c.94G>A	p.Asp32Asn	0.28
9	chr5:13864666-13864666	*DNAH5*	NM_001369.2	c.4436G>C	p.Cys1479Ser	0.32
9	chr5:57879029-57879029	*RAB3C*	NM_138453.2	c.-7G>A		0.15
9	chr5:65084274-65084274	*NLN*	NM_020726.4	c.1288G>A	p.Glu430Lys	0.32
9	chr5:137801704-137801704	*EGR1*	NM_001964.2	c.254C>T	p.Thr85Ile	0.37
9	chr5:140175345-140175345	*PCDHA2*	NM_018905.2	c.796G>A	p.Ala266Thr	0.30
9	chr5:140176335-140176335	*PCDHA2*	NM_018905.2	c.1786G>A	p.Ala596Thr	0.38
9	chr5:172097064-172097064	*NEURL1B*	NM_001142651.1	c.308C>T	p.Ala103Val	0.29
9	chr6:26022196-26022196	*HIST1H4A*	NM_003538.3	c.290C>G	p.Thr97Ser	0.82
9	chr6:26285665-26285665	*HIST1H4H*	NM_003543.3	c.63G>C	p.Lys21Asn	0.79
9	chr6:27115103-27115103	*HIST1H2AH*	NM_080596.2	c.196C>G	p.Leu66Val	0.74
9	chr6:27833408-27833408	*HIST1H2AL*	NM_003511.2	c.276G>C	p.Glu92Asp	0.59

9	chr6:27834940-27834940	*HIST1H1B*	NM_005322.2	c.368C>T	p.Ala123Val	0.69
9	chr6:29012714-29012714	*OR2W1*	NM_030903.3	c.239A>C	p.Gln80Pro	0.37
9	chr6:31323181-31323181	*HLA-B*	NM_005514.6	c.808G>C	p.Ala270Pro	0.77
9	chr6:34392970-34392970	*RPS10*	NM_001014.4	c.29C>T	p.Ala10Val	0.40
9	chr6:66012762-66012762	*LOC441155*	NM_001271675.1	c.348C>G	p.Ser116Arg	0.30
9	chr6:110085177-110085177	*FIG4*	NM_014845.5	c.1426C>A	p.Arg476Ser	0.33
9	chr6:152708388-152708388	*SYNE1*	NM_033071.3	c.8327A>C	p.Lys2776Thr	0.34
9	chr6:170592533-170592533	*DLL1*	NM_005618.3	c.1834A>T	p.Ile612Phe	0.40
9	chr7:47882660-47882660	*PKD1L1*	NM_138295.3	c.5345C>T	p.Ala1782Val	0.34
9	chr7:55540663-55540663	*VOPP1*	NM_030796.3	c.404C>A	p.Ala135Glu	0.46
9	chr7:56183991-56183991	*NUPR2*	NM_001145712.1	c.17A>T	p.Glu6Val	0.32
9	chr7:56183992-56183992	*NUPR2*	NM_001145712.1	c.16G>C	p.Glu6Gln	0.32
9	chr7:80433561-80433561	*SEMA3C*	NM_006379.3	c.662C>A	p.Pro221His	0.27
9	chr7:94259053-94259053	*SGCE*	NM_003919.2	c.210A>T	p.Glu70Asp	0.32
9	chr7:100350216-100350216	*ZAN*	NM_003386.1	c.2488A>G	p.Thr830Ala	0.40
9	chr7:136939627-136939627	*PTN*	NM_002825.5	c.94G>A	p.Ala32Thr	0.37
9	chr7:137773471-137773471	*AKR1D1*	NM_005989.3	c.218C>A	p.Ala73Glu	0.33
9	chr7:156743119-156743119	*NOM1*	NM_138400.1	c.688G>C	p.Gly230Arg	0.39
9	chr8:3245141-3245141	*CSMD1*	NM_033225.5	c.2657G>T	p.Gly886Val	0.36
9	chr8:12878952-12878952	*KIAA1456*	NM_020844.2	c.764C>A	p.Ser255Tyr	0.44
9	chr8:42841904-42841904	*HOOK3*	NM_032410.3	c.1498A>T	p.Asn500Tyr	0.41
9	chr8:87460398-87460398	*WWP1*	NM_007013.3	c.2020A>G	p.Ile674Val	0.38
9	chr8:95841237-95841237	*INTS8*	NM_017864.3	c.553G>A	p.Glu185Lys	0.45
9	chr8:101733638-101733638	*PABPC1*	NM_002568.3	c.174C>G	p.Asn58Lys	0.40
9	chr8:124232474-124232474	*C8orf76*	NM_032847.2	c.1012G>A	p.Gly338Ser	0.40
9	chr8:133634870-133634870	*LRRC6*	NM_012472.4	c.901G>A	p.Val301Met	0.45
9	chr8:139164223-139164223	*FAM135B*	NM_015912.3	c.2495T>C	p.Ile832Thr	0.40
9	chr9:15745602-15745602	*CCDC171*	NM_173550.2	c.2644G>A	p.Glu882Lys	0.43
9	chr9:37541655-37541655	*FBXO10*	NM_012166.2	c.111C>G	p.Ile37Met	0.40
9	chr9:67968540-67968540	*ANKRD20A1*	NM_032250.3	c.2099G>C	p.Ser700Thr	0.25
9	chr9:106889672-106889672	*SMC2*	NM_001042550.1	c.2701G>A	p.Glu901Lys	0.37
9	chr9:125589050-125589050	*PDCL*	NM_005388.4	c.17A>G	p.Asp6Gly	0.47
9	chr9:125752346-125752346	*RABGAP1*	NM_012197.3	c.777A>G	p.Ile259Met	0.42
9	chr9:131451887-131451887	*SET*	NM_003011.3	c.26G>A	p.Ser9Asn	0.53
9	chr9:135553473-135553473	*GTF3C4*	NM_012204.2	c.467A>G	p.Lys156Arg	0.37
9	chrX:15333729-15333729	*ASB11*	NM_080873.2	c.-2A>G		0.36
9	chrX:20031708-20031708	*MAP7D2*	NM_152780.3	c.1662T>G	p.Ser554Arg	0.40
9	chrX:29301104-29301104	*IL1RAPL1*	NM_014271.3	c.132G>T	p.Leu44Phe	0.36
9	chrX:44035611-44035611	*EFHC2*	NM_025184.3	c.1969A>G	p.Lys657Glu	0.41
9	chrX:44120398-44120398	*EFHC2*	NM_025184.3	c.529T>C	p.Phe177Leu	0.42
9	chrX:64752468-64752468	*LAS1L*	NM_031206.4	c.405G>T	p.Lys135Asn	0.44
9	chrX:79952240-79952240	*BRWD3*	NM_153252.4	c.3066T>G	p.Ile1022Met	0.41
9	chrX:99662854-99662854	*PCDH19*	NM_001184880.1	c.742C>A	p.Pro248Thr	0.39
9	chrX:139038123-139038123	*CXorf66*	NM_001013403.2	c.1018A>C	p.Lys340Gln	0.41
9	chrX:149638591-149638591	*MAMLD1*	NM_005491.3	c.746T>C	p.Met249Thr	0.46
9	chrX:151870046-151870046	*MAGEA6*	NM_005363.2	c.736C>A	p.Leu246Ile	0.41
9	chrX:153236129-153236129	*HCFC1*	NM_005334.2	c.163A>T	p.Ile55Leu	0.47
9	chr16:2522831-2522831	*NTN3*	NM_006181.2	c.1058G>T	p.Cys353Phe	0.46
9	chr16:68289856-68289856	*PLA2G15*	NM_012320.3	c.690G>C	p.Trp230Cys	0.43
9	chr19:36616676-36616676	*TBCB*	NM_001281.2	c.727G>C	p.Glu243Gln	0.38
9	chrX:108636151-108636151	*GUCY2F*	NM_001522.2	c.2558C>T	p.Thr853Met	0.44
9	chr1:21031182-21031182	*KIF17*	NM_020816.2	c.881G>A	p.Arg294Gln	0.44
9	chr1:22182310-22182310	*HSPG2*	NM_005529.5	c.5671G>A	p.Gly1891Arg	0.47
9	chr1:54640327-54640327	*CYB5RL*	NM_001031672.2	c.913G>A	p.Ala305Thr	0.40
9	chr1:112002119-112002119	*ATP5F1*	NM_001688.4	c.554G>A	p.Arg185Gln	0.46
9	chr1:152282021-152282021	*FLG*	NM_002016.1	c.5341C>T	p.Arg1781Cys	0.45
9	chr1:202861671-202861671	*KLHL12*	NM_021633.2	c.1697G>A	p.Arg566His	0.38
9	chr10:68940214-68940214	*CTNNA3*	NM_013266.2	c.908G>A	p.Arg303His	0.43
9	chr12:20766564-20766564	*PDE3A*	NM_000921.4	c.1199C>T	p.Ser400Leu	0.26
9	chr12:43896094-43896094	*ADAMTS20*	NM_025003.3	c.728A>G	p.Lys243Arg	0.62

9	chr12:102494824-102494824	*NUP37*	NM_024057.2	c.340A>G	p.Lys114Glu	0.20
9	chr12:121670284-121670284	*P2RX4*	NM_002560.2	c.952C>T	p.Arg318Cys	0.47
9	chr14:21796652-21796652	*RPGRIP1*	NM_020366.3	c.2965G>A	p.Gly989Arg	0.54
9	chr14:77945043-77945043	*ISM2*	NM_199296.2	c.989A>G	p.Lys330Arg	0.42
9	chr15:62253882-62253882	*VPS13C*	NM_020821.2	c.3814C>G	p.His1272Asp	0.42
9	chr15:65108841-65108841	*PIF1*	NM_025049.2	c.1798G>C	p.Ala600Pro	0.58
9	chr15:74623562-74623562	*CCDC33*	NM_025055.4	c.1696C>T	p.Arg566Trp	0.28
9	chr15:90190215-90190215	*KIF7*	NM_198525.2	c.1634G>C	p.Trp545Ser	0.91
9	chr16:1291610-1291610	*TPSAB1*	NM_003294.3	c.409G>A	p.Val137Ile	0.29
9	chr16:84792361-84792361	*USP10*	NM_005153.2	c.1232C>T	p.Ser411Leu	0.40
9	chr17:26696819-26696819	*VTN*	NM_000638.3	c.238G>A	p.Asp80Asn	0.53
9	chr17:30186226-30186226	*COPRS*	NM_018405.3	c.-8C>T		0.74
9	chr17:39092747-39092747	*KRT23*	NM_015515.3	c.109G>A	p.Gly37Ser	0.43
9	chr17:41898266-41898266	*MPP3*	NM_001932.4	c.845G>A	p.Arg282Gln	0.47
9	chr17:57915741-57915741	*VMP1*	NM_030938.3	c.1060G>A	p.Glu354Lys	0.43
9	chr17:74261644-74261644	*UBALD2*	NM_182565.3	c.58G>A	p.Ala20Thr	0.53
9	chr18:8638217-8638217	*RAB12*	NM_001025300.2	c.692C>T	p.Pro231Leu	0.31
9	chr18:77156228-77156228	*NFATC1*	NM_006162.4	c.4C>T	p.Pro2Ser	0.31
9	chr19:33137368-33137368	*ANKRD27*	NM_032139.2	c.367T>G	p.Ser123Ala	0.53
9	chr19:33137369-33137369	*ANKRD27*	NM_032139.2	c.366T>A	p.Ser122Arg	0.53
9	chr19:36278358-36278358	*ARHGAP33*	NM_001172630.1	c.2483C>T	p.Pro828Leu	0.44
9	chr19:46832470-46832470	*HIF3A*	NM_152795.3	c.1447G>A	p.Asp483Asn	0.53
9	chr19:53014231-53014231	*ZNF578*	NM_001099694.1	c.597G>T	p.Arg199Ser	0.45
9	chr19:55329941-55329941	*KIR3DL1*	NM_013289.2	c.242A>T	p.Asn81Ile	0.26
9	chr19:55329946-55329946	*KIR3DL1*	NM_013289.2	c.247A>G	p.Ser83Gly	0.30
9	chr19:55363663-55363663	*KIR3DL2*	NM_006737.3	c.281G>C	p.Arg94Thr	0.17
9	chr19:58565192-58565192	*ZSCAN1*	NM_182572.3	c.1000G>A	p.Val334Ile	0.35
9	chr2:171262103-171262103	*MYO3B*	NM_138995.4	c.2480G>A	p.Gly827Glu	0.57
9	chr2:187712521-187712521	*ZSWIM2*	NM_182521.2	c.167T>A	p.Val56Asp	0.37
9	chr20:60791852-60791852	*HRH3*	NM_007232.2	c.548T>C	p.Ile183Thr	0.43
9	chr3:8809743-8809743	*OXTR*	NM_000916.3	c.131C>T	p.Ala44Val	0.38
9	chr3:46245378-46245378	*CCR1*	NM_001295.2	c.427C>T	p.Arg143Trp	0.42
9	chr3:49725033-49725033	*MST1*	NM_020998.3	c.311C>T	p.Thr104Met	0.41
9	chr3:167542267-167542267	*SERPINI1*	NM_005025.4	c.1073T>C	p.Ile358Thr	0.45
9	chr4:55964865-55964865	*KDR*	NM_002253.2	c.2372G>A	p.Arg791Gln	0.57
9	chr4:115997472-115997472	*NDST4*	NM_022569.1	c.721G>C	p.Glu241Gln	0.37
9	chr5:14485253-14485253	*TRIO*	NM_007118.2	c.6733G>A	p.Val2245Met	0.53
9	chr5:36197730-36197730	*NADK2*	NM_153013.3	c.614C>T	p.Pro205Leu	0.58
9	chr6:26056185-26056185	*HIST1H1C*	NM_005319.3	c.472G>A	p.Ala158Thr	0.70
9	chr6:26056263-26056263	*HIST1H1C*	NM_005319.3	c.394G>A	p.Val132Ile	0.72
9	chr6:26156757-26156757	*HIST1H1E*	NM_005321.2	c.139G>A	p.Ala47Thr	0.78
9	chr6:26156958-26156958	*HIST1H1E*	NM_005321.2	c.340G>A	p.Gly114Arg	0.77
9	chr6:26234897-26234897	*HIST1H1D*	NM_005320.2	c.265G>A	p.Val89Met	0.75
9	chr6:143605254-143605254	*AIG1*	NM_016108.2	c.407C>T	p.Thr136Met	0.69
9	chr6:143654513-143654513	*AIG1*	NM_016108.2	c.610A>G	p.Thr204Ala	0.85
9	chr6:158317988-158317988	*SNX9*	NM_016224.4	c.430T>G	p.Trp144Gly	0.44
9	chr6:159660809-159660809	*FNDC1*	NM_032532.2	c.4441C>T	p.Arg1481Cys	0.44
9	chr7:87174159-87174159	*ABCB1*	NM_000927.4	c.2044C>T	p.Leu682Phe	0.40
9	chr7:117067495-117067495	*ASZ1*	NM_130768.2	c.20G>A	p.Arg7Gln	0.35
9	chr8:55534044-55534044	*RP1*	NM_006269.1	c.518G>T	p.Ser173Ile	0.59
9	chr9:2820070-2820070	*PUM3*	NM_014878.4	c.1217C>T	p.Ala406Val	0.30
9	chr9:32632753-32632753	*TAF1L*	NM_153809.2	c.2825T>C	p.Ile942Thr	0.43
9	chr9:88938537-88938537	*ZCCHC6*	NM_001185059.1	c.2128G>C	p.Glu710Gln	0.53
9	chr9:140082378-140082378	*ANAPC2*	NM_013366.3	c.295G>A	p.Glu99Lys	0.46
9	chrX:38420818-38420818	*TSPAN7*	NM_004615.3	c.19G>A	p.Glu7Lys	0.40
9	chrX:101969880-101969880	*GPRASP2*	NM_138437.5	c.83G>T	p.Arg28Ile	0.46
9	chrX:151304010-151304010	*MAGEA10*	NM_001011543.2	c.83C>T	p.Ala28Val	0.44
9	chr22:23230440-23230440	*IGLL5*	NM_001178126.1	c.206+1G>A		0.72
4	chr1:205811019-205811019	*PM20D1*	NM_152491.4	c.966-2A>G		0.30
4	chr1:206944760-206944760	*IL10*	NM_000572.2	c.166C>T	p.Gln56Ter	0.26

