

## SUPPLEMENTARY INFORMATION

### Generation of Whole-Genome Sequencing Data for Comparing Primary and Castration-Resistant Prostate Cancer

**Jong-Lyul Park<sup>1§</sup>, Seon-Kyu Kim<sup>2§</sup>, Jeong-Hwan Kim<sup>1</sup>, Seok Joong Yun<sup>3,4</sup>, Wun-Jae Kim<sup>3,4</sup>,  
Won Tae Kim<sup>3,4</sup>, Pildu Jeong<sup>3</sup>, Ho Won Kang<sup>4</sup>, Seon-Young Kim<sup>1,5\*</sup>**

<sup>1</sup>Genome Editing Research Center, Korea Research Institute of Bioscience and Biotechnology, Daejeon 34141, Korea, <sup>2</sup>Personalized Genomic Medicine Research Center, Korea Research Institute of Bioscience and Biotechnology, Daejeon 34141, Korea, <sup>3</sup>Department of Urology, Chungbuk National University College of Medicine, Cheongju 28644, Korea, <sup>4</sup>Department of Urology, Chungbuk National University Hospital, Cheongju 28644, Korea, <sup>5</sup>Department of Functional Genomics, University of Science and Technology, Daejeon 34113, Korea

**Supplementary Table 1.** Clinical characteristics of the four patients who had a primary PC biopsy followed by a CRPC biopsy

| Characteristic          | Patient 1 (P1) | Patient 2 (P2) | Patient 3 (P3) | Patient 4 (P4) |
|-------------------------|----------------|----------------|----------------|----------------|
| 1st operation           |                |                |                |                |
| Age (y)                 | 69             | 74             | 78             | 69             |
| Type of surgery         | RRP            | TUR-P          | TUR-P          | TUR-P          |
| PSA at operation (µg/L) | 90.8           | 379            | 200            | 89             |
| Gleason score           | 7 (3+4)        | 7 (4+3)        | 9 (4+5)        | 9 (4+5)        |
| TNM stage               | T3N1M0         | T3N1M1         | T3N1M0         | T4N1M0         |
| 2nd operation           |                |                |                |                |
| Age (y)                 | 81             | 78             | 79             | 70             |
| Type of surgery         | TUR-P          | TUR-P          | TUR-P          | TUR-P          |
| PSA at operation (µg/L) | 133.1          | 166            | 40.2           | 117.3          |
| Gleason score           | 7 (4+3)        | 7 (4+3)        | 9 (5+4)        | 9 (4+5)        |
| TNM stage               | T4N1M1         | T3N1M1         | T3N1M0         | T4N1M0         |

PC, prostate cancer; CRPC, castration-refractory prostate cancer; PSA, prostate-specific antigen; RRP, radical retropubic prostatectomy; TUR-P, transurethral resection of the prostate.

Supplementary Table 2. Detailed information on the non-synonymous and recurrent mutations of all samples