4	chr11:55029789-55029789	*TRIM48*	NM_024114.3	c.44+2T>G		0.30
4	chr14:51094863-51094863	*ATL1*	NM_015915.4	c.1234G>T	p.Glu412Ter	0.35
4	chr14:104638915-104638915	*KIF26A*	NM_015656.1	c.1330G>T	p.Glu444Ter	0.35
4	chr17:40721999-40721999	*MLX*	NM_170607.2	c.639-1_639insCA	p.Asn214ArgfsTer7	0.22
4	chr19:3523057-3523057	*FZR1*	NM_016263.3	c.69+1G>A		0.33
4	chr2:74733107-74733107	*PCGF1*	NM_032673.2	c.502C>T	p.Gln168Ter	0.52
4	chr2:225907050-225907050	*DOCK10*	NM_014689.2	c.41_42insATGTT	p.Arg15CysfsTer2	0.27
4	chr3:71179648-71179648	*FOXP1*	NM_001244815.1	c.186+1G>A		0.39
4	chr4:100348929-100348929	*ADH7*	NM_000673.4	c.600+1G>T		0.42
4	chr4:158041766-158041766	*GLRB*	NM_000824.4	c.182delA	p.Asn61ThrfsTer11	0.54
4	chr6:393330-393330	*IRF4*	NM_002460.3	c.178C>T	p.Gln60Ter	0.32
4	chr6:1610798-1610799	*FOXC1*	NM_001453.2	c.118_119delAT	p.Met40AlafsTer42	0.28
4	chr6:31324192-31324192	*HLA-B*	NM_005514.6	c.371delG	p.Gly124AlafsTer27	0.77
4	chr6:37138900-37138900	*PIM1*	NM_002648.3	c.241-1delG		0.31
4	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>T	p.Glu135Ter	0.37
4	chr7:5428441-5428441	*TNRC18*	NM_001080495.2	c.1013dupC	p.Pro339AlafsTer28	0.28
4	chr7:17338954-17338954	*AHR*	NM_001621.4	c.65+1G>A		0.34
4	chr8:60031444-60031444	*TOX*	NM_014729.2	c.102+1G>A		0.62
4	chrX:12994364-12994364	*TMSB4X*	NM_021109.3	c.-16-1G>A		0.78
4	chrX:48767274-48767274	*SLC35A2*	NM_005660.1	c.92-1G>A		0.79
4	chr1:203274831-203274831	*BTG2*	NM_006763.2	c.97C>T	p.Gln33Ter	0.29
4	chr16:3788618-3788618	*CREBBP*	NM_004380.2	c.4336C>T	p.Arg1446Cys	0.37
4	chr1:43904696-43904696	*SZT2*	NM_015284.3	c.6553C>T	p.Arg2185Trp	0.34
4	chr2:223084925-223084925	*PAX3*	NM_181457.3	c.1107C>A	p.Ser369Arg	0.35
4	chr8:144996397-144996397	*PLEC*	NM_000445.3	c.7673G>A	p.Arg2558His	0.43
4	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.77
4	chr10:96612522-96612522	*CYP2C19*	NM_000769.1	c.1324C>T	p.Arg442Cys	0.30
4	chr20:52198874-52198876	*ZNF217*	NM_006526.2	c.490_492delAGA	p.Arg164del	0.32
4	chr1:176809349-176809349	*PAPPA2*	NM_020318.2	c.5243G>T	p.Arg1748Leu	0.31
4	chr11:32456380-32456380	*WT1*	NM_024426.4	c.512C>G	p.Thr171Arg	0.39
4	chr15:52534357-52534357	*MYO5C*	NM_018728.3	c.2444A>C	p.Gln815Pro	0.32
4	chr17:62006799-62006799	*CD79B*	NM_001039933.1	c.589T>G	p.Tyr197Asp	0.45
4	chr2:141079621-141079621	*LRP1B*	NM_018557.2	c.12551T>A	p.Leu4184His	0.37
4	chr5:180030308-180030308	*FLT4*	NM_182925.4	c.3976G>A	p.Ala1326Thr	0.29
4	chr1:94502767-94502767	*ABCA4*	NM_000350.2	c.3747G>T	p.Glu1249Asp	0.29
4	chr1:158368692-158368692	*OR10T2*	NM_001004475.1	c.565G>A	p.Ala189Thr	0.21
4	chr1:215792380-215792380	*KCTD3*	NM_016121.3	c.1715C>A	p.Ala572Asp	0.25
4	chr1:248059229-248059229	*OR2W3*	NM_001001957.2	c.341T>C	p.Leu114Pro	0.49
4	chr10:112557275-112557275	*RBM20*	NM_001134363.1	c.1537C>T	p.Arg513Trp	0.48
4	chr11:1271137-1271137	*MUC5B*	NM_002458.2	c.13027A>C	p.Thr4343Pro	0.32
4	chr11:55797938-55797938	*OR5AS1*	NM_001001921.1	c.44T>C	p.Val15Ala	0.46
4	chr11:121323117-121323117	*SORL1*	NM_003105.5	c.77C>T	p.Ala26Val	0.26
4	chr12:71526587-71526587	*TSPAN8*	NM_004616.2	c.462G>T	p.Leu154Phe	0.27
4	chr12:85449620-85449620	*LRRIQ1*	NM_001079910.1	c.1049A>G	p.Lys350Arg	0.14
4	chr12:92537974-92537974	*BTG1*	NM_001731.2	c.398G>A	p.Ser133Asn	0.18
4	chr12:130898833-130898833	*RIMBP2*	NM_015347.4	c.2489G>A	p.Arg830His	0.27
4	chr13:88329222-88329222	*SLITRK5*	NM_015567.1	c.1579G>T	p.Gly527Cys	0.29
4	chr14:47770684-47770684	*MDGA2*	NM_001113498.2	c.143G>A	p.Arg48Lys	0.36
4	chr14:63174800-63174800	*KCNH5*	NM_139318.4	c.2393A>C	p.Asn798Thr	0.30
4	chr14:75537521-75537521	*ZC2HC1C*	NM_001042430.1	c.245G>A	p.Ser82Asn	0.39
4	chr14:94642434-94642434	*PPP4R4*	NM_058237.1	c.161G>A	p.Ser54Asn	0.38
4	chr14:105398375-105398375	*PLD4*	NM_138790.2	c.1085T>C	p.Leu362Pro	0.37
4	chr15:30019107-30019107	*TJP1*	NM_175610.2	c.2189C>T	p.Pro730Leu	0.39
4	chr15:72455692-72455692	*GRAMD2*	NM_001012642.2	c.871G>A	p.Glu291Lys	0.29
4	chr16:57713180-57713180	*ADGRG3*	NM_170776.4	c.584C>T	p.Ala195Val	0.43
4	chr16:88705618-88705618	*IL17C*	NM_013278.3	c.236A>G	p.His79Arg	0.26
4	chr17:48696180-48696180	*CACNA1G*	NM_018896.4	c.5592G>T	p.Glu1864Asp	0.35
4	chr17:74261651-74261651	*UBALD2*	NM_182565.3	c.65G>A	p.Gly22Asp	0.31
4	chr17:77918838-77918838	*TBC1D16*	NM_019020.3	c.1777C>T	p.His593Tyr	0.29
4	chr18:43666141-43666141	*ATP5A1*	NM_004046.5	c.1367C>T	p.Ala456Val	0.46
4	chr18:45555935-45555935	*ZBTB7C*	NM_001039360.2	c.1556G>A	p.Gly519Asp	0.33
4	chr18:77221328-77221328	*NFATC1*	NM_006162.4	c.1921G>A	p.Glu641Lys	0.46
4	chr19:9018184-9018184	*MUC16*	NM_024690.2	c.37754A>C	p.Lys12585Thr	0.31
4	chr19:10689614-10689614	*AP1M2*	NM_005498.4	c.842C>A	p.Ser281Tyr	0.39
4	chr19:16688050-16688050	*MED26*	NM_004831.3	c.591T>A	p.Asp197Glu	0.40
4	chr19:46387586-46387586	*IRF2BP1*	NM_015649.1	c.1447G>A	p.Ala483Thr	0.37

4	chr19:50204071-50204071	*CPT1C*	NM_001199752.1	c.412G>C	p.Glu138Gln	0.23
4	chr19:52793810-52793810	*ZNF766*	NM_001010851.2	c.766G>A	p.Ala256Thr	0.26
4	chr2:27532842-27532842	*MPV17*	NM_002437.4	c.469G>A	p.Val157Ile	0.33
4	chr2:47797230-47797230	*KCNK12*	NM_022055.1	c.241G>A	p.Ala81Thr	0.35
4	chr2:60780368-60780368	*BCL11A*	NM_018014.3	c.38G>A	p.Ser13Asn	0.31
4	chr2:96810751-96810751	*DUSP2*	NM_004418.3	c.343C>G	p.Leu115Val	0.36
4	chr2:220046783-220046783	*FAM134A*	NM_024293.4	c.1064G>A	p.Arg355Gln	0.42
4	chr2:230020664-230020664	*PID1*	NM_017933.4	c.140T>G	p.Leu47Arg	0.26
4	chr2:237076118-237076118	*GBX2*	NM_001485.2	c.497C>T	p.Ala166Val	0.31
4	chr20:32345043-32345043	*ZNF341*	NM_032819.3	c.831C>A	p.Asn277Lys	0.34
4	chr22:20130876-20130876	*ZDHHC8*	NM_001185024.1	c.1723G>A	p.Asp575Asn	0.37
4	chr22:24034650-24034650	*RGL4*	NM_153615.1	c.308A>C	p.Glu103Ala	0.39
4	chr3:32022414-32022414	*OSBPL10*	NM_017784.4	c.258C>A	p.Asn86Lys	0.52
4	chr3:32022546-32022546	*OSBPL10*	NM_017784.4	c.126C>G	p.Ser42Arg	0.51
4	chr3:32022573-32022573	*OSBPL10*	NM_017784.4	c.99C>G	p.Cys33Trp	0.50
4	chr3:32022610-32022610	*OSBPL10*	NM_017784.4	c.62G>A	p.Ser21Asn	0.29
4	chr3:32022631-32022631	*OSBPL10*	NM_017784.4	c.41G>C	p.Ser14Thr	0.27
4	chr3:42916012-42916012	*CYP8B1*	NM_004391.2	c.1297T>A	p.Trp433Arg	0.20
4	chr3:56789039-56789039	*ARHGEF3*	NM_001128615.1	c.441G>A	p.Met147Ile	0.32
4	chr3:65342745-65342745	*MAGI1*	NM_001033057.1	c.3697G>A	p.Gly1233Arg	0.36
4	chr3:105266288-105266288	*ALCAM*	NM_001627.3	c.1295C>A	p.Thr432Lys	0.38
4	chr3:136088063-136088063	*STAG1*	NM_005862.2	c.2432G>A	p.Arg811Lys	0.22
4	chr3:142499815-142499815	*TRPC1*	NM_001251845.1	c.904G>A	p.Glu302Lys	0.37
4	chr3:167254670-167254670	*WDR49*	NM_178824.3	c.886A>C	p.Thr296Pro	0.23
4	chr4:76911970-76911970	*SDAD1*	NM_018115.2	c.25C>T	p.Leu9Phe	0.41
4	chr4:89380569-89380569	*HERC5*	NM_016323.3	c.337T>C	p.Ser113Pro	0.64
4	chr4:141320038-141320038	*CLGN*	NM_001130675.1	c.851T>G	p.Ile284Ser	0.43
4	chr5:68404198-68404198	*SLC30A5*	NM_022902.4	c.382A>G	p.Ser128Gly	0.51
4	chr5:73236723-73236723	*ARHGEF28*	NM_001080479.2	c.5081G>A	p.Arg1694His	0.38
4	chr5:102295722-102295722	*PAM*	NM_000919.3	c.1049C>T	p.Pro350Leu	0.36
4	chr5:125696020-125696020	*GRAMD3*	NM_001146319.1	c.-4G>T		0.37
4	chr6:393105-393105	*IRF4*	NM_002460.3	c.-48C>T		0.29
4	chr6:1611798-1611798	*FOXC1*	NM_001453.2	c.1118G>A	p.Ser373Asn	0.51
4	chr6:26385392-26385392	*BTN2A2*	NM_001197238.1	c.244T>C	p.Tyr82His	0.33
4	chr6:27839879-27839879	*HIST1H3I*	NM_003533.2	c.215T>A	p.Val72Glu	0.28
4	chr6:31239570-31239570	*HLA-C*	NM_002117.5	c.149G>A	p.Gly50Asp	0.41
4	chr6:34664329-34664329	*C6orf106*	NM_024294.2	c.52T>C	p.Cys18Arg	0.34
4	chr6:37138369-37138369	*PIM1*	NM_002648.3	c.18C>G	p.Ile6Met	0.35
4	chr6:37138441-37138441	*PIM1*	NM_002648.3	c.82+8C>T		0.29
4	chr6:37138560-37138560	*PIM1*	NM_002648.3	c.94G>A	p.Glu32Lys	0.35
4	chr6:37138569-37138569	*PIM1*	NM_002648.3	c.103G>A	p.Glu35Lys	0.36
4	chr6:37138642-37138642	*PIM1*	NM_002648.3	c.176C>T	p.Ser59Phe	0.32
4	chr6:37138658-37138658	*PIM1*	NM_002648.3	c.189+3G>A		0.29
4	chr6:37138769-37138769	*PIM1*	NM_002648.3	c.202C>T	p.His68Tyr	0.35
4	chr6:37138805-37138805	*PIM1*	NM_002648.3	c.238C>A	p.Leu80Met	0.29
4	chr6:37138815-37138815	*PIM1*	NM_002648.3	c.240+8C>T		0.28
4	chr6:37138901-37138901	*PIM1*	NM_002648.3	c.241C>A	p.Pro81Thr	0.31
4	chr6:37138956-37138956	*PIM1*	NM_002648.3	c.296G>A	p.Gly99Asp	0.33
4	chr6:37138987-37138987	*PIM1*	NM_002648.3	c.327G>C	p.Trp109Cys	0.34
4	chr6:37139097-37139097	*PIM1*	NM_002648.3	c.437G>A	p.Ser146Asn	0.40
4	chr6:37139110-37139110	*PIM1*	NM_002648.3	c.450G>C	p.Gln150His	0.27
4	chr6:37139135-37139135	*PIM1*	NM_002648.3	c.475C>T	p.His159Tyr	0.22
4	chr6:37139210-37139210	*PIM1*	NM_002648.3	c.550C>T	p.Leu184Phe	0.36
4	chr6:37139237-37139237	*PIM1*	NM_002648.3	c.577C>T	p.Leu193Phe	0.76
4	chr6:39867979-39867979	*DAAM2*	NM_001201427.1	c.2806G>A	p.Asp936Asn	0.32
4	chr6:66200534-66200534	*EYS*	NM_001142800.1	c.815A>C	p.Asn272Thr	0.42
4	chr6:117662792-117662792	*ROS1*	NM_002944.2	c.4673C>T	p.Pro1558Leu	0.45
4	chr6:129929107-129929107	*ARHGAP18*	NM_033515.2	c.1213C>T	p.Leu405Phe	0.43
4	chr7:5568958-5568958	*ACTB*	NM_001101.3	c.197C>T	p.Thr66Ile	0.35
4	chr7:21840807-21840807	*DNAH11*	NM_001277115.1	c.10079C>G	p.Ala3360Gly	0.33
4	chr8:52321597-52321597	*PXDNL*	NM_144651.4	c.2587G>A	p.Ala863Thr	0.30
4	chr8:55372511-55372511	*SOX17*	NM_022454.3	c.1201G>A	p.Asp401Asn	0.39
4	chr9:37424900-37424900	*GRHPR*	NM_012203.1	c.142G>A	p.Gly48Ser	0.25
4	chr9:37424976-37424976	*GRHPR*	NM_012203.1	c.214+4C>G		0.33
4	chr9:37425996-37425996	*GRHPR*	NM_012203.1	c.287+5C>T		0.26
4	chr9:37426001-37426001	*GRHPR*	NM_012203.1	c.287+10G>A		0.24

4	chr9:82189837-82189837	*TLE4*	NM_007005.3	c.193C>T	p.Arg65Trp	0.26
4	chrX:49020999-49020999	*MAGIX*	NM_001099680.1	c.-6C>T		0.62
4	chr1:40536643-40536643	*CAP1*	NM_006367.3	c.1336G>A	p.Gly446Ser	0.26
4	chr11:114400949-114400949	*NXPE1*	NM_152315.2	c.355C>T	p.Arg119Trp	0.23
4	chr11:118130800-118130800	*MPZL2*	NM_005797.3	c.553G>A	p.Glu185Lys	0.55
4	chr12:53877268-53877268	*MAP3K12*	NM_006301.3	c.1379G>A	p.Arg460Gln	0.29
4	chr16:5135725-5135725	*EEF2KMT*	NM_201400.2	c.901G>A	p.Gly301Arg	0.25
4	chr16:57787344-57787344	*KATNB1*	NM_005886.2	c.1090G>A	p.Glu364Lys	0.37
4	chr17:18143964-18143964	*LLGL1*	NM_004140.3	c.2279C>T	p.Pro760Leu	0.41
4	chr17:38068624-38068624	*GSDMB*	NM_001165958.1	c.362C>T	p.Ser121Leu	0.43
4	chr17:40722005-40722005	*MLX*	NM_170607.2	c.644A>G	p.Tyr215Cys	0.27
4	chr19:5221131-5221131	*PTPRS*	NM_002850.3	c.3335C>T	p.Thr1112Met	0.30
4	chr19:41748914-41748914	*AXL*	NM_021913.4	c.1439G>A	p.Arg480His	0.32
4	chr19:50826955-50826955	*KCNC3*	NM_004977.2	c.1255G>A	p.Val419Ile	0.30
4	chr2:220473883-220473883	*STK11IP*	NM_052902.2	c.1907G>A	p.Arg636Gln	0.35
4	chr2:242011216-242011216	*SNED1*	NM_001080437.1	c.3740C>T	p.Ser1247Leu	0.42
4	chr22:40362029-40362029	*GRAP2*	NM_004810.2	c.326G>A	p.Arg109Gln	0.26
4	chr4:80328117-80328117	*GK2*	NM_033214.2	c.1238G>A	p.Arg413His	0.31
4	chr6:3012883-3012883	*NQO2*	NM_000904.3	c.278G>A	p.Arg93Gln	0.14
4	chr6:37138355-37138355	*PIM1*	NM_002648.3	c.4C>T	p.Leu2Phe	0.37
4	chr6:37138545-37138545	*PIM1*	NM_002648.3	c.83-4C>T		0.32
4	chr6:37138583-37138583	*PIM1*	NM_002648.3	c.117G>C	p.Gln39His	0.31
4	chr7:113518710-113518710	*PPP1R3A*	NM_002711.3	c.2437C>T	p.Arg813Cys	0.27
4	chr8:87111214-87111214	*ATP6V0D2*	NM_152565.1	c.7G>A	p.Glu3Lys	0.28
5	chr1:45251896-45251896	*BEST4*	NM_153274.2	c.485dupT	p.Met163HisfsTer10	0.38
5	chr1:57202821-57202821	*C1orf168*	NM_001004303.4	c.1733-1G>C		0.28
5	chr1:117113594-117113594	*CD58*	NM_001779.2	c.1A>G	p.Met1?	0.62
5	chr1:196801119-196801119	*CFHR1*	NM_002113.2	c.988dupA	p.Arg330LysfsTer36	0.32
5	chr1:203276356-203276356	*BTG2*	NM_006763.2	c.267delG	p.Gln89HisfsTer12	0.25
5	chr1:215972447-215972447	*USH2A*	NM_206933.2	c.9760G>T	p.Glu3254Ter	0.26
5	chr10:68687470-68687470	*LRRTM3*	NM_178011.3	c.796G>T	p.Glu266Ter	0.38
5	chr11:55033127-55033127	*TRIM48*	NM_024114.3	c.511C>T	p.Gln171Ter	0.33
5	chr11:102269623-102269623	*TMEM123*	NM_052932.2	c.603-1G>A		0.38
5	chr12:11803095-11803095	*ETV6*	NM_001987.4	c.33+1G>A		0.32
5	chr12:11803096-11803096	*ETV6*	NM_001987.4	c.33+2T>A		0.42
5	chr12:81671138-81671138	*PPFIA2*	NM_003625.3	c.3268G>T	p.Glu1090Ter	0.20
5	chr12:122460090-122460090	*BCL7A*	NM_001024808.1	c.92+1G>A		0.21
5	chr13:25480133-25480134	*CENPJ*	NM_018451.4	c.2042_2043delGC	p.Ser681AsnfsTer3	0.33
5	chr13:32676133-32676133	*FRY*	NM_023037.2	c.304G>T	p.Glu102Ter	0.24
5	chr2:29073209-29073209	*TRMT61B*	NM_017910.3	c.1375C>T	p.Gln459Ter	0.29
5	chr2:182761692-182761692	*SSFA2*	NM_001130445.1	c.364+1G>T		0.28
5	chr2:205990357-205990357	*PARD3B*	NM_152526.5	c.1330C>T	p.Arg444Ter	0.35
5	chr20:43723585-43723586	*KCNS1*	NM_002251.3	c.1506_1507delAA	p.Glu502AspfsTer17	0.40
5	chr3:38182337-38182337	*MYD88*	NM_002468.4	c.773C>T	p.Pro258Leu	0.42
5	chr3:89259012-89259012	*EPHA3*	NM_005233.5	c.156G>A	p.Trp52Ter	0.25
5	chr4:148555367-148555367	*TMEM184C*	NM_018241.2	c.1099C>T	p.Gln367Ter	0.35
5	chr5:19473556-19473556	*CDH18*	NM_004934.3	c.2152C>T	p.Gln718Ter	0.34
5	chr5:140795179-140795179	*PCDHGA10*	NM_018913.2	c.2436+1G>T		0.35
5	chr5:150429393-150429393	*TNIP1*	NM_001252390.1	c.838C>T	p.Gln280Ter	0.34
5	chr5:167645913-167645913	*TENM2*	NM_001122679.1	c.4990C>T	p.Gln1664Ter	0.38
5	chr6:26199928-26199928	*HIST1H2BF*	NM_003522.3	c.142C>T	p.Gln48Ter	0.26
5	chr6:29910727-29910727	*HLA-A*	NM_001242758.1	c.269dupA	p.Asn90LysfsTer9	0.48
5	chr6:31324513-31324513	*HLA-B*	NM_005514.6	c.295C>T	p.Arg99Ter	0.75
5	chr6:150184662-150184662	*LRP11*	NM_032832.5	c.495C>A	p.Cys165Ter	0.41
5	chr7:83675718-83675718	*SEMA3A*	NM_006080.2	c.589C>T	p.Arg197Ter	0.31
5	chr7:150069172-150069172	*REPIN1*	NM_013400.3	c.842C>A	p.Ser281Ter	0.33
5	chr8:74204006-74204006	*RPL7*	NM_000971.3	c.428+2T>C		0.42
5	chr8:91967724-91967724	*NECAB1*	NM_022351.4	c.1040G>A	p.Trp347Ter	0.31
5	chr9:75407110-75407110	*TMC1*	NM_138691.2	c.1408G>T	p.Glu470Ter	0.38
5	chr9:140139758-140139758	*FAM166A*	NM_001001710.1	c.522+1G>A		0.43
5	chr12:88568426-88568429	*TMTC3*	NM_181783.3	c.1247_1250delCTCA	p.Thr416IlefsTer3	0.23
5	chr9:2718697-2718697	*KCNV2*	NM_133497.3	c.958C>T	p.Arg320Cys	0.39

5	chr17:80207393-80207393	*CSNK1D*	NM_001893.4	c.971G>A	p.Arg324His	0.38
5	chr4:13546048-13546048	*NKX3-2*	NM_001189.3	c.-10C>T		0.41
5	chr3:122003472-122003472	*CASR*	NM_000388.3	c.2671C>T	p.Arg891Cys	0.33
5	chr11:64645634-64645634	*EHD1*	NM_006795.2	c.303G>C	p.Met101Ile	0.30
5	chr12:122252766-122252766	*SETD1B*	NM_015048.1	c.2645G>A	p.Arg882His	0.36
5	chr13:20012275-20012275	*TPTE2*	NM_001271850.1	c.5T>G	p.Val2Gly	0.45
5	chr16:2141485-2141485	*PKD1*	NM_001009944.2	c.11651G>A	p.Ser3884Asn	0.40
5	chr17:62006680-62006680	*CD79B*	NM_001039933.1	c.599T>A	p.Leu200Gln	0.70
5	chr18:19244094-19244094	*ABHD3*	NM_138340.4	c.653G>A	p.Gly218Glu	0.32
5	chr21:47531922-47531922	*COL6A2*	NM_001849.3	c.145T>A	p.Phe49Ile	0.78
5	chr22:29121338-29121338	*CHEK2*	NM_007194.3	c.337T>C	p.Tyr113His	0.42
5	chr3:6903499-6903499	*GRM7*	NM_000844.3	c.424C>T	p.Pro142Ser	0.39
5	chr3:130717192-130717192	*ATP2C1*	NM_001001486.1	c.2446G>A	p.Val816Met	0.36
5	chr4:183714331-183714331	*TENM3*	NM_001080477.1	c.6506G>A	p.Arg2169His	0.34
5	chr5:79966124-79966124	*MSH3*	NM_002439.4	c.788C>T	p.Ala263Val	0.43
5	chr5:170883616-170883616	*FGF18*	NM_003862.2	c.431C>G	p.Ala144Gly	0.48
5	chr7:33376071-33376071	*BBS9*	NM_198428.2	c.1035A>G	p.Ile345Met	0.28
5	chr9:139252535-139252535	*GPSM1*	NM_001145638.2	c.1891G>A	p.Glu631Lys	0.40
5	chr1:20879731-20879731	*FAM43B*	NM_207334.2	c.265G>A	p.Gly89Ser	0.39
5	chr1:23885817-23885817	*ID3*	NM_002167.4	c.101C>T	p.Ala34Val	0.33
5	chr1:68954627-68954627	*DEPDC1*	NM_001114120.1	c.562G>A	p.Glu188Lys	0.41
5	chr1:179961323-179961323	*CEP350*	NM_014810.4	c.362G>A	p.Arg121His	0.31
5	chr1:197871870-197871870	*C1orf53*	NM_001024594.2	c.91G>A	p.Ala31Thr	0.28
5	chr1:201180478-201180478	*IGFN1*	NM_001164586.1	c.6457G>A	p.Gly2153Ser	0.24
5	chr1:216405328-216405328	*USH2A*	NM_206933.2	c.2960A>G	p.Asp987Gly	0.29
5	chr1:223286334-223286334	*TLR5*	NM_003268.5	c.40A>C	p.Met14Leu	0.26
5	chr10:72494973-72494973	*ADAMTS14*	NM_139155.2	c.1410G>T	p.Gln470His	0.43
5	chr11:55579001-55579001	*OR5L1*	NM_001004738.1	c.59T>C	p.Val20Ala	0.43
5	chr11:55944916-55944916	*OR5J2*	NM_001005492.1	c.823T>G	p.Ser275Ala	0.34
5	chr11:56058019-56058019	*OR8H1*	NM_001005199.1	c.520C>T	p.Arg174Cys	0.38
5	chr11:56128267-56128267	*OR8J1*	NM_001005205.2	c.545T>G	p.Val182Gly	0.52
5	chr11:64535204-64535204	*SF1*	NM_001178030.1	c.1556C>G	p.Pro519Arg	0.39
5	chr11:67203736-67203736	*PTPRCAP*	NM_005608.2	c.89G>A	p.Gly30Asp	0.42
5	chr11:128391897-128391897	*ETS1*	NM_001162422.1	c.-8C>T		0.45
5	chr12:33535441-33535441	*SYT10*	NM_198992.3	c.1213G>T	p.Val405Leu	0.18
5	chr12:58139663-58139663	*TSPAN31*	NM_005981.3	c.199G>A	p.Ala67Thr	0.31
5	chr12:81528635-81528635	*ACSS3*	NM_024560.2	c.497A>C	p.Lys166Thr	0.32
5	chr12:91347861-91347861	*CCER1*	NM_152638.2	c.659C>T	p.Thr220Met	0.38
5	chr12:98941513-98941513	*TMPO*	NM_001032283.2	c.1242G>C	p.Trp414Cys	0.28
5	chr12:117348869-117348869	*FBXW8*	NM_012174.1	c.27C>G	p.Phe9Leu	0.39
5	chr13:25486874-25486874	*CENPJ*	NM_018451.4	c.290C>T	p.Thr97Ile	0.45
5	chr13:103384338-103384338	*CCDC168*	NM_001146197.1	c.18709T>C	p.Tyr6237His	0.44
5	chr14:21238417-21238417	*EDDM3B*	NM_022360.4	c.108G>T	p.Gln36His	0.38
5	chr14:21570109-21570109	*TMEM253*	NM_001146683.1	c.194C>T	p.Ala65Val	0.34
5	chr14:57755565-57755565	*AP5M1*	NM_018229.3	c.1436C>G	p.Ala479Gly	0.21
5	chr14:75991514-75991514	*BATF*	NM_006399.3	c.151G>C	p.Ala51Pro	0.37
5	chr14:91007747-91007747	*TTC7B*	NM_001010854.1	c.2497G>A	p.Ala833Thr	0.40
5	chr14:103946752-103946752	*MARK3*	NM_001128918.1	c.1511G>A	p.Arg504Gln	0.37
5	chr15:23892588-23892588	*MAGEL2*	NM_019066.4	c.302A>C	p.Lys101Thr	0.41
5	chr15:38631980-38631980	*SPRED1*	NM_152594.2	c.466C>A	p.Leu156Ile	0.29
5	chr15:41750005-41750005	*RTF1*	NM_015138.4	c.593A>C	p.Gln198Pro	0.41
5	chr16:216410-216410	*HBM*	NM_001003938.3	c.236C>T	p.Ala79Val	0.43
5	chr16:23690490-23690490	*PLK1*	NM_005030.3	c.237C>A	p.Phe79Leu	0.38
5	chr16:47143448-47143448	*NETO2*	NM_018092.4	c.829G>A	p.Asp277Asn	0.41
5	chr16:55516883-55516883	*MMP2*	NM_004530.4	c.216C>A	p.Asp72Glu	0.36
5	chr16:61891091-61891091	*CDH8*	NM_001796.4	c.599G>T	p.Gly200Val	0.36
5	chr16:71660274-71660274	*MARVELD3*	NM_052858.5	c.142G>A	p.Asp48Asn	0.37
5	chr17:17124721-17124721	*FLCN*	NM_144606.5	c.1001G>A	p.Arg334Gln	0.41
5	chr17:25917851-25917851	*KSR1*	NM_014238.1	c.650C>T	p.Ser217Phe	0.39
5	chr17:36912154-36912154	*PSMB3*	NM_002795.2	c.207C>A	p.Phe69Leu	0.42

5	chr17:76392417-76392417	*PGS1*	NM_024419.3	c.362T>C	p.Val121Ala	0.39
5	chr18:30350281-30350281	*KLHL14*	NM_020805.1	c.274C>T	p.Pro92Ser	0.38
5	chr18:43796444-43796444	*C18orf25*	NM_145055.3	c.598C>G	p.Leu200Val	0.25
5	chr18:65178781-65178781	*DSEL*	NM_032160.2	c.3095C>A	p.Ala1032Asp	0.16
5	chr18:67068491-67068491	*DOK6*	NM_152721.5	c.11A>T	p.Asn4Ile	0.15
5	chr19:22156643-22156643	*ZNF208*	NM_007153.3	c.1193A>G	p.Lys398Arg	0.25
5	chr19:42746407-42746407	*GSK3A*	NM_019884.2	c.211G>A	p.Gly71Ser	0.34
5	chr19:42857935-42857935	*MEGF8*	NM_001410.2	c.3569G>A	p.Gly1190Asp	0.48
5	chr19:49632668-49632668	*PPFIA3*	NM_003660.3	c.539G>A	p.Arg180His	0.40
5	chr19:57646777-57646777	*ZIM3*	NM_052882.1	c.928A>G	p.Thr310Ala	0.48
5	chr2:70315663-70315663	*PCBP1*	NM_006196.3	c.788G>C	p.Ser263Thr	0.20
5	chr2:96810880-96810880	*DUSP2*	NM_004418.3	c.214C>T	p.Pro72Ser	0.34
5	chr2:153484931-153484931	*FMNL2*	NM_052905.3	c.2284T>G	p.Leu762Val	0.44
5	chr2:210558108-210558108	*MAP2*	NM_002374.3	c.1214G>A	p.Gly405Glu	0.37
5	chr2:210560965-210560965	*MAP2*	NM_002374.3	c.4071A>C	p.Glu1357Asp	0.29
5	chr20:13251155-13251155	*ISM1*	NM_080826.1	c.143A>C	p.Asn48Thr	0.30
5	chr20:30309960-30309960	*BCL2L1*	NM_138578.1	c.62G>A	p.Gly21Glu	0.44
5	chr20:40733252-40733252	*PTPRT*	NM_133170.3	c.3554T>G	p.Leu1185Arg	0.43
5	chr22:18220927-18220929	*BID*	NM_197966.2	c.568_570delAAG	p.Lys190del	0.24
5	chr22:37387231-37387231	*TEX33*	NM_001163857.1	c.832T>G	p.Ser278Ala	0.36
5	chr3:53835358-53835358	*CACNA1D*	NM_000720.3	c.5374C>A	p.Pro1792Thr	0.36
5	chr3:74535741-74535741	*CNTN3*	NM_020872.1	c.224A>G	p.His75Arg	0.33
5	chr3:100378569-100378569	*ADGRG7*	NM_032787.2	c.1861A>C	p.Lys621Gln	0.45
5	chr3:113323785-113323785	*SIDT1*	NM_017699.2	c.1366G>A	p.Ala456Thr	0.37
5	chr3:119887054-119887054	*GPR156*	NM_001168271.1	c.1258G>A	p.Gly420Arg	0.36
5	chr3:121342060-121342060	*FBXO40*	NM_016298.3	c.1784A>C	p.Gln595Pro	0.32
5	chr3:123512633-123512633	*MYLK*	NM_053025.3	c.56T>C	p.Val19Ala	0.36
5	chr3:180361968-180361968	*CCDC39*	NM_181426.1	c.1605A>C	p.Glu535Asp	0.35
5	chr3:186760526-186760526	*ST6GAL1*	NM_173216.2	c.35G>A	p.Cys12Tyr	0.22
5	chr3:193855537-193855537	*HES1*	NM_005524.3	c.358G>C	p.Glu120Gln	0.30
5	chr4:57871413-57871413	*POLR2B*	NM_000938.1	c.902T>G	p.Val301Gly	0.44
5	chr4:141074014-141074014	*MAML3*	NM_018717.4	c.468G>C	p.Met156Ile	0.41
5	chr5:41007480-41007480	*MROH2B*	NM_173489.4	c.3685G>A	p.Asp1229Asn	0.42
5	chr5:41042222-41042222	*MROH2B*	NM_173489.4	c.1925C>T	p.Ala642Val	0.39
5	chr5:60083233-60083233	*ELOVL7*	NM_024930.2	c.-9C>A		0.31
5	chr5:94620116-94620116	*MCTP1*	NM_024717.4	c.164C>T	p.Ser55Leu	0.45
5	chr5:96117502-96117502	*ERAP1*	NM_016442.3	c.2342G>A	p.Gly781Asp	0.38
5	chr5:121187785-121187785	*FTMT*	NM_177478.1	c.127A>T	p.Ile43Phe	0.41
5	chr5:132150237-132150237	*SOWAHA*	NM_175873.4	c.924G>T	p.Glu308Asp	0.41
5	chr5:137906741-137906741	*HSPA9*	NM_004134.6	c.318G>C	p.Lys106Asn	0.36
5	chr5:138728051-138728051	*PROB1*	NM_001161546.1	c.2720A>T	p.Asp907Val	0.36
5	chr5:140750972-140750972	*PCDHGB3*	NM_018924.2	c.1011T>G	p.Ile337Met	0.38
5	chr5:172110647-172110647	*NEURL1B*	NM_001142651.1	c.803G>A	p.Arg268Gln	0.47
5	chr5:177632044-177632044	*HNRNPAB*	NM_031266.2	c.206C>T	p.Ala69Val	0.29
5	chr5:179994962-179994962	*CNOT6*	NM_015455.3	c.986C>T	p.Ala329Val	0.34
5	chr6:32149014-32149014	*AGER*	NM_001136.4	c.1121A>G	p.Lys374Arg	0.65
5	chr6:37138127-37138127	*PIM1*	NM_001243186.1	c.49C>T	p.Pro17Ser	0.35
5	chr6:37138128-37138128	*PIM1*	NM_001243186.1	c.50C>T	p.Pro17Leu	0.35
5	chr6:37138372-37138372	*PIM1*	NM_002648.3	c.21C>G	p.Asn7Lys	0.35
5	chr6:37138440-37138440	*PIM1*	NM_002648.3	c.82+7G>A		0.39
5	chr6:37138441-37138441	*PIM1*	NM_002648.3	c.82+8C>T		0.43
5	chr6:37138555-37138555	*PIM1*	NM_002648.3	c.89A>G	p.Glu30Gly	0.46
5	chr6:37138653-37138653	*PIM1*	NM_002648.3	c.187C>T	p.Pro63Ser	0.37
5	chr6:37138812-37138812	*PIM1*	NM_002648.3	c.240+5G>A		0.32
5	chr6:37138946-37138946	*PIM1*	NM_002648.3	c.286G>T	p.Val96Leu	0.71
5	chr6:37139063-37139063	*PIM1*	NM_002648.3	c.403G>C	p.Glu135Gln	0.39
5	chr6:37139081-37139081	*PIM1*	NM_002648.3	c.421G>C	p.Glu141Gln	0.41
5	chr6:37139204-37139204	*PIM1*	NM_002648.3	c.544C>G	p.Leu182Val	0.34
5	chr6:37139210-37139210	*PIM1*	NM_002648.3	c.550C>T	p.Leu184Phe	0.42
5	chr6:54806722-54806722	*FAM83B*	NM_001010872.2	c.2953G>C	p.Val985Leu	0.43

5	chr6:74229179-74229179	*EEF1A1*	NM_001402.5	c.205C>T	p.Arg69Cys	0.42
5	chr6:100062600-100062600	*PRDM13*	NM_021620.3	c.2089C>G	p.Pro697Ala	0.37
5	chr6:108214708-108214708	*SEC63*	NM_007214.4	c.1652A>T	p.Gln551Leu	0.14
5	chr6:165806241-165806241	*PDE10A*	NM_001130690.2	c.1550A>C	p.Lys517Thr	0.43
5	chr7:138968224-138968224	*UBN2*	NM_173569.3	c.2573C>T	p.Ala858Val	0.34
5	chr8:3326336-3326336	*CSMD1*	NM_033225.5	c.1459T>A	p.Ser487Thr	0.39
5	chr8:8185584-8185584	*SGK223*	NM_001080826.1	c.2708G>A	p.Cys903Tyr	0.36
5	chr8:30945387-30945387	*WRN*	NM_000553.4	c.1527A>C	p.Glu509Asp	0.33
5	chr8:41585488-41585488	*ANK1*	NM_001142446.1	c.364G>A	p.Gly122Arg	0.43
5	chr8:105405177-105405177	*DPYS*	NM_001385.2	c.1278C>A	p.Asn426Lys	0.38
5	chr8:109254029-109254029	*EIF3E*	NM_001568.2	c.204T>A	p.His68Gln	0.33
5	chr8:128750984-128750984	*MYC*	NM_002467.4	c.521G>T	p.Ser174Ile	0.43
5	chr9:15779103-15779103	*CCDC171*	NM_173550.2	c.3036C>G	p.Asp1012Glu	0.46
5	chr9:35724278-35724278	*TLN1*	NM_006289.3	c.565G>A	p.Glu189Lys	0.46
5	chr9:79936578-79936578	*VPS13A*	NM_033305.2	c.5746A>G	p.Ser1916Gly	0.31
5	chr9:84608735-84608735	*SPATA31D1*	NM_001001670.2	c.3350T>G	p.Ile1117Arg	0.40
5	chr9:107510116-107510116	*NIPSNAP3A*	NM_015469.1	c.43C>T	p.Arg15Trp	0.33
5	chr9:109691219-109691219	*ZNF462*	NM_021224.4	c.5026G>A	p.Ala1676Thr	0.35
5	chr9:113530200-113530200	*MUSK*	NM_005592.3	c.1021T>C	p.Tyr341His	0.33
5	chr9:132805256-132805256	*FNBP1*	NM_015033.2	c.-2C>T		0.30
5	chrX:140983300-140983300	*MAGEC3*	NM_138702.1	c.1078C>T	p.Arg360Cys	0.79
5	chr7:27286007-27286007	*EVX1*	NM_001989.3	c.1187C>T	p.Ala396Val	0.43
5	chr1:27099906-27099906	*ARID1A*	NM_006015.4	c.3785G>A	p.Arg1262His	0.41
5	chr1:159505434-159505434	*OR10J5*	NM_001004469.1	c.364C>T	p.Arg122Cys	0.45
5	chr1:203134969-203134969	*ADORA1*	NM_000674.2	c.922C>T	p.Arg308Cys	0.14
5	chr1:230492930-230492930	*PGBD5*	NM_001258311.1	c.469G>A	p.Gly157Arg	0.29
5	chr10:46999272-46999272	*GPRIN2*	NM_014696.3	c.392G>A	p.Arg131Gln	0.20
5	chr10:47087370-47087370	*NPY4R*	NM_005972.5	c.587C>T	p.Ala196Val	0.18
5	chr11:4929486-4929486	*OR51A7*	NM_001004749.1	c.887G>A	p.Arg296Gln	0.32
5	chr11:55681238-55681238	*OR5W2*	NM_001001960.1	c.821C>A	p.Thr274Asn	0.36
5	chr11:74547746-74547746	*RNF169*	NM_001098638.1	c.2098C>T	p.Arg700Trp	0.42
5	chr11:74904463-74904463	*SLCO2B1*	NM_007256.4	c.1276G>A	p.Val426Met	0.37
5	chr11:120188000-120188000	*POU2F3*	NM_001244682.1	c.1204G>A	p.Ala402Thr	0.45
5	chr12:53453328-53453328	*TNS2*	NM_198316.1	c.1531G>A	p.Glu511Lys	0.42
5	chr12:63544529-63544529	*AVPR1A*	NM_000706.4	c.88C>T	p.Arg30Trp	0.39
5	chr15:33988554-33988554	*RYR3*	NM_001036.3	c.5996C>T	p.Ala1999Val	0.38
5	chr16:103522-103522	*POLR3K*	NM_016310.3	c.65G>A	p.Arg22His	0.36
5	chr17:8732265-8732265	*PIK3R6*	NM_001010855.2	c.932G>A	p.Arg311His	0.33
5	chr19:1465858-1465858	*APC2*	NM_005883.2	c.2558G>A	p.Arg853His	0.42
5	chr2:105859046-105859046	*GPR45*	NM_007227.3	c.731C>T	p.Ala244Val	0.42
5	chr2:235949663-235949663	*SH3BP4*	NM_014521.2	c.250G>A	p.Val84Ile	0.36
5	chr20:54940189-54940189	*FAM210B*	NM_080821.2	c.233C>T	p.Thr78Ile	0.45
5	chr22:23230410-23230410	*IGLL5*	NM_001178126.1	c.177C>G	p.Ser59Arg	0.28
5	chr22:37637640-37637640	*RAC2*	NM_002872.4	c.94T>C	p.Tyr32His	0.43
5	chr3:49700782-49700782	*BSN*	NM_003458.3	c.11191G>A	p.Gly3731Arg	0.40
5	chr3:49753273-49753273	*RNF123*	NM_022064.3	c.3169C>T	p.Arg1057Cys	0.35
5	chr3:123019127-123019127	*ADCY5*	NM_183357.2	c.2740G>A	p.Val914Met	0.43
5	chr6:26043515-26043515	*HIST1H2BB*	NM_021062.2	c.371G>A	p.Ser124Asn	0.40
5	chr6:26157112-26157112	*HIST1H1E*	NM_005321.2	c.494C>T	p.Ala165Val	0.36
5	chr6:26225657-26225657	*HIST1H3E*	NM_003532.2	c.275C>T	p.Ala92Val	0.37
5	chr6:37138355-37138355	*PIM1*	NM_002648.3	c.4C>T	p.Leu2Phe	0.29
5	chr6:37138549-37138549	*PIM1*	NM_002648.3	c.83G>A	p.Gly28Asp	0.32
5	chr6:37138911-37138911	*PIM1*	NM_002648.3	c.251C>T	p.Thr84Ile	0.66
5	chr7:151082267-151082267	*WDR86*	NM_198285.2	c.769G>A	p.Val257Ile	0.35
5	chr22:23230410-23230410	*IGLL5*	NM_001178126.1	c.177C>G	p.Ser59Arg	0.28
5	chr6:37138544-37138544	*PIM1*	NM_002648.3	c.83-5C>T		0.33
8	chr1:93300390-93300390	*RPL5*	NM_000969.3	c.244G>T	p.Glu82Ter	0.27
8	chr12:2706601-2706601	*CACNA1C*	NM_001129843.1	c.2794-2A>T		0.42
8	chr15:52414967-52414967	*GNB5*	NM_016194.3	c.1177-2A>G		0.39
8	chr17:28506169-28506169	*NSRP1*	NM_032141.3	c.362delG	p.Arg121LysfsTer24	0.36