| Sample ID | Chrom | Start     | End       | Ref_allele | Var_allele | Types             | Symbol      | Refseq_id    | Exon_num | Cdna_change | AA_change |
|-----------|-------|-----------|-----------|------------|------------|-------------------|-------------|--------------|----------|-------------|-----------|
| P2        | chr7  | 121717913 | 121717913 | C          | T          | nonsynonymous SNV | AASS        | NM_005763    | exon23   | c.G2641A    | p.A881T   |
| P2        | chr17 | 67297370  | 67297370  | G          | A          | nonsynonymous SNV | ABCA5       | NM_018672    | exon8    | c.C1177T    | p.P393S   |
| P2        | chr13 | 95673843  | 95673843  | C          | T          | nonsynonymous SNV | ABCC4       | NM_005845    | exon31   | c.G3964A    | p.E1322K  |
| P3        | chr16 | 67691668  | 67691668  | A          | G          | nonsynonymous SNV | ACD         | NM_001082487 | exon11   | c.T1505C    | p.V502A   |
| P2        | chr1  | 236914784 | 236914784 | G          | A          | synonymous SNV    | ACTN2       | NM_001278343 | exon15   | c.G1671A    | p.A557A   |
| P2        | chr7  | 149981855 | 149981855 | C          | T          | nonsynonymous SNV | ACTR3C      | NM_001164459 | exon6    | c.G551A     | p.R184H   |
| P2        | chr12 | 52307405  | 52307405  | G          | A          | nonsynonymous SNV | ACVRL1      | NM_000020    | exon4    | c.G376A     | p.V126M   |
| P2        | chr5  | 156916167 | 156916167 | G          | A          | synonymous SNV    | ADAM19      | NM_033274    | exon20   | c.C2268T    | p.S756S   |
| P2        | chr9  | 136303408 | 136303408 | G          | T          | nonsynonymous SNV | ADAMTS13    | NM_139025    | exon14   | c.G1627T    | p.D543Y   |
| P2        | chr16 | 77359829  | 77359829  | C          | T          | nonsynonymous SNV | ADAMTS18    | NM_199355    | exon13   | c.G1966A    | p.A656T   |
| P2        | chr12 | 43763134  | 43763134  | C          | T          | nonsynonymous SNV | ADAMTS20    | NM_025003    | exon37   | c.G5497A    | p.A1833T  |
| P2        | chr9  | 18776871  | 18776871  | G          | A          | nonsynonymous SNV | ADAMTSL1    | NM_001040272 | exon19   | c.G2644A    | p.V882M   |
| P2        | chr8  | 131964160 | 131964160 | G          | A          | stopgain          | ADCY8       | NM_001115    | exon3    | c.C1195T    | p.Q399X   |
| P2        | chrX  | 1718302   | 1718302   | G          | A          | nonsynonymous SNV | AKAP17A     | NM_005088    | exon4    | c.G1129A    | p.A377T   |
| P2        | chr1  | 165648811 | 165648811 | C          | T          | synonymous SNV    | ALDH9A1     | NM_000696    | exon6    | c.G798A     | p.E266E   |
| P2        | chr18 | 56204909  | 56204909  | G          | T          | nonsynonymous SNV | ALPK2       | NM_052947    | exon5    | c.C2510A    | p.S837Y   |
| P2        | chr16 | 2577913   | 2577913   | C          | A          | synonymous SNV    | AMDHD2      | NM_001145815 | exon5    | c.G555A     | p.T185T   |
| P2        | chr3  | 134090157 | 134090157 | C          | A          | nonsynonymous SNV | AMOTL2      | NM_001278685 | exon2    | c.G119T     | p.R40M    |
| P2        | chr10 | 61833289  | 61833289  | G          | A          | synonymous SNV    | ANK3        | NM_020987    | exon37   | c.C7350T    | p.D2450D  |
| P2        | chr7  | 16650267  | 16650267  | A          | G          | nonsynonymous SNV | ANKMY2      | NM_020319    | exon6    | c.T653C     | p.L218S   |
| P2        | chr9  | 69423721  | 69423721  | G          | A          | nonsynonymous SNV | ANKRD20A4   | NM_001098805 | exon15   | c.G2017A    | p.A673T   |
| P2        | chr9  | 69423983  | 69423983  | T          | C          | nonsynonymous SNV | ANKRD20A4   | NM_001098805 | exon15   | c.C2279C    | p.I760T   |
| P3        | chr9  | 69391171  | 69391171  | G          | A          | nonsynonymous SNV | ANKRD20A4   | NM_001098805 | exon5    | c.G679A     | p.A227T   |
| P1        | chr2  | 98128234  | 98128234  | T          | C          | synonymous SNV    | ANKRD36B    | NM_025190    | exon39   | c.A3087G    | p.R1029R  |
| P2        | chr2  | 98128473  | 98128473  | G          | A          | nonsynonymous SNV | ANKRD36B    | NM_025190    | exon39   | c.C2848T    | p.R950C   |
| P2        | chr17 | 34050697  | 34050697  | C          | T          | synonymous SNV    | AP2B1       | NM_001030006 | exon22   | c.C2835T    | p.Y945Y   |
| P2        | chr8  | 42025184  | 42025184  | A          | G          | nonsynonymous SNV | AP3M2       | NM_001134296 | exon9    | c.A1012G    | p.M338V   |