8	chr17:49079095-49079095	*SPAG9*	NM_001130528.2	c.1588C>T	p.Arg530Ter	0.30
8	chr3:171426629-171426629	*PLD1*	NM_002662.4	c.1062-1G>A		0.28
8	chr6:37138560-37138560	*PIM1*	NM_002648.3	c.94G>T	p.Glu32Ter	0.21
8	chr7:84636126-84636126	*SEMA3D*	NM_152754.2	c.1900C>T	p.Arg634Ter	0.33
8	chrX:12994455-12994455	*TMSB4X*	NM_021109.3	c.80dupA	p.Asn27LysfsTer10	0.83
8	chr2:189863409-189863409	*COL3A1*	NM_000090.3	c.1987G>T	p.Gly663Cys	0.45
8	chr20:37464683-37464683	*PPP1R16B*	NM_015568.2	c.115C>T	p.Gln39Ter	0.25
8	chr2:232879586-232879586	*DIS3L2*	NM_152383.4	c.-52A>G		0.37
8	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.36
8	chr15:42749210-42749212	*ZNF106*	NM_022473.1	c.192_194delAGA	p.Glu64del	0.31
8	chr3:193380715-193380715	*OPA1*	NM_015560.2	c.2460C>A	p.Asn820Lys	0.26
8	chr11:17464757-17464757	*ABCC8*	NM_000352.3	c.1435A>T	p.Thr479Ser	0.29
8	chr12:50348031-50348031	*AQP2*	NM_000486.5	c.454C>T	p.Arg152Cys	0.29
8	chr16:85954883-85954883	*IRF8*	NM_002163.2	c.1276G>C	p.Val426Leu	0.38
8	chr4:55958791-55958791	*KDR*	NM_002253.2	c.3062C>T	p.Ser1021Leu	0.29
8	chr4:104117093-104117093	*CENPE*	NM_001813.2	c.341T>C	p.Phe114Ser	0.37
8	chr1:60331596-60331596	*HOOK1*	NM_015888.4	c.1797G>A	p.Met599Ile	0.28
8	chr1:84348685-84348685	*TTLL7*	NM_024686.4	c.2504G>A	p.Gly835Glu	0.39
8	chr1:156195440-156195440	*PMF1*	NM_001199654.1	c.254G>A	p.Arg85Lys	0.28
8	chr1:169993710-169993710	*KIFAP3*	NM_014970.3	c.869C>T	p.Ala290Val	0.40
8	chr1:203274787-203274787	*BTG2*	NM_006763.2	c.53G>A	p.Gly18Asp	0.20
8	chr1:206858570-206858570	*MAPKAPK2*	NM_032960.3	c.-5G>A		0.25
8	chr1:216538360-216538360	*USH2A*	NM_206933.2	c.719G>A	p.Arg240Lys	0.24
8	chr10:69651181-69651181	*SIRT1*	NM_012238.4	c.811C>T	p.Pro271Ser	0.50
8	chr10:118321064-118321064	*PNLIP*	NM_000936.2	c.1250T>G	p.Phe417Cys	0.28
8	chr10:128147714-128147714	*C10orf90*	NM_001004298.2	c.1792G>T	p.Val598Phe	0.27
8	chr10:135051612-135051612	*VENTX*	NM_014468.2	c.194A>G	p.Glu65Gly	0.30
8	chr11:237065-237065	*PSMD13*	NM_002817.3	c.16G>A	p.Gly6Ser	0.26
8	chr11:34501790-34501790	*ELF5*	NM_001422.3	c.743A>C	p.His248Pro	0.44
8	chr11:56058331-56058331	*OR8H1*	NM_001005199.1	c.208G>C	p.Asp70His	0.28
8	chr11:58979905-58979905	*MPEG1*	NM_001039396.1	c.434C>T	p.Ala145Val	0.33
8	chr11:73765706-73765706	*C2CD3*	NM_015531.4	c.5101G>A	p.Glu1701Lys	0.43
8	chr11:124756901-124756901	*ROBO4*	NM_019055.5	c.2407G>C	p.Glu803Gln	0.27
8	chr12:13240965-13240965	*GSG1*	NM_001080554.2	c.634G>A	p.Asp212Asn	0.17
8	chr12:18241872-18241872	*RERGL*	NM_024730.2	c.74T>A	p.Leu25His	0.21
8	chr12:56648460-56648460	*ANKRD52*	NM_173595.3	c.595C>T	p.Leu199Phe	0.21
8	chr12:57466656-57466656	*NEMP1*	NM_001130963.1	c.167A>G	p.Gln56Arg	0.55
8	chr12:92539308-92539308	*BTG1*	NM_001731.2	c.4C>T	p.His2Tyr	0.28
8	chr12:124337793-124337793	*DNAH10*	NM_207437.3	c.5978G>T	p.Arg1993Leu	0.19
8	chr13:75898532-75898532	*TBC1D4*	NM_014832.2	c.2039T>G	p.Leu680Arg	0.42
8	chr14:76488692-76488692	*IFT43*	NM_052873.2	c.170G>A	p.Arg57His	0.39
8	chr14:104465035-104465035	*TDRD9*	NM_153046.2	c.1453G>T	p.Ala485Ser	0.32
8	chr15:25615807-25615807	*UBE3A*	NM_130838.1	c.1454C>T	p.Thr485Ile	0.33
8	chr16:48162588-48162588	*ABCC12*	NM_033226.2	c.1297G>C	p.Val433Leu	0.40
8	chr17:3961309-3961309	*ZZEF1*	NM_015113.3	c.5144G>T	p.Ser1715Ile	0.22
8	chr17:59112099-59112099	*BCAS3*	NM_001099432.1	c.1755C>G	p.Phe585Leu	0.34
8	chr17:77768740-77768740	*CBX8*	NM_020649.2	c.864G>C	p.Arg288Ser	0.29
8	chr17:81037755-81037755	*METRNL*	NM_001004431.1	c.64C>T	p.Pro22Ser	0.43
8	chr18:11999105-11999105	*IMPA2*	NM_014214.2	c.149C>A	p.Ala50Asp	0.40
8	chr18:53254367-53254367	*TCF4*	NM_001083962.1	c.-20G>A		0.42
8	chr19:3290271-3290271	*CELF5*	NM_021938.3	c.1229A>G	p.Glu410Gly	0.36
8	chr19:5598871-5598871	*SAFB2*	NM_014649.2	c.1715T>C	p.Val572Ala	0.41
8	chr19:22941613-22941613	*ZNF99*	NM_001080409.2	c.1098G>C	p.Glu366Asp	0.43
8	chr19:23158757-23158757	*ZNF728*	NM_001267716.1	c.1382T>A	p.Phe461Tyr	0.32
8	chr19:35823810-35823810	*CD22*	NM_001771.3	c.395T>A	p.Ile132Lys	0.31
8	chr2:69002456-69002456	*ARHGAP25*	NM_001007231.2	c.165G>C	p.Lys55Asn	0.33
8	chr20:44006861-44006861	*TP53TG5*	NM_014477.2	c.16A>G	p.Lys6Glu	0.32
8	chr21:39086583-39086583	*KCNJ6*	NM_002240.3	c.877T>C	p.Ser293Pro	0.29
8	chr22:23235893-23235893	*IGLL5*	NM_001178126.1	c.220C>T	p.Pro74Ser	0.25
8	chr22:23237834-23237834	*IGLL5*	NM_001178126.1	c.605G>A	p.Ser202Asn	0.22

8	chr22:23237863-23237863	*IGLL5*	NM_001178126.1	c.634G>A	p.Glu212Lys	0.18
8	chr22:43619109-43619109	*SCUBE1*	NM_173050.3	c.1321G>A	p.Val441Met	0.25
8	chr22:44543773-44543773	*PARVB*	NM_001003828.2	c.844G>A	p.Ala282Thr	0.20
8	chr3:39307812-39307812	*CX3CR1*	NM_001171174.1	c.285G>C	p.Lys95Asn	0.42
8	chr3:51251675-51251675	*DOCK3*	NM_004947.4	c.1249C>T	p.Pro417Ser	0.33
8	chr3:100593737-100593737	*ABI3BP*	NM_015429.3	c.879A>C	p.Lys293Asn	0.35
8	chr3:151155589-151155589	*IGSF10*	NM_178822.4	c.6760C>T	p.His2254Tyr	0.34
8	chr3:154042201-154042201	*DHX36*	NM_020865.2	c.5G>A	p.Ser2Asn	0.48
8	chr4:15993895-15993895	*PROM1*	NM_006017.2	c.1887G>T	p.Met629Ile	0.32
8	chr4:62679587-62679587	*ADGRL3*	NM_015236.4	c.1256T>A	p.Leu419Gln	0.45
8	chr4:89383349-89383349	*HERC5*	NM_016323.3	c.530C>T	p.Pro177Leu	0.24
8	chr4:126371035-126371035	*FAT4*	NM_024582.4	c.8864C>T	p.Ser2955Phe	0.28
8	chr4:126372989-126372989	*FAT4*	NM_024582.4	c.10818C>G	p.Asp3606Glu	0.39
8	chr5:23509603-23509603	*PRDM9*	NM_020227.2	c.94T>C	p.Ser32Pro	0.28
8	chr5:68805621-68805621	*OCLN*	NM_002538.3	c.704A>G	p.His235Arg	0.38
8	chr5:168678402-168678402	*SLIT3*	NM_003062.3	c.259C>T	p.Leu87Phe	0.34
8	chr5:171533810-171533810	*STK10*	NM_005990.3	c.602C>A	p.Pro201His	0.35
8	chr6:37138308-37138308	*PIM1*	NM_001243186.1	c.230G>A	p.Ser77Asn	0.25
8	chr6:37138355-37138355	*PIM1*	NM_002648.3	c.4C>G	p.Leu2Val	0.22
8	chr6:37138440-37138440	*PIM1*	NM_002648.3	c.82+7G>A		0.26
8	chr6:37138544-37138544	*PIM1*	NM_002648.3	c.83-5C>G		0.22
8	chr6:37138549-37138549	*PIM1*	NM_002648.3	c.83G>T	p.Gly28Val	0.20
8	chr6:37138577-37138577	*PIM1*	NM_002648.3	c.111G>T	p.Gln37His	0.26
8	chr6:37138649-37138649	*PIM1*	NM_002648.3	c.183C>G	p.Asn61Lys	0.26
8	chr6:37138898-37138898	*PIM1*	NM_002648.3	c.241-3C>T		0.23
8	chr6:37138901-37138901	*PIM1*	NM_002648.3	c.241C>T	p.Pro81Ser	0.24
8	chr6:37138916-37138916	*PIM1*	NM_002648.3	c.256G>A	p.Val86Met	0.21
8	chr6:37138956-37138956	*PIM1*	NM_002648.3	c.296G>A	p.Gly99Asp	0.30
8	chr6:37138967-37138967	*PIM1*	NM_002648.3	c.307G>C	p.Val103Leu	0.20
8	chr6:37138982-37138982	*PIM1*	NM_002648.3	c.322G>A	p.Asp108Asn	0.18
8	chr6:37139097-37139097	*PIM1*	NM_002648.3	c.437G>A	p.Ser146Asn	0.30
8	chr6:37139156-37139156	*PIM1*	NM_002648.3	c.496C>G	p.Arg166Gly	0.17
8	chr6:37139247-37139247	*PIM1*	NM_002648.3	c.587C>G	p.Thr196Ser	0.18
8	chr6:37140893-37140893	*PIM1*	NM_002648.3	c.729G>C	p.Glu243Asp	0.29
8	chr6:37140953-37140953	*PIM1*	NM_002648.3	c.784+5C>G		0.25
8	chr6:37141832-37141832	*PIM1*	NM_002648.3	c.907C>G	p.His303Asp	0.19
8	chr7:81372703-81372703	*HGF*	NM_000601.4	c.831C>A	p.His277Gln	0.30
8	chr7:91632484-91632484	*AKAP9*	NM_005751.4	c.3253A>G	p.Arg1085Gly	0.25
8	chr7:92760547-92760547	*SAMD9L*	NM_152703.2	c.4738G>T	p.Asp1580Tyr	0.25
8	chr7:94740680-94740680	*PPP1R9A*	NM_001166160.1	c.1505T>G	p.Leu502Arg	0.38
8	chr8:55542140-55542140	*RP1*	NM_006269.1	c.5698A>T	p.Thr1900Ser	0.27
8	chr8:67507951-67507951	*MYBL1*	NM_001080416.2	c.554G>A	p.Arg185Gln	0.44
8	chr8:97332559-97332559	*PTDSS1*	NM_014754.1	c.1159T>C	p.Trp387Arg	0.23
8	chr8:125332383-125332383	*TMEM65*	NM_194291.2	c.565C>T	p.Pro189Ser	0.32
8	chr9:4661937-4661937	*SPATA6L*	NM_001039395.3	c.139T>G	p.Phe47Val	0.42
8	chr9:19276302-19276302	*DENND4C*	NM_017925.5	c.130A>T	p.Thr44Ser	0.38
8	chr9:73442807-73442807	*TRPM3*	NM_001007471.2	c.929G>A	p.Arg310Gln	0.33
8	chr9:80537156-80537156	*GNAQ*	NM_002072.3	c.242A>G	p.Gln81Arg	0.21
8	chr9:125390908-125390908	*OR1B1*	NM_001004450.1	c.907G>A	p.Val303Ile	0.44
8	chr9:128086080-128086080	*GAPVD1*	NM_015635.2	c.1736C>A	p.Pro579His	0.45
8	chr9:139103170-139103170	*QSOX2*	NM_181701.3	c.1489C>T	p.Pro497Ser	0.29
8	chrX:12994462-12994462	*TMSB4X*	NM_021109.3	c.82C>T	p.Pro28Ser	0.83
8	chr12:52865493-52865493	*KRT6C*	NM_173086.4	c.779G>A	p.Arg260His	0.20
8	chr10:135011982-135011982	*KNDC1*	NM_152643.6	c.2048C>T	p.Ala683Val	0.25
8	chr12:11461265-11461265	*PRB4*	NM_002723.4	c.652G>A	p.Ala218Thr	0.27
8	chr12:13061691-13061691	*GPRC5A*	NM_003979.3	c.508G>A	p.Ala170Thr	0.23
8	chr12:49432498-49432498	*KMT2D*	NM_003482.3	c.8641C>T	p.Arg2881Trp	0.27
8	chr12:92537945-92537945	*BTG1*	NM_001731.2	c.427G>T	p.Val143Leu	0.25
8	chr2:167266241-167266241	*SCN7A*	NM_002976.3	c.3916C>T	p.Arg1306Cys	0.24
8	chr20:23065017-23065017	*CD93*	NM_012072.3	c.1813G>A	p.Val605Ile	0.21

8	chr22:23237615-23237615	*IGLL5*	NM_001178126.1	c.386C>T	p.Ala129Val	0.21
8	chr22:23237748-23237748	*IGLL5*	NM_001178126.1	c.519G>C	p.Lys173Asn	0.27
8	chr22:40417824-40417824	*FAM83F*	NM_138435.2	c.1310G>A	p.Arg437His	0.28
8	chr5:140589269-140589269	*PCDHB12*	NM_018932.3	c.790G>A	p.Val264Ile	0.32
8	chr6:37138944-37138944	*PIM1*	NM_002648.3	c.284A>G	p.Lys95Arg	0.25
8	chr8:81892701-81892701	*PAG1*	NM_018440.3	c.905G>A	p.Arg302Gln	0.43
8	chr9:32630861-32630861	*TAF1L*	NM_153809.2	c.4717C>T	p.Arg1573Cys	0.41
1	chr12:49415906-49415909	*KMT2D*	NM_003482.3	c.16438_16441delAACT	p.Asn5480ValfsTer6	0.25
1	chr11:58979135-58979135	*MPEG1*	NM_001039396.1	c.1204C>T	p.Gln402Ter	0.50
1	chr12:12006417-12006417	*ETV6*	NM_001987.4	c.391dupT	p.Ser131PhefsTer23	0.56
1	chr12:92538204-92538204	*BTG1*	NM_001731.2	c.168G>A	p.Trp56Ter	0.27
1	chr15:45003763-45003766	*B2M*	NM_004048.2	c.19_22delTTAG	p.Ala8CysfsTer35	0.24
1	chr15:45003768-45003768	*B2M*	NM_004048.2	c.24delT	p.Val9CysfsTer35	0.25
1	chr17:12855822-12855822	*ARHGAP44*	NM_014859.4	c.1060C>T	p.Gln354Ter	0.44
1	chr17:18206014-18206014	*TOP3A*	NM_004618.3	c.523C>T	p.Arg175Ter	0.39
1	chr18:30349993-30349993	*KLHL14*	NM_020805.1	c.562C>T	p.Gln188Ter	0.44
1	chr19:14694247-14694247	*CLEC17A*	NM_001204118.1	c.121+1G>T		0.50
1	chr2:175440031-175440031	*WIPF1*	NM_001077269.1	c.259G>T	p.Gly87Ter	0.47
1	chr22:23235994-23235994	*IGLL5*	NM_001178126.1	c.322delC	p.Leu108Ter	0.94
1	chr3:32022634-32022637	*OSBPL10*	NM_017784.4	c.35_38delGGGG	p.Gly12ValfsTer97	0.75
1	chr5:179994237-179994237	*CNOT6*	NM_015455.3	c.868dupG	p.Glu290GlyfsTer12	0.55
1	chr6:26031933-26031934	*HIST1H3B*	NM_003537.3	c.355_356delAC	p.Thr119TyrfsTer28	0.39
1	chr6:37139268-37139268	*PIM1*	NM_002648.3	c.607+1G>T		0.50
1	chr7:99171056-99171056	*ZNF655*	NM_001083956.1	c.1430delA	p.Glu477GlyfsTer38	0.32
1	chrX:12994364-12994364	*TMSB4X*	NM_021109.3	c.-16-1G>A		0.48
1	chr2:86352191-86352191	*PTCD3*	NM_017952.5	c.790C>T	p.Arg264Ter	0.43
1	chr6:37138434-37138434	*PIM1*	NM_002648.3	c.82+1G>A		0.28
1	chr12:113496202-113496202	*DTX1*	NM_004416.2	c.205C>G	p.Leu69Val	0.30
1	chr7:21784224-21784224	*DNAH11*	NM_001277115.1	c.8316+7G>A		0.65
1	chr12:12871754-12871754	*CDKN1B*	NM_004064.3	c.476-5C>T		0.30
1	chr3:32022629-32022631	*OSBPL10*	NM_017784.4	c.41_43delGCA	p.Ser14del	0.78
1	chr1:15794022-15794022	*CELA2A*	NM_033440.2	c.781T>C	p.Trp261Arg	0.42
1	chr10:75843142-75843142	*VCL*	NM_014000.2	c.893C>T	p.Ala298Val	0.51
1	chr11:57456022-57456022	*ZDHHC5*	NM_015457.2	c.269T>C	p.Leu90Pro	0.51
1	chr12:12870915-12870915	*CDKN1B*	NM_004064.3	c.142C>A	p.His48Asn	0.30
1	chr17:65147324-65147324	*HELZ*	NM_014877.3	c.2194C>T	p.Arg732Cys	0.38
1	chr17:73493881-73493881	*TMEM94*	NM_014738.4	c.3427C>A	p.Pro1143Thr	0.44
1	chr6:393330-393330	*IRF4*	NM_002460.3	c.178C>A	p.Gln60Lys	0.45
1	chr6:393343-393343	*IRF4*	NM_002460.3	c.191G>T	p.Arg64Leu	0.48
1	chr1:62262992-62262992	*PATJ*	NM_176877.2	c.1294C>T	p.His432Tyr	0.44
1	chr1:97217061-97217061	*PTBP2*	NM_021190.2	c.115+5G>T		0.49
1	chr1:149784902-149784902	*HIST2H3D*	NM_001123375.2	c.335C>T	p.Ala112Val	0.46
1	chr1:149784977-149784977	*HIST2H3D*	NM_001123375.2	c.260G>A	p.Ser87Asn	0.48
1	chr1:151260479-151260481	*ZNF687*	NM_020832.1	c.1717_1719delTTC	p.Phe573del	0.48
1	chr1:156626849-156626849	*BCAN*	NM_021948.4	c.2170G>C	p.Ala724Pro	0.42
1	chr1:175362916-175362916	*TNR*	NM_003285.2	c.1356G>T	p.Lys452Asn	0.42
1	chr1:203274881-203274881	*BTG2*	NM_006763.2	c.142+5G>C		0.46
1	chr1:203276234-203276234	*BTG2*	NM_006763.2	c.145C>T	p.His49Tyr	0.42
1	chr1:231335902-231335902	*TRIM67*	NM_001004342.3	c.1272G>T	p.Trp424Cys	0.43
1	chr10:95931141-95931141	*PLCE1*	NM_016341.3	c.1697C>A	p.Pro566His	0.39
1	chr10:104650362-104650362	*AS3MT*	NM_020682.3	c.947C>T	p.Ala316Val	0.41
1	chr10:124895694-124895694	*HMX3*	NM_001105574.1	c.128G>A	p.Arg43Gln	0.48
1	chr11:47189717-47189717	*ARFGAP2*	NM_032389.4	c.1027G>A	p.Asp343Asn	0.34
1	chr11:58604842-58604842	*GLYATL2*	NM_145016.3	c.215C>A	p.Thr72Asn	0.45
1	chr11:58979042-58979042	*MPEG1*	NM_001039396.1	c.1297C>G	p.Leu433Val	0.49
1	chr11:58979053-58979053	*MPEG1*	NM_001039396.1	c.1286G>T	p.Gly429Val	0.46
1	chr11:64645557-64645557	*EHD1*	NM_006795.2	c.380C>T	p.Ala127Val	0.45
1	chr12:6646090-6646090	*GAPDH*	NM_002046.4	c.241G>A	p.Asp81Asn	0.28
1	chr12:11803087-11803087	*ETV6*	NM_001987.4	c.26G>T	p.Ser9Ile	0.28
1	chr12:12870765-12870765	*CDKN1B*	NM_004064.3	c.-7delG		0.28

1	chr12:12871243-12871243	*CDKN1B*	NM_004064.3	c.470C>G	p.Thr157Ser	0.29
1	chr12:21531309-21531309	*IAPP*	NM_000415.2	c.219G>T	p.Arg73Ser	0.27
1	chr12:56552502-56552502	*MYL6*	NM_021019.4	c.31+7T>C		0.66
1	chr12:70949035-70949035	*PTPRB*	NM_001109754.2	c.5048G>T	p.Ser1683Ile	0.30
1	chr12:92538191-92538191	*BTG1*	NM_001731.2	c.181C>T	p.Pro61Ser	0.27
1	chr12:92539184-92539184	*BTG1*	NM_001731.2	c.128G>A	p.Ser43Asn	0.33
1	chr12:113496256-113496256	*DTX1*	NM_004416.2	c.259G>T	p.Gly87Cys	0.27
1	chr12:120638544-120638544	*RPLP0*	NM_001002.3	c.43C>T	p.Leu15Phe	0.31
1	chr12:129558478-129558478	*TMEM132D*	NM_133448.2	c.3242A>G	p.Asp1081Gly	0.30
1	chr13:26153032-26153032	*ATP8A2*	NM_016529.4	c.1862C>T	p.Thr621Met	0.47
1	chr13:32799933-32799933	*FRY*	NM_023037.2	c.5028C>A	p.Asp1676Glu	0.36
1	chr13:41240154-41240154	*FOXO1*	NM_002015.3	c.196G>A	p.Val66Ile	0.55
1	chr13:47127797-47127797	*LRCH1*	NM_001164213.1	c.266C>T	p.Thr89Ile	0.49
1	chr13:109792983-109792983	*MYO16*	NM_001198950.1	c.4423C>A	p.His1475Asn	0.42
1	chr14:69256915-69256915	*ZFP36L1*	NM_004926.3	c.352G>A	p.Glu118Lys	0.50
1	chr14:105957968-105957968	*C14orf80*	NM_001134877.1	c.34C>T	p.Leu12Phe	0.48
1	chr15:45399614-45399614	*DUOX2*	NM_014080.4	c.1622G>A	p.Arg541Gln	0.46
1	chr15:65688427-65688427	*IGDCC4*	NM_020962.1	c.1072G>A	p.Ala358Thr	0.58
1	chr15:101910712-101910712	*PCSK6*	NM_002570.3	c.1547C>A	p.Ala516Glu	0.48
1	chr16:2347444-2347444	*ABCA3*	NM_001089.2	c.2149G>A	p.Val717Met	0.39
1	chr16:53495650-53495650	*RBL2*	NM_005611.3	c.1347-3T>A		0.40
1	chr16:75150543-75150543	*LDHD*	NM_194436.2	c.72+4C>A		0.36
1	chr17:7474754-7474754	*SENP3*	NM_015670.5	c.1679C>T	p.Ser560Leu	0.46
1	chr17:45786117-45786117	*TBKBP1*	NM_014726.2	c.1018C>T	p.Arg340Cys	0.40
1	chr17:56400122-56400122	*TSPOAP1*	NM_004758.3	c.1210G>A	p.Ala404Thr	0.44
1	chr17:57917265-57917265	*VMP1*	NM_030938.3	c.1214C>T	p.Thr405Ile	0.44
1	chr17:59067543-59067543	*BCAS3*	NM_001099432.1	c.1433G>A	p.Arg478His	0.43
1	chr17:61560880-61560880	*ACE*	NM_000789.3	c.1547G>T	p.Gly516Val	0.41
1	chr17:71282647-71282647	*CDC42EP4*	NM_012121.4	c.-8C>A		0.56
1	chr17:73316539-73316539	*GRB2*	NM_203506.2	c.441C>G	p.Asn147Lys	0.85
1	chr17:79671378-79671378	*MRPL12*	NM_002949.3	c.179A>G	p.Tyr60Cys	0.50
1	chr18:30349747-30349747	*KLHL14*	NM_020805.1	c.808C>T	p.Pro270Ser	0.48
1	chr18:30350169-30350169	*KLHL14*	NM_020805.1	c.386G>T	p.Gly129Val	0.51
1	chr18:57026257-57026257	*LMAN1*	NM_005570.3	c.214+6C>T		0.46
1	chr19:2476405-2476405	*GADD45B*	NM_015675.3	c.44+5G>C		0.43
1	chr19:12902634-12902634	*JUNB*	NM_002229.2	c.49G>A	p.Ala17Thr	0.53
1	chr19:12976905-12976905	*MAST1*	NM_014975.2	c.2018G>A	p.Ser673Asn	0.45
1	chr19:14694246-14694246	*CLEC17A*	NM_001204118.1	c.121G>A	p.Gly41Arg	0.50
1	chr19:56671077-56671077	*ZNF444*	NM_001253792.1	c.488C>T	p.Pro163Leu	0.44
1	chr2:80808937-80808937	*CTNNA2*	NM_001164883.1	c.2000G>C	p.Ser667Thr	0.40
1	chr2:136873307-136873307	*CXCR4*	NM_003467.2	c.191G>A	p.Gly64Asp	0.52
1	chr2:136873485-136873485	*CXCR4*	NM_003467.2	c.16-3C>G		0.42
1	chr2:225907009-225907009	*DOCK10*	NM_014689.2	c.83C>T	p.Ser28Phe	0.47
1	chr2:233244934-233244934	*ALPP*	NM_001632.3	c.696G>T	p.Met232Ile	0.43
1	chr2:239976526-239976526	*HDAC4*	NM_006037.3	c.2992G>T	p.Asp998Tyr	0.46
1	chr2:242041662-242041662	*MTERF4*	NM_182501.3	c.21+6C>T		0.47
1	chr21:43256633-43256633	*PRDM15*	NM_022115.3	c.2225T>C	p.Ile742Thr	0.48
1	chr22:23230334-23230334	*IGLL5*	NM_001178126.1	c.101T>G	p.Val34Gly	0.46
1	chr22:23230360-23230360	*IGLL5*	NM_001178126.1	c.127G>T	p.Val43Phe	0.44
1	chr22:39413900-39413900	*APOBEC3C*	NM_014508.2	c.304G>A	p.Gly102Arg	0.42
1	chr22:50892994-50892994	*SBF1*	NM_002972.2	c.4990T>C	p.Cys1664Arg	0.45
1	chr3:14444359-14444359	*SLC6A6*	NM_001134367.2	c.-50+4C>T		0.53
1	chr3:32022386-32022386	*OSBPL10*	NM_017784.4	c.281+5C>T		0.90
1	chr3:32022391-32022391	*OSBPL10*	NM_017784.4	c.281G>A	p.Arg94Lys	0.91
1	chr3:101568656-101568656	*NFKBIZ*	NM_031419.3	c.184T>C	p.Ser62Pro	0.50
1	chr3:121345623-121345623	*FBXO40*	NM_016298.3	c.1996T>C	p.Ser666Pro	0.40
1	chr3:128516814-128516814	*RAB7A*	NM_004637.5	c.82T>A	p.Tyr28Asn	0.44
1	chr3:184429036-184429036	*MAGEF1*	NM_022149.4	c.574A>G	p.Met192Val	0.36
1	chr4:57798212-57798212	*REST*	NM_005612.4	c.3188T>G	p.Ile1063Ser	0.42
1	chr4:113566007-113566007	*LARP7*	NM_015454.2	c.182T>A	p.Ile61Lys	0.44

1	chr4:125592357-125592357	*ANKRD50*	NM_001167882.1	c.1538T>G	p.Ile513Ser	0.46
1	chr4:167675715-167675715	*SPOCK3*	NM_016950.2	c.884A>G	p.Tyr295Cys	0.45
1	chr5:639211-639211	*CEP72*	NM_018140.3	c.1214C>T	p.Pro405Leu	0.43
1	chr5:10564941-10564941	*ANKRD33B*	NM_001164440.1	c.362G>A	p.Gly121Asp	0.41
1	chr5:36039773-36039773	*UGT3A2*	NM_174914.3	c.881G>A	p.Gly294Asp	0.40
1	chr5:89975372-89975372	*ADGRV1*	NM_032119.3	c.5450A>C	p.Glu1817Ala	0.44
1	chr6:26158771-26158771	*HIST1H2BD*	NM_138720.2	c.374C>T	p.Ser125Phe	0.48
1	chr6:26273531-26273531	*HIST1H2BI*	NM_003525.2	c.328C>T	p.His110Tyr	0.51
1	chr6:37138355-37138355	*PIM1*	NM_002648.3	c.4C>G	p.Leu2Val	0.37
1	chr6:37138379-37138379	*PIM1*	NM_002648.3	c.28G>A	p.Ala10Thr	0.32
1	chr6:37138416-37138416	*PIM1*	NM_002648.3	c.65C>T	p.Ala22Val	0.60
1	chr6:37138433-37138433	*PIM1*	NM_002648.3	c.82G>A	p.Gly28Ser	0.29
1	chr6:37138436-37138436	*PIM1*	NM_002648.3	c.82+3G>A		0.28
1	chr6:37138441-37138441	*PIM1*	NM_002648.3	c.82+8C>T		0.63
1	chr6:37138769-37138769	*PIM1*	NM_002648.3	c.202delCinsT	p.His68Tyr	0.55
1	chr6:37138770-37138781	*PIM1*	NM_002648.3	c.202delCinsT	p.His68Tyr	0.55
1	chr6:37138791-37138791	*PIM1*	NM_002648.3	c.224C>T	p.Ser75Phe	0.60
1	chr6:37139199-37139199	*PIM1*	NM_002648.3	c.539G>A	p.Gly180Asp	0.26
1	chr6:37139204-37139204	*PIM1*	NM_002648.3	c.544C>T	p.Leu182Phe	0.64
1	chr6:37139210-37139210	*PIM1*	NM_002648.3	c.550C>T	p.Leu184Phe	0.28
1	chr6:37140764-37140764	*PIM1*	NM_002648.3	c.608-8G>A		0.55
1	chr6:37140764-37140764	*PIM1*	NM_001243186.1	c.881-8G>A		0.55
1	chr6:37141721-37141721	*PIM1*	NM_002648.3	c.796C>T	p.Leu266Phe	0.43
1	chr6:37141748-37141748	*PIM1*	NM_002648.3	c.823C>A	p.Pro275Thr	0.52
1	chr6:51921689-51921689	*PKHD1*	NM_138694.3	c.1601T>G	p.Leu534Arg	0.41
1	chr6:75812413-75812413	*COL12A1*	NM_004370.5	c.8320-5T>C		0.48
1	chr7:2978320-2978320	*CARD11*	NM_032415.4	c.1010G>A	p.Arg337Gln	0.71
1	chr7:12401116-12401116	*VWDE*	NM_001135924.1	c.2930C>A	p.Pro977His	0.61
1	chr7:19748573-19748573	*TWISTNB*	NM_001002926.1	c.67G>T	p.Ala23Ser	0.66
1	chr7:45717574-45717574	*ADCY1*	NM_021116.2	c.1712G>A	p.Arg571His	0.24
1	chr7:63538297-63538297	*ZNF727*	NM_001159522.1	c.870C>G	p.His290Gln	0.30
1	chr7:80427561-80427561	*SEMA3C*	NM_006379.3	c.987-9C>A		0.35
1	chr7:91793028-91793028	*LRRD1*	NM_001161528.1	c.1489A>G	p.Asn497Asp	0.59
1	chr7:97736486-97736486	*LMTK2*	NM_014916.3	c.-4C>T		0.29
1	chr7:134249472-134249472	*AKR1B15*	NM_001080538.2	c.101T>G	p.Leu34Arg	0.32
1	chr7:142991694-142991694	*CASP2*	NM_032982.3	c.575A>G	p.Tyr192Cys	0.65
1	chr8:16850783-16850783	*FGF20*	NM_019851.2	c.434A>T	p.Glu145Val	0.45
1	chr8:101733660-101733660	*PABPC1*	NM_002568.3	c.152C>T	p.Ser51Phe	0.44
1	chrX:10096714-10096714	*WWC3*	NM_015691.3	c.2398C>T	p.Arg800Cys	0.45
1	chrX:14871188-14871188	*FANCB*	NM_001018113.1	c.1299A>T	p.Lys433Asn	0.51
1	chrX:23685851-23685851	*PRDX4*	NM_006406.1	c.164C>T	p.Ala55Val	0.38
1	chrX:32366528-32366528	*DMD*	NM_004006.2	c.5443G>T	p.Asp1815Tyr	0.46
1	chrX:48775908-48775908	*PIM2*	NM_006875.3	c.76G>A	p.Glu26Lys	0.48
1	chrX:48775914-48775914	*PIM2*	NM_006875.3	c.70G>C	p.Asp24His	0.46
1	chrX:48776051-48776051	*PIM2*	NM_006875.3	c.61G>C	p.Gly21Arg	0.50
1	chrX:114424714-114424714	*RBMXL3*	NM_001145346.1	c.710C>T	p.Pro237Leu	0.46
1	chrX:123215315-123215315	*STAG2*	NM_001042749.1	c.2861G>A	p.Arg954His	0.53
1	chrX:154528135-154528135	*CLIC2*	NM_001289.4	c.256A>T	p.Ile86Phe	0.44
1	chr18:30350140-30350140	*KLHL14*	NM_020805.1	c.415C>T	p.Leu139Phe	0.43
1	chr1:160160764-160160764	*CASQ1*	NM_001231.4	c.223C>T	p.Pro75Ser	0.50
1	chr10:25138811-25138811	*PRTFDC1*	NM_020200.5	c.640G>A	p.Val214Ile	0.44
1	chr11:58035038-58035038	*OR10W1*	NM_207374.3	c.293T>C	p.Leu98Pro	0.46
1	chr11:58978913-58978913	*MPEG1*	NM_001039396.1	c.1426G>C	p.Gly476Arg	0.45
1	chr12:12871783-12871783	*CDKN1B*	NM_004064.3	c.500C>T	p.Ala167Val	0.30
1	chr17:57915739-57915739	*VMP1*	NM_030938.3	c.1058G>A	p.Ser353Asn	0.45
1	chr19:49840396-49840396	*CD37*	NM_001774.2	c.268-8C>T		0.49
1	chr20:31967442-31967442	*CDK5RAP1*	NM_001278167.1	c.932C>T	p.Ser311Leu	0.55
1	chr20:35060704-35060704	*DLGAP4*	NM_014902.4	c.584G>A	p.Arg195Gln	0.46
1	chr22:23235906-23235906	*IGLL5*	NM_001178126.1	c.233G>A	p.Arg78Lys	0.86
1	chr22:25016894-25016894	*GGT1*	NM_013430.2	c.590G>A	p.Arg197Gln	0.47