| P2        | chr1  | 10493990  | 10493990  | C          | T          | nonsynonymous SNV | APITD1-CORT | NM_001270517 | exon2    | c.C143T     | p.A48V    |
| P2        | chr9  | 33385733  | 33385733  | C          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G657A     | p.M219I   |
| P2        | chr9  | 33385740  | 33385740  | A          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.T650A     | p.L217H   |
| P2        | chr9  | 33385750  | 33385750  | C          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G640A     | p.G214R   |
| P2        | chr9  | 33385771  | 33385771  | C          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G619A     | p.G207S   |
| P2        | chr9  | 33385784  | 33385784  | C          | G          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G606C     | p.E202D   |
| P2        | chr9  | 33385786  | 33385786  | C          | G          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G604C     | p.E202Q   |
| P2        | chr9  | 33385828  | 33385828  | C          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G562A     | p.A188T   |
| P2        | chr9  | 33385852  | 33385852  | C          | T          | nonsynonymous SNV | AQP7        | NM_001170    | exon7    | c.G538A     | p.G180R   |
| P2        | chr9  | 33386146  | 33386146  | C          | A          | nonsynonymous SNV | AQP7        | NM_001170    | exon6    | c.G454T     | p.V152F   |
| P3        | chr9  | 33386146  | 33386146  | C          | A          | nonsynonymous SNV | AQP7        | NM_001170    | exon6    | c.G454T     | p.V152F   |
| P2        | chr11 | 72437998  | 72437998  | C          | T          | nonsynonymous SNV | ARAP1       | NM_001040118 | exon3    | c.G176A     | p.R59H    |
| P2        | chr4  | 153809416 | 153809416 | G          | A          | nonsynonymous SNV | ARFIP1      | NM_001287431 | exon8    | c.G923A     | p.R308H   |
| P3        | chr5  | 149008403 | 149008403 | A          | G          | synonymous SNV    | ARHGEF37    | NM_001001669 | exon12   | c.A1692G    | p.L564L   |
| P2        | chr5  | 90669632  | 90669632  | C          | T          | nonsynonymous SNV | ARRDC3      | NM_020801    | exon7    | c.G1057A    | p.V353I   |
| P2        | chr1  | 23765719  | 23765719  | G          | A          | stopgain          | ASAP3       | NM_001143778 | exon10   | c.C922T     | p.P308X   |
| P2        | chr8  | 62559359  | 62559359  | G          | A          | nonsynonymous SNV | ASPH        | NM_032466    | exon6    | c.C569T     | p.T190I   |
| P2        | chr1  | 63329766  | 63329766  | T          | C          | nonsynonymous SNV | ATG4C       | NM_178221    | exon11   | c.T1313C    | p.L438P   |
| P2        | chr3  | 130650924 | 130650924 | G          | A          | nonsynonymous SNV | ATP2C1      | NM_001001486 | exon3    | c.G176A     | p.G59D    |
| P2        | chr13 | 31835161  | 31835161  | G          | A          | nonsynonymous SNV | B3GALT1     | NM_194318    | exon7    | c.G538A     | p.V180I   |
| P2        | chr15 | 40758297  | 40758297  | C          | T          | nonsynonymous SNV | BAHD1       | NM_001301132 | exon7    | c.C2308T    | p.R770C   |
| P2        | chr1  | 32201471  | 32201471  | C          | T          | nonsynonymous SNV | BAI2        | NM_001294335 | exon23   | c.G3224A    | p.G1075D  |
| P2        | chr11 | 118772429 | 118772429 | G          | A          | nonsynonymous SNV | BCL9L       | NM_182557    | exon6    | c.C2023T    | p.R675C   |
| P3        | chr2  | 32716525  | 32716525  | G          | C          | nonsynonymous SNV | BIRC6       | NM_016252    | exon44   | c.G8240C    | p.S2747T  |
| P2        | chr3  | 9781124   | 9781124   | C          | A          | synonymous SNV    | BRPF1       | NM_004634    | exon3    | c.C1041A    | p.R347R   |
| P2        | chr10 | 93753543  | 93753543  | G          | A          | synonymous SNV    | BTAF1       | NM_003972    | exon22   | c.G3138A    | p.L1046L  |
| P2        | chr5  | 180486728 | 180486728 | G          | A          | nonsynonymous SNV | BTNL9       | NM_152547    | exon11   | c.G1474A    | p.D492N   |
| P2        | chr15 | 45250696  | 45250696  | C          | T          | nonsynonymous SNV | C15orf43    | NM_152448    | exon3    | c.C272T     | p.A91V    |
| P2        | chr16 | 4626235   | 4626235   | C          | T          | nonsynonymous SNV | C16orf96    | NM_001145011 | exon5    | c.C1754T    | p.A585V   |
| P2        | chr7  | 7278034   | 7278034   | A          | G          | synonymous SNV    | C1GALT1     | NM_020156    | exon3    | c.A369G     | p.S123S   |