1	chr22:31998708-31998708	*SFI1*	NM_001007467.2	c.1742G>A	p.Arg581His	0.49
1	chr22:45607884-45607884	*KIAA0930*	NM_001009880.1	c.169C>T	p.Arg57Trp	0.41
1	chr5:71015181-71015181	*CARTPT*	NM_004291.3	c.61C>T	p.Pro21Ser	0.46
1	chr6:26124740-26124740	*HIST1H2AC*	NM_003512.3	c.280C>G	p.Leu94Val	0.47
1	chr6:37138544-37138544	*PIM1*	NM_002648.3	c.83-5C>T		0.76
1	chr6:37138549-37138549	*PIM1*	NM_002648.3	c.83G>A	p.Gly28Asp	0.76
1	chr6:37138772-37138772	*PIM1*	NM_002648.3	c.205G>A	p.Val69Met	0.33
1	chr6:47847381-47847381	*PTCHD4*	NM_001013732.3	c.1199G>A	p.Arg400His	0.44
1	chr9:91793248-91793248	*SHC3*	NM_016848.5	c.128C>T	p.Ala43Val	0.47
1	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.48
6	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.39
6	chr17:36104531-36104531	*HNF1B*	NM_000458.2	c.344+1G>A		0.64
6	chr1:156551353-156551353	*TTC24*	NM_001105669.2	c.197_198insA	p.Ser67LeufsTer34	0.38
6	chr10:64960247-64960247	*JMJD1C*	NM_032776.1	c.5265C>G	p.Tyr1755Ter	0.45
6	chr11:58978476-58978476	*MPEG1*	NM_001039396.1	c.1863G>A	p.Trp621Ter	0.42
6	chr12:122243079-122243079	*SETD1B*	NM_015048.1	c.230G>A	p.Trp77Ter	0.41
6	chr13:25067846-25067846	*PARP4*	NM_006437.3	c.767C>G	p.Ser256Ter	0.27
6	chr14:67817384-67817384	*ATP6V1D*	NM_015994.3	c.182dupT	p.Met62AspfsTer10	0.38
6	chr2:23865207-23865207	*KLHL29*	NM_052920.1	c.428-1G>A		0.39
6	chr21:43338337-43338337	*C2CD2*	NM_015500.1	c.598-1G>C		0.38
6	chr22:50898994-50898994	*SBF1*	NM_002972.2	c.3115C>T	p.Arg1039Ter	0.43
6	chr4:26487513-26487514	*CCKAR*	NM_000730.2	c.371_372delCT	p.Ser124CysfsTer7	0.32
6	chr4:83294756-83294756	*HNRNPD*	NM_031370.2	c.76C>T	p.Gln26Ter	0.53
6	chr8:82196141-82196141	*FABP5*	NM_001444.2	c.286C>T	p.Gln96Ter	0.41
6	chr9:37424841-37424841	*GRHPR*	NM_012203.1	c.84-1G>A		0.63
6	chr11:2604774-2604774	*KCNQ1*	NM_000218.2	c.1031C>T	p.Ala344Val	0.57
6	chr1:201184770-201184770	*IGFN1*	NM_001164586.1	c.9102delC	p.Ile3035PhefsTer46	0.66
6	chr14:22133972-22133972	*OR4E2*	NM_001001912.1	c.676C>T	p.Arg226Ter	0.46
6	chr16:2988204-2988204	*FLYWCH1*	NM_020912.1	c.1794delG	p.Glu598AspfsTer3	0.32
6	chr16:2988205-2988205	*FLYWCH1*	NM_020912.1	c.1795_1796insCCTC	p.Phe599SerfsTer63	0.32
6	chr8:125565242-125565242	*MTSS1*	NM_014751.4	c.2259delC	p.Ser755LeufsTer16	0.54
6	chr17:36104532-36104532	*HNF1B*	NM_000458.2	c.344G>A	p.Ser115Asn	0.64
6	chr6:135511005-135511007	*MYB*	NM_001130173.1	c.297_299delAGA	p.Glu99del	0.40
6	chr12:2775892-2775892	*CACNA1C*	NM_000719.6	c.4567C>T	p.Arg1523Trp	0.57
6	chr17:38253656-38253656	*NR1D1*	NM_021724.4	c.32G>C	p.Gly11Ala	0.47
6	chr19:51527328-51527328	*KLK11*	NM_001136032.2	c.436G>A	p.Gly146Ser	0.45
6	chr3:164727113-164727113	*SI*	NM_001041.3	c.4133T>G	p.Ile1378Ser	0.41
6	chr4:187192852-187192852	*F11*	NM_000128.3	c.145G>C	p.Val49Leu	0.53
6	chr5:112238114-112238114	*REEP5*	NM_005669.4	c.314T>A	p.Ile105Asn	0.55
6	chr6:393221-393221	*IRF4*	NM_002460.3	c.69G>C	p.Lys23Asn	0.46
6	chr6:393222-393222	*IRF4*	NM_002460.3	c.70C>T	p.Leu24Phe	0.47
6	chr1:28817481-28817481	*PHACTR4*	NM_001048183.1	c.1835G>A	p.Arg612His	0.34
6	chr1:169267939-169267939	*NME7*	NM_013330.3	c.503C>T	p.Ala168Val	0.56
6	chr1:179955321-179955321	*CEP350*	NM_014810.4	c.5G>A	p.Arg2Lys	0.29
6	chr1:209849150-209849150	*G0S2*	NM_015714.3	c.121G>A	p.Gly41Ser	0.67
6	chr1:213139693-213139693	*VASH2*	NM_001136474.1	c.302+6C>T		0.75
6	chr1:215259741-215259741	*KCNK2*	NM_001017424.2	c.65C>A	p.Ser22Tyr	0.31
6	chr1:244715641-244715641	*C1orf101*	NM_001130957.1	c.554T>C	p.Val185Ala	0.64
6	chr10:56089431-56089431	*PCDH15*	NM_033056.3	c.630G>T	p.Leu210Phe	0.53
6	chr10:93390385-93390385	*PPP1R3C*	NM_005398.5	c.253G>A	p.Val85Ile	0.39
6	chr11:724812-724812	*EPS8L2*	NM_022772.3	c.1543A>C	p.Lys515Gln	0.41
6	chr11:19954893-19954893	*NAV2*	NM_001111018.1	c.911G>A	p.Ser304Asn	0.41
6	chr11:58978685-58978685	*MPEG1*	NM_001039396.1	c.1654C>G	p.Pro552Ala	0.39
6	chr11:65124202-65124202	*TIGD3*	NM_145719.2	c.923A>G	p.Tyr308Cys	0.48
6	chr11:66114076-66114076	*B4GAT1*	NM_006876.2	c.941G>A	p.Arg314Gln	0.37
6	chr11:101937315-101937315	*C11orf70*	NM_032930.2	c.368G>A	p.Ser123Asn	0.42
6	chr11:102196145-102196145	*BIRC3*	NM_182962.2	c.853+52T>C		0.58
6	chr12:10531155-10531155	*KLRK1*	NM_007360.3	c.427C>G	p.Gln143Glu	0.45
6	chr12:21331943-21331943	*SLCO1B1*	NM_006446.4	c.716A>C	p.Tyr239Ser	0.38
6	chr12:22068742-22068742	*ABCC9*	NM_020297.2	c.676G>A	p.Ala226Thr	0.39

6	chr12:29936584-29936584	*TMTC1*	NM_001193451.1	c.101C>G	p.Ala34Gly	0.56
6	chr12:122459996-122459996	*BCL7A*	NM_001024808.1	c.-2C>T		0.44
6	chr12:122839814-122839814	*CLIP1*	NM_002956.2	c.1051A>T	p.Thr351Ser	0.44
6	chr13:103388892-103388892	*CCDC168*	NM_001146197.1	c.14155A>G	p.Thr4719Ala	0.39
6	chr14:21550253-21550253	*ARHGEF40*	NM_018071.4	c.3226C>T	p.Arg1076Trp	0.43
6	chr14:33015907-33015907	*AKAP6*	NM_004274.4	c.2048C>G	p.Thr683Ser	0.65
6	chr14:69259691-69259691	*ZFP36L1*	NM_001244701.1	c.172C>G	p.Pro58Ala	0.53
6	chr14:70038469-70038469	*CCDC177*	NM_001271507.1	c.1871C>T	p.Ala624Val	0.47
6	chr14:73719409-73719409	*PAPLN*	NM_173462.3	c.939C>A	p.Asp313Glu	0.47
6	chr14:74206464-74206464	*ELMSAN1*	NM_194278.3	c.248C>A	p.Thr83Asn	0.44
6	chr15:41099876-41099876	*ZFYVE19*	NM_001077268.1	c.89G>A	p.Gly30Asp	0.47
6	chr15:57816858-57816858	*CGNL1*	NM_001252335.1	c.2948G>T	p.Arg983Leu	0.43
6	chr15:59064090-59064090	*FAM63B*	NM_001040450.1	c.496C>T	p.Pro166Ser	0.43
6	chr16:840357-840357	*CHTF18*	NM_022092.2	c.710G>A	p.Arg237Gln	0.52
6	chr16:2988200-2988200	*FLYWCH1*	NM_032296.2	c.1790_1791insTTC	p.Leu597_Glu598insSer	0.32
6	chr16:5061166-5061166	*SEC14L5*	NM_014692.1	c.1871T>G	p.Val624Gly	0.42
6	chr16:5061168-5061168	*SEC14L5*	NM_014692.1	c.1873G>T	p.Ala625Ser	0.42
6	chr16:54319972-54319972	*IRX3*	NM_024336.2	c.-10G>A		0.29
6	chr16:85945197-85945197	*IRF8*	NM_002163.2	c.380C>T	p.Ala127Val	0.59
6	chr16:88677770-88677770	*ZC3H18*	NM_144604.3	c.1301G>A	p.Arg434His	0.43
6	chr16:88951504-88951504	*CBFA2T3*	NM_005187.5	c.1067C>T	p.Ala356Val	0.55
6	chr17:7827298-7827298	*KCNAB3*	NM_004732.3	c.915G>C	p.Arg305Ser	0.42
6	chr17:30179253-30179253	*COPRS*	NM_018405.3	c.460A>G	p.Ile154Val	0.46
6	chr17:33750002-33750002	*SLFN12*	NM_018042.3	c.46C>G	p.Leu16Val	0.45
6	chr17:34590455-34590455	*TBC1D3C*	NM_001001418.4	c.-1G>A		0.47
6	chr17:61561774-61561774	*ACE*	NM_000789.3	c.1793C>T	p.Pro598Leu	0.54
6	chr18:3174127-3174127	*MYOM1*	NM_003803.3	c.1102G>T	p.Val368Leu	0.56
6	chr19:577897-577897	*BSG*	NM_001728.3	c.191A>G	p.Asn64Ser	0.43
6	chr19:1254365-1254365	*MIDN*	NM_177401.4	c.584T>C	p.Val195Ala	0.48
6	chr19:9204777-9204777	*OR1M1*	NM_001004456.1	c.857A>T	p.Asn286Ile	0.48
6	chr19:14774235-14774235	*ADGRE3*	NM_032571.3	c.194G>A	p.Cys65Tyr	0.47
6	chr19:16437729-16437729	*KLF2*	NM_016270.2	c.955C>T	p.Leu319Phe	0.52
6	chr19:36049335-36049335	*ATP4A*	NM_000704.2	c.1429A>T	p.Asn477Tyr	0.48
6	chr19:37368294-37368294	*ZNF345*	NM_001242474.1	c.562G>T	p.Ala188Ser	0.38
6	chr19:47919931-47919931	*MEIS3*	NM_020160.2	c.374C>T	p.Ser125Phe	0.37
6	chr19:53553205-53553205	*ERVV-2*	NM_001191055.1	c.701C>T	p.Ser234Leu	0.58
6	chr2:26696856-26696856	*OTOF*	NM_194248.2	c.3408+3G>T		0.53
6	chr20:58570897-58570897	*CDH26*	NM_177980.2	c.1676T>A	p.Val559Asp	0.41
6	chr22:23235947-23235947	*IGLL5*	NM_001178126.1	c.274C>T	p.Pro92Ser	0.80
6	chr22:23523205-23523205	*BCR*	NM_004327.3	c.58C>T	p.Pro20Ser	0.43
6	chr3:46777853-46777853	*PRSS46*	NM_001205271.1	c.26A>G	p.Gln9Arg	0.48
6	chr3:101383870-101383870	*ZBTB11*	NM_014415.3	c.1561C>T	p.His521Tyr	0.45
6	chr4:982874-982874	*SLC26A1*	NM_022042.3	c.1853C>T	p.Pro618Leu	0.48
6	chr4:16024988-16024988	*PROM1*	NM_006017.2	c.745A>G	p.Ile249Val	0.42
6	chr4:37432195-37432195	*NWD2*	NM_001144990.1	c.359G>A	p.Gly120Glu	0.59
6	chr4:118005525-118005525	*TRAM1L1*	NM_152402.2	c.1025C>A	p.Ser342Tyr	0.43
6	chr4:126412160-126412160	*FAT4*	NM_024582.4	c.14183G>T	p.Gly4728Val	0.40
6	chr4:153249393-153249393	*FBXW7*	NM_033632.3	c.1385C>T	p.Ser462Phe	0.36
6	chr4:153897553-153897553	*FHDC1*	NM_033393.2	c.3110G>A	p.Arg1037Gln	0.43
6	chr4:159158715-159158715	*TMEM144*	NM_018342.4	c.602G>A	p.Gly201Glu	0.45
6	chr5:112418642-112418642	*MCC*	NM_001085377.1	c.1699A>G	p.Ile567Val	0.40
6	chr5:132161687-132161687	*SHROOM1*	NM_001172700.1	c.146C>G	p.Ser49Trp	0.60
6	chr5:140476730-140476730	*PCDHB2*	NM_018936.2	c.2356G>A	p.Glu786Lys	0.40
6	chr6:26056356-26056356	*HIST1H1C*	NM_005319.3	c.301G>A	p.Ala101Thr	0.47
6	chr6:26285421-26285421	*HIST1H4H*	NM_003543.3	c.307G>A	p.Gly103Ser	0.98
6	chr6:27792018-27792018	*HIST1H4J*	NM_021968.3	c.116C>G	p.Ala39Gly	0.41
6	chr6:32808741-32808741	*PSMB8*	NM_004159.4	c.814C>A	p.Gln272Lys	0.44
6	chr6:37138248-37138248	*PIM1*	NM_001243186.1	c.170G>A	p.Ser57Asn	0.54
6	chr6:37139145-37139145	*PIM1*	NM_002648.3	c.485G>A	p.Gly162Glu	0.45
6	chr6:37139204-37139204	*PIM1*	NM_002648.3	c.544C>G	p.Leu182Val	0.36

6	chr6:56426281-56426281	*DST*	NM_015548.4	c.6266T>C	p.Leu2089Pro	0.38
6	chr6:74110062-74110062	*DDX43*	NM_018665.2	c.412A>C	p.Asn138His	0.34
6	chr6:74189515-74189515	*MTO1*	NM_133645.2	c.886C>T	p.Leu296Phe	0.58
6	chr6:145160360-145160360	*UTRN*	NM_007124.2	c.10117C>T	p.His3373Tyr	0.45
6	chr7:5338885-5338885	*SLC29A4*	NM_153247.2	c.1036C>T	p.Arg346Cys	0.54
6	chr7:66703292-66703292	*TYW1*	NM_018264.3	c.1978-3C>T		0.43
6	chr7:128323127-128323127	*FAM71F2*	NM_001128926.1	c.817A>G	p.Ser273Gly	0.40
6	chr7:151073713-151073713	*NUB1*	NM_016118.4	c.1522-7C>T		0.58
6	chr7:155532659-155532659	*RBM33*	NM_053043.2	c.1988C>T	p.Thr663Ile	0.45
6	chr8:30694510-30694510	*TEX15*	NM_031271.3	c.8141T>G	p.Phe2714Cys	0.43
6	chr8:110439254-110439254	*PKHD1L1*	NM_177531.4	c.2869G>T	p.Ala957Ser	0.53
6	chr8:144906414-144906414	*PUF60*	NM_078480.2	c.111+69C>T		0.55
6	chr8:145773763-145773763	*ARHGAP39*	NM_025251.1	c.707G>T	p.Gly236Val	0.48
6	chr9:37424844-37424844	*GRHPR*	NM_012203.1	c.86G>A	p.Cys29Tyr	0.66
6	chr9:132400555-132400555	*ASB6*	NM_017873.3	c.780G>T	p.Glu260Asp	0.98
6	chrX:70523701-70523701	*ITGB1BP2*	NM_012278.1	c.579T>G	p.Asp193Glu	0.41
6	chrX:100745821-100745821	*ARMCX4*	NM_001256155.1	c.2245C>T	p.Arg749Trp	0.53
6	chrX:101912776-101912776	*GPRASP1*	NM_001184727.1	c.3935A>T	p.Glu1312Val	0.42
6	chrX:103295409-103295409	*H2BFM*	NM_001164416.1	c.443C>T	p.Ala148Val	0.48
6	chrX:112065495-112065495	*AMOT*	NM_001113490.1	c.860A>C	p.Tyr287Ser	0.44
6	chrX:153490661-153490661	*OPN1MW2*	NM_001048181.2	c.397G>A	p.Val133Ile	0.79
6	chr17:79095119-79095119	*AATK*	NM_001080395.2	c.2617G>A	p.Asp873Asn	0.40
6	chr1:17318748-17318748	*ATP13A2*	NM_022089.2	c.1995C>A	p.Asn665Lys	0.44
6	chr1:31347239-31347239	*SDC3*	NM_014654.3	c.1067C>T	p.Pro356Leu	0.46
6	chr1:42925590-42925590	*PPCS*	NM_024664.2	c.929G>A	p.Arg310Lys	0.45
6	chr1:224491532-224491532	*NVL*	NM_002533.3	c.853C>T	p.Arg285Cys	0.60
6	chr1:226923755-226923755	*ITPKB*	NM_002221.3	c.1405G>A	p.Gly469Arg	0.63
6	chr1:228467741-228467741	*OBSCN*	NM_001271223.2	c.8903G>A	p.Arg2968Gln	0.39
6	chr1:231696963-231696963	*TSNAX*	NM_005999.2	c.457A>G	p.Ile153Val	0.15
6	chr10:105178302-105178302	*PDCD11*	NM_014976.1	c.2017G>A	p.Val673Ile	0.46
6	chr11:212684-212684	*RIC8A*	NM_021932.4	c.1153C>T	p.Arg385Cys	0.47
6	chr11:46703656-46703656	*ARHGAP1*	NM_004308.3	c.394G>A	p.Asp132Asn	0.45
6	chr11:57193647-57193647	*SLC43A3*	NM_014096.3	c.-2T>C		0.43
6	chr11:108535993-108535993	*DDX10*	NM_004398.2	c.113G>A	p.Arg38Lys	0.57
6	chr12:114261087-114261087	*RBM19*	NM_001146699.1	c.2825T>C	p.Ile942Thr	0.54
6	chr13:21735962-21735962	*SKA3*	NM_145061.5	c.796C>T	p.Pro266Ser	0.53
6	chr13:31495939-31495939	*MEDAG*	NM_032849.3	c.743G>A	p.Arg248Gln	0.57
6	chr13:43362907-43362907	*FAM216B*	NM_182508.2	c.401G>A	p.Arg134His	0.36
6	chr14:21993393-21993393	*SALL2*	NM_005407.1	c.469A>G	p.Thr157Ala	0.42
6	chr14:80164113-80164113	*NRXN3*	NM_004796.5	c.2638A>G	p.Asn880Asp	0.43
6	chr14:96552860-96552860	*C14orf132*	NM_001252507.1	c.40G>C	p.Gly14Arg	0.47
6	chr15:81234384-81234384	*CEMIP*	NM_018689.1	c.3602G>T	p.Gly1201Val	0.61
6	chr16:2231142-2231142	*CASKIN1*	NM_020764.3	c.2227C>T	p.Arg743Trp	0.37
6	chr16:31927606-31927606	*ZNF267*	NM_001265588.1	c.1940G>A	p.Arg647Gln	0.41
6	chr18:77089178-77089178	*ATP9B*	NM_198531.3	c.1811C>T	p.Thr604Met	0.52
6	chr19:15726566-15726566	*CYP4F8*	NM_007253.3	c.139C>T	p.Arg47Cys	0.40
6	chr19:55423541-55423541	*NCR1*	NM_001145457.2	c.685A>G	p.Thr229Ala	0.40
6	chr19:56467168-56467168	*NLRP8*	NM_176811.2	c.1744G>A	p.Gly582Ser	0.44
6	chr2:70910761-70910761	*ADD2*	NM_001617.3	c.1087C>T	p.His363Tyr	0.47
6	chr2:137814212-137814212	*THSD7B*	NM_001080427.1	c.269G>A	p.Arg90His	0.43
6	chr2:159651881-159651881	*DAPL1*	NM_001017920.2	c.-4C>T		0.33
6	chr2:204305088-204305088	*RAPH1*	NM_213589.1	c.2825C>T	p.Pro942Leu	0.45
6	chr2:219513664-219513664	*ZNF142*	NM_001105537.2	c.967T>C	p.Cys323Arg	0.45
6	chr2:231988121-231988121	*HTR2B*	NM_000867.4	c.352+6T>C		0.63
6	chr21:45821620-45821620	*TRPM2*	NM_003307.3	c.2378C>T	p.Thr793Ile	0.60
6	chr22:20458543-20458543	*RIMBP3*	NM_015672.1	c.2759C>T	p.Ala920Val	0.30
6	chr22:50307266-50307266	*ALG12*	NM_024105.3	c.148C>A	p.Gln50Lys	0.42
6	chr3:46307211-46307211	*CCR3*	NM_001837.3	c.562C>T	p.Pro188Ser	0.44
6	chr3:47270156-47270156	*KIF9*	NM_001134878.1	c.2359G>A	p.Ala787Thr	0.38
6	chr3:130733155-130733155	*ASTE1*	NM_014065.2	c.1786A>G	p.Ile596Val	0.43

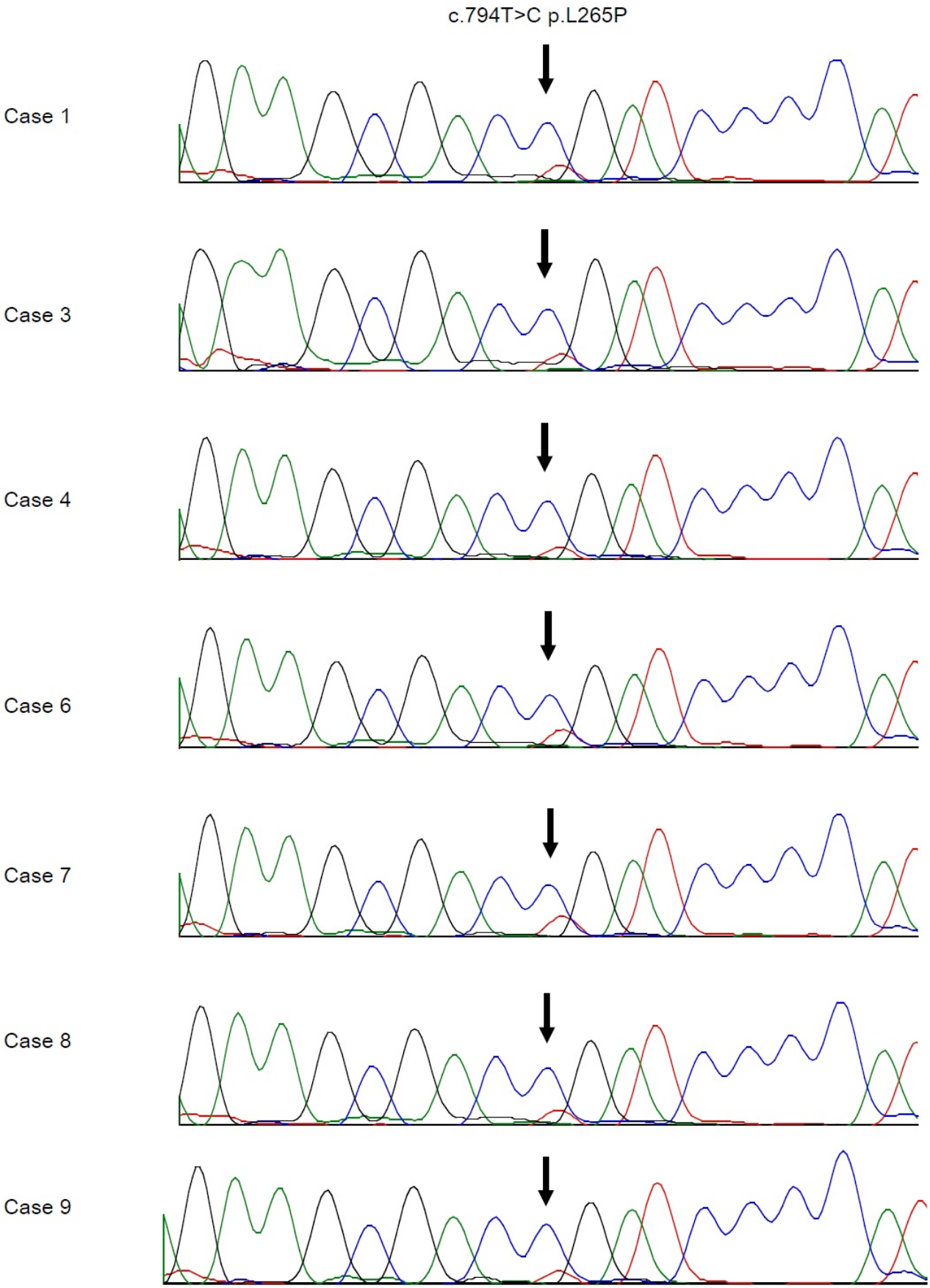
6	chr5:89783901-89783901	*POLR3G*	NM_006467.2	c.202A>G	p.Met68Val	0.59
6	chr5:90079672-90079672	*ADGRV1*	NM_032119.3	c.13451T>C	p.Ile4484Thr	0.52
6	chr6:31323967-31323967	*HLA-B*	NM_005514.6	c.596G>A	p.Gly199Glu	0.39
6	chr6:37138549-37138549	*PIM1*	NM_002648.3	c.83G>A	p.Gly28Asp	0.48
6	chr6:37138583-37138583	*PIM1*	NM_002648.3	c.117G>C	p.Gln39His	0.46
6	chr6:87725923-87725923	*HTR1E*	NM_000865.2	c.871C>T	p.Arg291Cys	0.43
6	chr7:70880968-70880968	*WBSCR17*	NM_022479.2	c.683G>A	p.Arg228His	0.44
6	chr7:150490295-150490295	*TMEM176B*	NM_014020.3	c.481G>A	p.Asp161Asn	0.26
6	chr9:27359052-27359052	*MOB3B*	NM_024761.4	c.601C>T	p.Arg201Cys	0.44
3	chr3:38182641-38182641	*MYD88*	NM_002468.4	c.794T>C	p.Leu265Pro	0.89
3	chr12:49436599-49436599	*KMT2D*	NM_003482.3	c.5707C>T	p.Arg1903Ter	0.64
3	chr1:6614562-6614562	*NOL9*	NM_024654.4	c.1A>T	p.Met1?	0.57
3	chr1:57415242-57415242	*C8B*	NM_000066.3	c.850C>T	p.Arg284Ter	0.45
3	chr11:124765351-124765351	*ROBO4*	NM_019055.5	c.1036+2T>C		0.53
3	chr12:104709569-104709570	*TXNRD1*	NM_001093771.2	c.629_630delTG	p.Val210GlufsTer7	0.56
3	chr18:55104048-55104049	*ONECUT2*	NM_004852.2	c.1105_1106delTC	p.Ser369ArgfsTer11	0.47
3	chr2:170359686-170359686	*BBS5*	NM_152384.2	c.898delG	p.Val300TrpfsTer25	0.58
3	chr22:23230440-23230440	*IGLL5*	NM_001178126.1	c.206+1G>C		0.61
3	chr3:49294633-49294633	*CCDC36*	NM_178173.3	c.1703C>G	p.Ser568Ter	0.45
3	chr3:146239791-146239791	*PLSCR1*	NM_021105.2	c.405delT	p.Phe135LeufsTer28	0.42
3	chr3:148750085-148750085	*HLTF*	NM_003071.3	c.2952delC	p.Phe985LeufsTer11	0.56
3	chr6:90529283-90529283	*MDN1*	NM_014611.1	c.44T>G	p.Leu15Ter	0.47
3	chr7:48018346-48018346	*HUS1*	NM_004507.3	c.120delC	p.Phe41SerfsTer12	0.41
3	chr7:150775181-150775181	*FASTK*	NM_001258461.1	c.745-2A>T		0.40
3	chr8:8560110-8560110	*CLDN23*	NM_194284.2	c.203dupA	p.Trp69ValfsTer302	0.39
3	chr8:60031444-60031444	*TOX*	NM_014729.2	c.102+1G>T		0.89
3	chr9:125084845-125084845	*MRRF*	NM_199177.2	c.578G>A	p.Trp193Ter	0.44
3	chrX:12994423-12994423	*TMSB4X*	NM_021109.3	c.43A>T	p.Lys15Ter	0.16
3	chr1:113456680-113456680	*SLC16A1*	NM_003051.3	c.1336C>T	p.Arg446Ter	0.46
3	chr10:115341777-115341777	*HABP2*	NM_004132.3	c.981G>A	p.Trp327Ter	0.54
3	chr12:22622730-22622730	*C2CD5*	NM_014802.1	c.2447-1G>T		0.35
3	chr14:65417683-65417683	*RAB15*	NM_198686.2	c.433C>T	p.Gln145Ter	0.42
3	chr15:59664696-59664696	*MYO1E*	NM_004998.3	c.3+1G>A		0.32
3	chr2:79253207-79253207	*REG3G*	NM_198448.3	c.-11-2A>G		0.54
3	chr22:29456521-29456521	*C22orf31*	NM_015370.1	c.314T>G	p.Leu105Ter	0.47
3	chr8:3046419-3046419	*CSMD1*	NM_033225.5	c.5513C>A	p.Ser1838Ter	0.52
3	chr4:6303036-6303036	*WFS1*	NM_006005.3	c.1514G>C	p.Cys505Ser	0.61
3	chr9:21994138-21994138	*CDKN2A*	NM_058195.3	c.193G>C	p.Gly65Arg	0.97
3	chr12:133240657-133240657	*POLE*	NM_006231.2	c.2639C>T	p.Thr880Met	0.61
3	chr12:133240658-133240658	*POLE*	NM_006231.2	c.2638A>C	p.Thr880Pro	0.60
3	chr3:124774655-124774657	*HEG1*	NM_020733.1	c.78_80delGGC	p.Ala27del	0.69
3	chr18:55221655-55221655	*FECH*	NM_000140.3	c.914T>G	p.Val305Gly	0.45
3	chr2:211507249-211507249	*CPS1*	NM_001875.4	c.3001C>T	p.Arg1001Cys	0.54
3	chr1:5927826-5927826	*NPHP4*	NM_015102.3	c.3446G>A	p.Arg1149His	0.54
3	chr10:71880325-71880325	*AIFM2*	NM_001198696.1	c.445G>C	p.Gly149Arg	0.47
3	chr11:2291390-2291390	*ASCL2*	NM_005170.2	c.173G>C	p.Arg58Pro	0.44
3	chr12:14804405-14804405	*GUCY2C*	NM_004963.3	c.1646G>A	p.Gly549Asp	0.67
3	chr17:29685997-29685997	*NF1*	NM_001042492.2	c.8124T>G	p.Phe2708Leu	0.47
3	chr2:3685186-3685186	*COLEC11*	NM_024027.4	c.266G>C	p.Gly89Ala	0.44
3	chr2:220440001-220440001	*INHA*	NM_002191.3	c.854G>T	p.Ser285Ile	0.39
3	chr3:15686433-15686433	*BTD*	NM_000060.2	c.1070C>T	p.Ser357Phe	0.93
3	chr5:134871151-134871151	*NEUROG1*	NM_006161.2	c.230G>A	p.Arg77Gln	0.48
3	chr6:19838344-19838344	*ID4*	NM_001546.3	c.359C>T	p.Pro120Leu	0.56
3	chr1:983733-983733	*AGRN*	NM_198576.3	c.4093G>A	p.Val1365Ile	0.45
3	chr1:3527717-3527717	*MEGF6*	NM_001409.3	c.116C>T	p.Pro39Leu	0.52
3	chr1:6614371-6614371	*NOL9*	NM_024654.4	c.192G>C	p.Glu64Asp	0.44
3	chr1:16736475-16736475	*SPATA21*	NM_198546.1	c.208G>T	p.Ala70Ser	0.43
3	chr1:35370639-35370639	*DLGAP3*	NM_001080418.1	c.346C>T	p.Arg116Cys	0.44
3	chr1:42914261-42914261	*ZMYND12*	NM_032257.4	c.301G>A	p.Glu101Lys	0.44
3	chr1:49511299-49511299	*AGBL4*	NM_032785.3	c.551G>T	p.Arg184Ile	0.44

3	chr1:77094313-77094313	*ST6GALNAC3*	NM_152996.2	c.740G>C	p.Gly247Ala	0.56
3	chr1:151502551-151502551	*CGN*	NM_020770.2	c.2273C>T	p.Ala758Val	0.47
3	chr1:152277640-152277640	*FLG*	NM_002016.1	c.9722G>A	p.Gly3241Glu	0.40
3	chr10:23729821-23729821	*OTUD1*	NM_001145373.2	c.1435G>A	p.Ala479Thr	0.48
3	chr11:56128203-56128203	*OR8J1*	NM_001005205.2	c.481T>C	p.Ser161Pro	0.20
3	chr11:56128207-56128207	*OR8J1*	NM_001005205.2	c.485A>G	p.Tyr162Cys	0.22
3	chr11:118374585-118374585	*KMT2A*	NM_001197104.1	c.7978G>A	p.Gly2660Ser	0.45
3	chr12:54349287-54349287	*HOXC12*	NM_173860.1	c.574T>G	p.Ser192Ala	0.31
3	chr12:101430906-101430906	*ANO4*	NM_178826.3	c.770A>G	p.Glu257Gly	0.60
3	chr12:121670824-121670824	*P2RX4*	NM_002560.2	c.1069G>T	p.Val357Phe	0.25
3	chr14:51224437-51224437	*NIN*	NM_020921.3	c.3311T>A	p.Met1104Lys	0.43
3	chr15:45427481-45427481	*DUOX1*	NM_017434.3	c.487C>T	s	0.47
3	chr15:80844984-80844984	*ARNT2*	NM_014862.3	c.958A>G	p.Thr320Ala	0.48
3	chr16:70569262-70569262	*SF3B3*	NM_012426.4	c.764A>G	p.Tyr255Cys	0.54
3	chr16:87636894-87636894	*JPH3*	NM_020655.3	c.142G>A	p.Glu48Lys	0.47
3	chr16:89777242-89777242	*VPS9D1*	NM_004913.2	c.1010C>T	p.Pro337Leu	0.44
3	chr17:11603101-11603101	*DNAH9*	NM_001372.3	c.4926G>T	p.Gln1642His	0.47
3	chr17:18661790-18661790	*FBXW10*	NM_001267585.1	c.1405C>G	p.Leu469Val	0.26
3	chr17:37948917-37948917	*IKZF3*	NM_012481.4	c.424+9T>C		0.34
3	chr17:37948921-37948921	*IKZF3*	NM_012481.4	c.424+5A>G		0.38
3	chr17:37948947-37948947	*IKZF3*	NM_012481.4	c.403G>A	p.Val135Ile	0.36
3	chr17:37948949-37948949	*IKZF3*	NM_012481.4	c.401T>C	p.Met134Thr	0.36
3	chr17:37948958-37948958	*IKZF3*	NM_012481.4	c.392A>G	p.Asn131Ser	0.39
3	chr19:618707-618707	*POLRMT*	NM_005035.3	c.3321C>A	p.Ser1107Arg	0.43
3	chr19:41596320-41596320	*CYP2A13*	NM_000766.4	c.505G>A	p.Asp169Asn	0.37
3	chr19:42406704-42406704	*ARHGEF1*	NM_004706.3	c.1519T>G	p.Trp507Gly	0.44
3	chr19:47597261-47597261	*ZC3H4*	NM_015168.1	c.458G>A	p.Arg153His	0.48
3	chr2:25358475-25358475	*EFR3B*	NM_014971.1	c.1451G>A	p.Arg484His	0.46
3	chr2:26686944-26686944	*OTOF*	NM_194248.2	c.4991C>T	p.Ala1664Val	0.45
3	chr2:27439779-27439779	*ATRAID*	NM_080592.3	c.818T>C	p.Leu273Pro	0.57
3	chr2:45812823-45812823	*SRBD1*	NM_018079.4	c.739C>A	p.Arg247Ser	0.35
3	chr2:133540141-133540141	*NCKAP5*	NM_207363.2	c.4243C>T	p.Pro1415Ser	0.40
3	chr2:136872624-136872624	*CXCR4*	NM_003467.2	c.874T>G	p.Phe292Val	0.46
3	chr2:136873310-136873310	*CXCR4*	NM_003467.2	c.188T>A	p.Met63Lys	0.44
3	chr2:160035532-160035532	*TANC1*	NM_033394.2	c.2368G>T	p.Asp790Tyr	0.53
3	chr2:160901518-160901518	*PLA2R1*	NM_007366.4	c.260G>A	p.Ser87Asn	0.38
3	chr2:174783388-174783388	*SP3*	NM_003111.4	c.1765C>G	p.His589Asp	0.57
3	chr2:174783391-174783391	*SP3*	NM_003111.4	c.1762C>G	p.Gln588Glu	0.58
3	chr2:179460428-179460428	*TTN*	NM_001267550.1	c.57653A>T	p.Asn19218Ile	0.54
3	chr2:185463703-185463703	*ZNF804A*	NM_194250.1	c.17T>C	p.Ile6Thr	0.48
3	chr2:197755568-197755568	*PGAP1*	NM_024989.3	c.1157G>T	p.Cys386Phe	0.27
3	chr2:229890386-229890386	*PID1*	NM_017933.4	c.709G>C	p.Glu237Gln	0.35
3	chr20:25477345-25477345	*NINL*	NM_025176.4	c.1264G>A	p.Asp422Asn	0.53
3	chr21:38862594-38862594	*DYRK1A*	NM_001396.3	c.782T>G	p.Leu261Arg	0.34
3	chr22:17288944-17288944	*XKR3*	NM_175878.3	c.20A>G	p.Glu7Gly	0.41
3	chr22:23230224-23230224	*IGLL5*	NM_001178126.1	c.-10C>T		0.47
3	chr22:23230449-23230449	*IGLL5*	NM_001178126.1	c.206+10A>G		0.60
3	chr22:24583349-24583349	*SUSD2*	NM_019601.3	c.1822A>G	p.Thr608Ala	0.44
3	chr3:46727145-46727145	*ALS2CL*	NM_001190707.1	c.667-11T>C		0.55
3	chr3:126070904-126070904	*KLF15*	NM_014079.3	c.862G>A	p.Ala288Thr	0.48
3	chr3:148858075-148858075	*HPS3*	NM_032383.3	c.502G>A	p.Glu168Lys	0.46
3	chr3:172165378-172165378	*GHSR*	NM_004122.2	c.826C>T	p.Leu276Phe	0.48
3	chr4:1987573-1987573	*NELFA*	NM_005663.4	c.887A>T	p.Lys296Met	0.45
3	chr4:10445615-10445615	*ZNF518B*	NM_053042.2	c.2338G>T	p.Val780Phe	0.44
3	chr4:20884231-20884231	*KCNIP4*	NM_025221.5	c.163A>T	p.Asn55Tyr	0.44
3	chr4:24810144-24810144	*CCDC149*	NM_173463.4	c.1457C>A	p.Ala486Asp	0.56
3	chr4:46125860-46125860	*GABRG1*	NM_173536.3	c.71T>A	p.Val24Asp	0.48
3	chr4:74485999-74485999	*RASSF6*	NM_177532.4	c.-35+6A>G		0.55
3	chr4:109667671-109667671	*ETNPPL*	NM_031279.3	c.1187G>A	p.Arg396Gln	0.42
3	chr4:169183261-169183261	*DDX60*	NM_017631.5	c.3163T>G	p.Phe1055Val	0.33

3	chr4:187118177-187118177	*CYP4V2*	NM_207352.3	c.497T>C	p.Met166Thr	0.40
3	chr5:228370-228370	*SDHA*	NM_004168.2	c.692G>A	p.Cys231Tyr	0.40
3	chr5:5186234-5186234	*ADAMTS16*	NM_139056.2	c.833A>T	p.Lys278Met	0.46
3	chr5:63991395-63991395	*FAM159B*	NM_001164442.1	c.253G>A	p.Val85Ile	0.37
3	chr5:137801630-137801630	*EGR1*	NM_001964.2	c.180C>G	p.Ser60Arg	0.46
3	chr5:137801647-137801647	*EGR1*	NM_001964.2	c.197G>C	p.Ser66Thr	0.53
3	chr5:147003216-147003216	*JAKMIP2*	NM_001270941.1	c.2032C>T	p.His678Tyr	0.45
3	chr6:13592089-13592089	*SIRT5*	NM_012241.4	c.438C>G	p.His146Gln	0.45
3	chr6:26056356-26056356	*HIST1H1C*	NM_005319.3	c.301G>T	p.Ala101Ser	0.33
3	chr6:26056385-26056385	*HIST1H1C*	NM_005319.3	c.272G>C	p.Gly91Ala	0.32
3	chr6:26123944-26123944	*HIST1H2BC*	NM_003526.2	c.189G>A	p.Met63Ile	0.48
3	chr6:26156811-26156811	*HIST1H1E*	NM_005321.2	c.193G>T	p.Ala65Ser	0.45
3	chr6:26157234-26157234	*HIST1H1E*	NM_005321.2	c.616C>G	p.Pro206Ala	0.47
3	chr6:26197242-26197242	*HIST1H3D*	NM_003530.4	c.237C>G	p.Phe79Leu	0.44
3	chr6:27776367-27776367	*HIST1H2AI*	NM_003509.2	c.380C>G	p.Ala127Gly	0.41
3	chr6:31324659-31324659	*HLA-B*	NM_005514.6	c.149G>A	p.Gly50Asp	0.42
3	chr6:37138950-37138950	*PIM1*	NM_002648.3	c.290G>C	p.Ser97Thr	0.48
3	chr6:41903710-41903710	*CCND3*	NM_001760.3	c.847A>G	p.Thr283Ala	0.38
3	chr6:88218155-88218155	*SLC35A1*	NM_006416.4	c.592G>A	p.Val198Ile	0.45
3	chr6:108508600-108508600	*NR2E1*	NM_003269.3	c.1091A>G	p.Lys364Arg	0.47
3	chr7:30538459-30538459	*GGCT*	NM_024051.3	c.383C>G	p.Thr128Arg	0.45
3	chr7:42972044-42972044	*MRPL32*	NM_031903.2	c.59T>C	p.Leu20Pro	0.43
3	chr7:124475414-124475414	*POT1*	NM_015450.2	c.1424C>G	p.Pro475Arg	0.41
3	chr8:26227882-26227882	*PPP2R2A*	NM_001177591.1	c.1327G>A	p.Val443Ile	0.46
3	chr8:38961179-38961179	*ADAM9*	NM_003816.2	c.2420G>A	p.Arg807His	0.45
3	chr8:77895726-77895726	*PEX2*	NM_001079867.1	c.689C>T	p.Ala230Val	0.37
3	chr8:86158077-86158077	*CA13*	NM_198584.2	c.20G>A	p.Gly7Glu	0.48
3	chr8:87755738-87755738	*CNGB3*	NM_019098.4	c.118A>T	p.Thr40Ser	0.21
3	chr8:113516132-113516132	*CSMD3*	NM_198123.1	c.4970G>A	p.Ser1657Asn	0.46
3	chr9:38068494-38068494	*SHB*	NM_003028.2	c.149C>T	p.Ala50Val	0.42
3	chr9:75387419-75387419	*TMC1*	NM_138691.2	c.832T>C	p.Phe278Leu	0.53
3	chr9:104312939-104312939	*RNF20*	NM_019592.6	c.1144C>A	p.Arg382Ser	0.57
3	chrX:8565279-8565279	*ANOS1*	NM_000216.2	c.337A>G	p.Ser113Gly	0.26
3	chr11:121475833-121475833	*SORL1*	NM_003105.5	c.4663G>A	p.Val1555Met	0.44
3	chr11:134229021-134229021	*GLB1L2*	NM_138342.3	c.719G>A	p.Gly240Glu	0.48
3	chr5:80626671-80626671	*ACOT12*	NM_130767.2	c.1480G>A	p.Gly494Arg	0.46
3	chr1:6228308-6228308	*CHD5*	NM_015557.2	c.109G>A	p.Asp37Asn	0.41
3	chr1:10421876-10421876	*KIF1B*	NM_015074.3	c.4159C>A	p.Pro1387Thr	0.58
3	chr1:21031047-21031047	*KIF17*	NM_020816.2	c.1016C>T	p.Pro339Leu	0.52
3	chr1:31406152-31406152	*PUM1*	NM_001020658.1	c.3473A>G	p.Tyr1158Cys	0.43
3	chr11:14096912-14096912	*SPON1*	NM_006108.3	c.500G>A	p.Arg167His	0.41
3	chr11:56128209-56128209	*OR8J1*	NM_001005205.2	c.487G>A	p.Val163Ile	0.23
3	chr11:101374981-101374981	*TRPC6*	NM_004621.5	c.719G>A	p.Arg240Gln	0.43
3	chr11:101937378-101937378	*C11orf70*	NM_032930.2	c.431G>A	p.Arg144Gln	0.40
3	chr11:126137454-126137454	*SRPRA*	NM_003139.3	c.355C>T	p.Arg119Trp	0.45
3	chr12:9313074-9313074	*PZP*	NM_002864.2	c.2885G>T	p.Gly962Val	0.27
3	chr15:77087669-77087669	*SCAPER*	NM_020843.2	c.724G>T	p.Ala242Ser	0.45
3	chr15:91455886-91455886	*MAN2A2*	NM_006122.2	c.2461G>A	p.Glu821Lys	0.40
3	chr16:4457573-4457573	*CORO7*	NM_001201472.1	c.362A>T	p.Asp121Val	0.54
3	chr16:25151547-25151547	*LCMT1*	NM_016309.2	c.383C>T	p.Thr128Met	0.39
3	chr16:84213049-84213049	*TAF1C*	NM_005679.3	c.2108C>T	p.Ala703Val	0.45
3	chr17:10348183-10348183	*MYH4*	NM_017533.2	c.5500C>G	p.Gln1834Glu	0.52
3	chr17:10417015-10417015	*MYH1*	NM_005963.3	c.742-10dupT		0.33
3	chr17:15215706-15215706	*TEKT3*	NM_031898.2	c.971A>G	p.Asp324Gly	0.47
3	chr18:3879839-3879839	*DLGAP1*	NM_004746.3	c.230C>T	p.Ser77Leu	0.47
3	chr19:3623901-3623901	*CACTIN*	NM_021231.1	c.427C>T	p.Arg143Trp	0.47
3	chr19:19656410-19656410	*CILP2*	NM_153221.2	c.3056G>A	p.Arg1019Gln	0.48
3	chr19:43698569-43698569	*PSG4*	NM_002780.4	c.1166G>A	p.Ser389Asn	0.46
3	chr2:42553333-42553333	*EML4*	NM_019063.3	c.2282C>G	p.Ser761Trp	0.46
3	chr20:23028508-23028508	*THBD*	NM_000361.2	c.1634C>T	p.Ala545Val	0.42

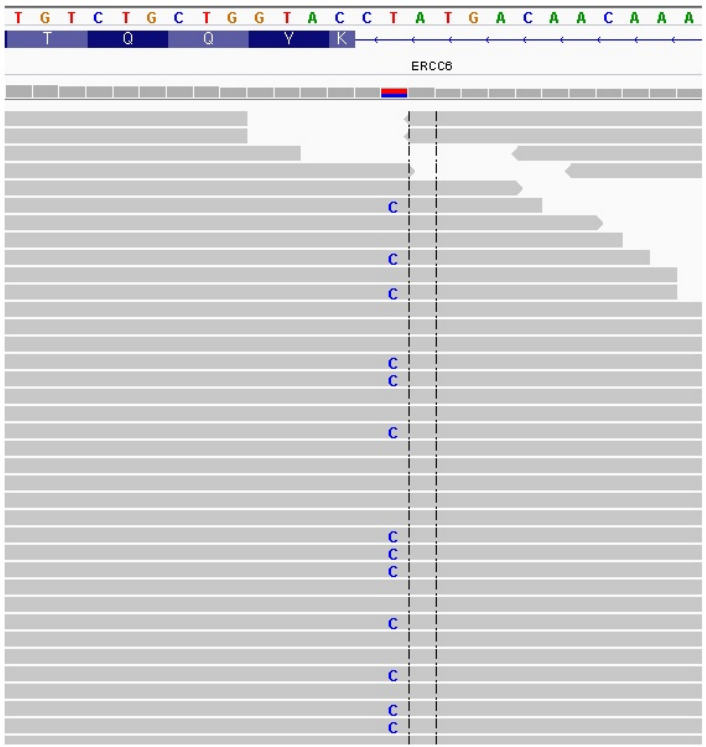
3	chr21:37650331-37650331	*DOPEY2*	NM_005128.2	c.5771C>T	p.Pro1924Leu	0.70
3	chr21:45483446-45483446	*TRAPPC10*	NM_003274.4	c.818G>A	p.Cys273Tyr	0.34
3	chr21:45978217-45978217	*KRTAP10-3*	NM_198696.2	c.382G>A	p.Val128Ile	0.22
3	chr3:36873129-36873129	*TRANK1*	NM_014831.2	c.7813C>T	p.Arg2605Trp	0.46
3	chr3:119501669-119501669	*NR1I2*	NM_022002.2	c.65A>G	p.His22Arg	0.45
3	chr4:83557814-83557814	*SCD5*	NM_001037582.2	c.732G>A	p.Met244Ile	0.52
3	chr4:169321978-169321978	*DDX60L*	NM_001012967.1	c.3490A>G	p.Ile1164Val	0.52
3	chr5:75587122-75587122	*SV2C*	NM_014979.1	c.1214G>A	p.Arg405Lys	0.45
3	chr5:148747696-148747696	*PCYOX1L*	NM_024028.3	c.964A>G	p.Ile322Val	0.48
3	chr6:18250048-18250048	*DEK*	NM_003472.3	c.596C>T	p.Thr199Ile	0.40
3	chr6:26156862-26156862	*HIST1H1E*	NM_005321.2	c.244C>G	p.Leu82Val	0.47
3	chr6:27101004-27101004	*HIST1H2AG*	NM_021064.4	c.154C>G	p.Leu52Val	0.55
3	chr6:42650801-42650801	*UBR2*	NM_015255.2	c.4727G>A	p.Arg1576His	0.33
3	chr7:94293706-94293706	*PEG10*	NM_015068.3	c.838C>T	p.Arg280Cys	0.44
3	chr7:142564665-142564665	*EPHB6*	NM_001280794.1	c.713A>C	p.Glu238Ala	0.46
3	chr8:3855503-3855503	*CSMD1*	NM_033225.5	c.740C>T	p.Ala247Val	0.40
3	chr8:134237791-134237791	*WISP1*	NM_003882.3	c.769C>T	p.Arg257Trp	0.81
3	chr8:145140282-145140282	*GPAA1*	NM_003801.3	c.1351G>A	p.Val451Ile	0.57
3	chr9:85677391-85677391	*RASEF*	NM_152573.3	c.392T>A	p.Phe131Tyr	0.44

Supplemental Figure 1. *MYD88* L265P mutations confirmed by Sanger sequencing. Mutant Enrichment with 3′-Modified Oligonucleotides PCR method was used.

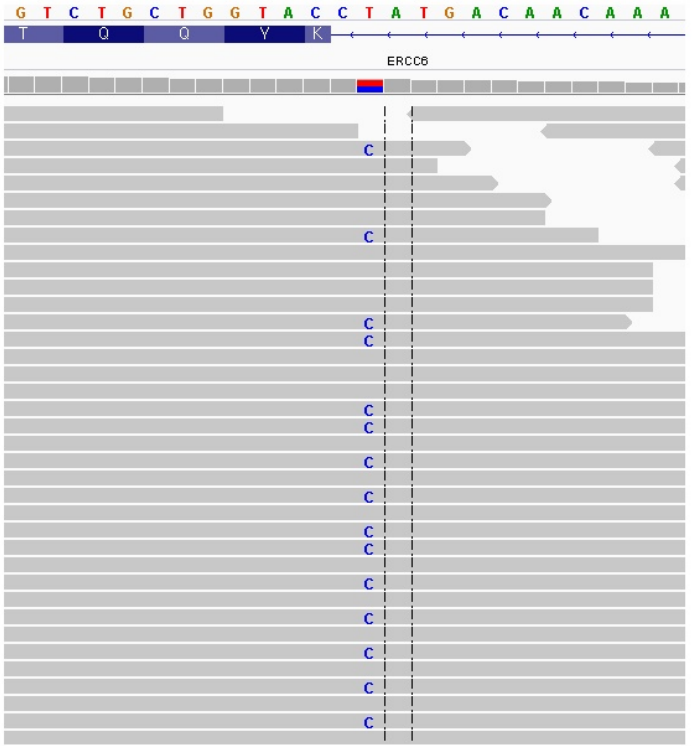


Supplemental Figure 2. *ERCC6* germline mutation

ERCC6 c.1527-2A>G
vitreous, variant allele frequency 0.45



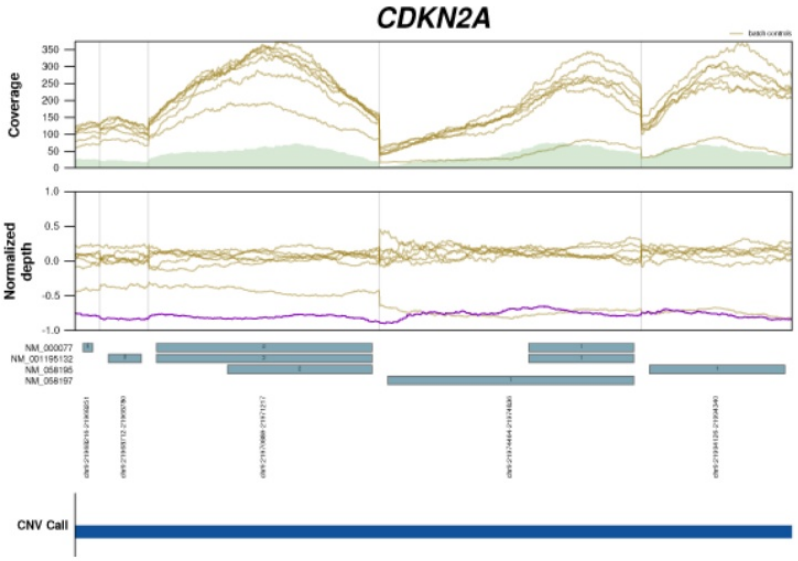
ERCC6 c.1527-2A>G
blood, variant allele frequency 0.47



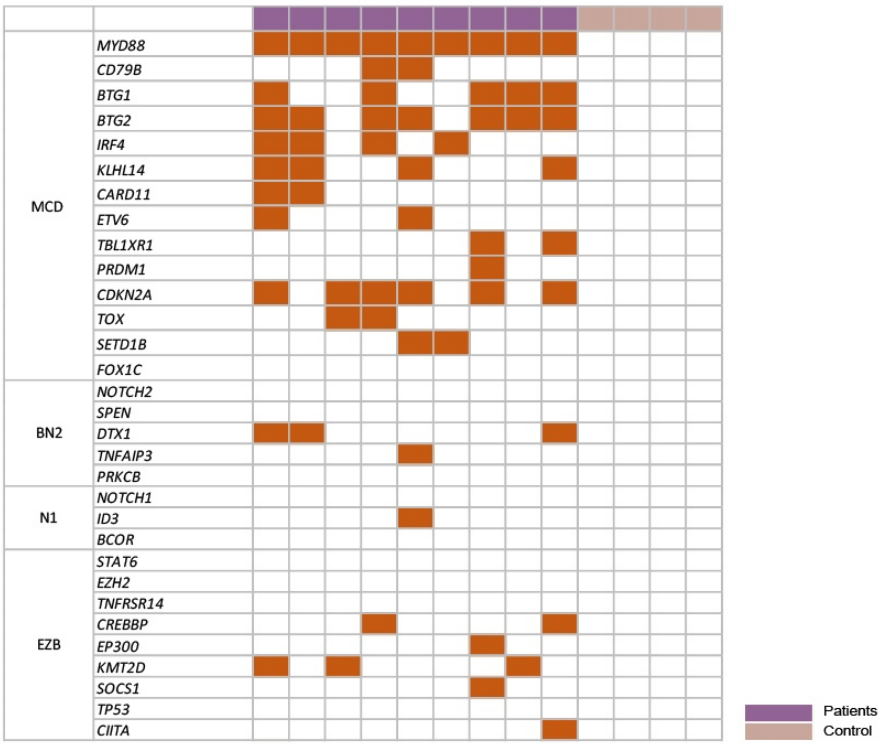
Supplemental Figure 3. Copy number variation of CDKN2A and TP53 in patients with vitreoretinal lymphoma with the exemplary figure representing homozygous deletion of CDKN2A. In the bottom figure, yellow lines represent the depth of samples within the same batch and purple line represents the index sample, which shows homozygous deletion.

Copy number variations									
	1	2	3	4	5	6	7	8	9
CDKN2A									
TP53									

Deletion detected
Not detected



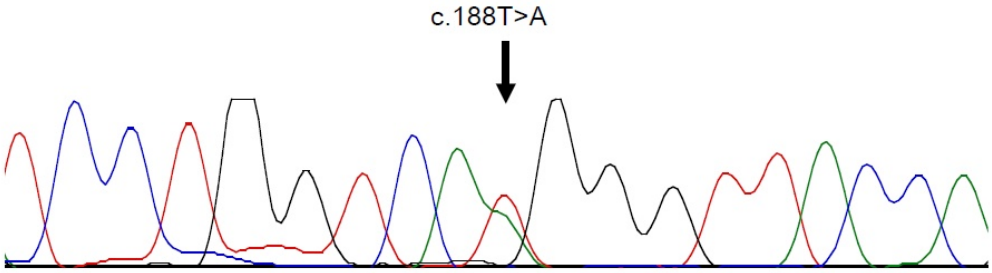
Supplemental Figure 4. According to the genetic subtypes of DLBCL reported by Schmitz et al.(ref 12), VRL can be classified into the MCD (defined based on co-occurrence of MYD88 L265P and CD79B mutations) subtype. MCD, based on the co-occurrence of MYD88 and CD79B mutations. BN2, based on BCL6 fusions and NOTCH2 mutations. N1, based on NOTCH1 mutations. EZB, based on EZH2 mutations and BCL2 translocations



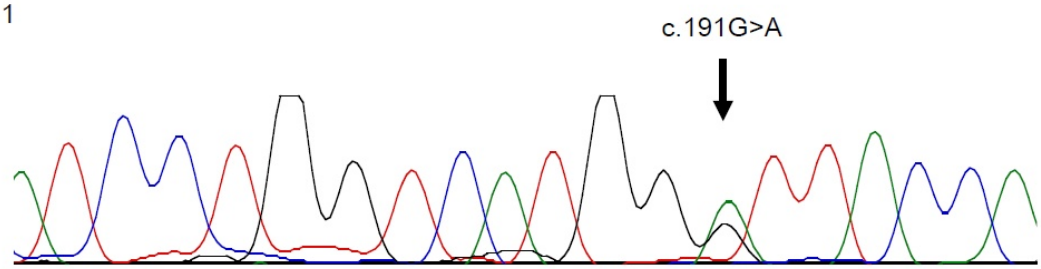
Supplemental Figure 5. Mutations in *CXCR4* and *BTG1* confirmed by Sanger sequencing

CXCR4

Case 3



Case 1



BTG1

Case 1