| P2        | chr2  | 24255780  | 24255780  | C          | T          | nonsynonymous SNV | C2orf44     | NM_025203    | exon3    | c.G1855A    | p.A619T   |
| P2        | chr19 | 6692959   | 6692959   | C          | T          | synonymous SNV    | C3          | NM_000064    | exon26   | c.G3366A    | p.A1122A  |
| P3        | chr19 | 48722180  | 48722180  | C          | T          | synonymous SNV    | CARD8       | NM_014959    | exon10   | c.G1101A    | p.E367E   |
| P2        | chr19 | 5772833   | 5772833   | G          | A          | nonsynonymous SNV | CATSPERD    | NM_152784    | exon20   | c.G1798A    | p.A600T   |
| P2        | chr12 | 123265872 | 123265872 | C          | A          | nonsynonymous SNV | CCDC62      | NM_201435    | exon3    | c.C391A     | p.L131I   |
| P1        | chr2  | 135711846 | 135711846 | T          | G          | nonsynonymous SNV | CCNT2       | NM_001241    | exon9    | c.T1821G    | p.S607R   |
| P2        | chr4  | 91229728  | 91229728  | G          | A          | nonsynonymous SNV | CCSER1      | NM_001145065 | exon2    | c.G293A     | p.S98N    |
| P2        | chr12 | 7550954   | 7550954   | G          | A          | synonymous SNV    | CD163L1     | NM_174941    | exon7    | c.C1635T    | p.C545C   |
| P2        | chr9  | 5457379   | 5457379   | A          | G          | nonsynonymous SNV | CD274       | NM_014143    | exon3    | c.A353G     | p.Y118C   |
| P2        | chr3  | 45153778  | 45153778  | G          | A          | nonsynonymous SNV | CDCP1       | NM_022842    | exon3    | c.C452T     | p.P151L   |
| P2        | chr10 | 73501571  | 73501571  | C          | T          | nonsynonymous SNV | CDH23       | NM_022124    | exon36   | c.C4738T    | p.R1580C  |
| P2        | chr16 | 62055291  | 62055291  | G          | A          | nonsynonymous SNV | CDH8        | NM_001796    | exon2    | c.C17T      | p.A6V     |
| P2        | chr22 | 46776797  | 46776797  | C          | T          | nonsynonymous SNV | CELSR1      | NM_014246    | exon22   | c.G7144A    | p.E2382K  |
| P2        | chr3  | 424296    | 424296    | C          | A          | nonsynonymous SNV | CHL1        | NM_006614    | exon18   | c.C2118A    | p.N706K   |
| P2        | chr3  | 424298    | 424298    | A          | G          | nonsynonymous SNV | CHL1        | NM_006614    | exon18   | c.A2120G    | p.E707G   |
| P3        | chr19 | 59063292  | 59063292  | G          | A          | synonymous SNV    | CHMP2A      | NM_198426    | exon5    | c.C522T     | p.S174S   |
| P2        | chr7  | 2473499   | 2473499   | G          | A          | nonsynonymous SNV | CHST12      | NM_018641    | exon2    | c.G1225A    | p.E409K   |
| P4        | chr7  | 73790318  | 73790318  | G          | C          | synonymous SNV    | CLIP2       | NM_003388    | exon10   | c.G1587C    | p.S529S   |
| P2        | chr1  | 26507365  | 26507365  | G          | A          | nonsynonymous SNV | CNKSR1      | NM_001297647 | exon3    | c.G370A     | p.A124T   |
| P2        | chr1  | 103431078 | 103431078 | C          | T          | nonsynonymous SNV | COL11A1     | NM_001854    | exon38   | c.G2881A    | p.G961S   |
| P2        | chr6  | 75855148  | 75855148  | A          | G          | synonymous SNV    | COL12A1     | NM_004370    | exon25   | c.T4584C    | p.N1528N  |
| P2        | chr20 | 61938843  | 61938843  | C          | A          | synonymous SNV    | COL20A1     | NM_020882    | exon6    | c.C498A     | p.A166A   |
| P2        | chr9  | 117051232 | 117051232 | C          | T          | synonymous SNV    | COL27A1     | NM_032888    | exon44   | c.C4137T    | p.G1379G  |
| P2        | chr9  | 137582889 | 137582889 | G          | A          | nonsynonymous SNV | COL5A1      | NM_001278074 | exon2    | c.G241A     | p.A81T    |

|    |       |           |           |   |   |                   |          |              |        |           |          |
|----|-------|-----------|-----------|---|---|-------------------|----------|--------------|--------|-----------|----------|
| P2 | chr6  | 70962003  | 70962003  | G | A | nonsynonymous SNV | COL9A1   | NM_001851    | exon27 | c.C1780T  | p.P594S  |
| P2 | chr19 | 19014144  | 19014144  | G | A | nonsynonymous SNV | COPE     | NM_007263    | exon7  | c.C668T   | p.A223V  |
| P2 | chr4  | 47765397  | 47765397  | T | G | nonsynonymous SNV | CORIN    | NM_001278585 | exon3  | c.A415C   | p.S139R  |
| P2 | chr1  | 207697185 | 207697185 | G | A | synonymous SNV    | CR1      | NM_000573    | exon5  | c.G717A   | p.T239T  |
| P2 | chr16 | 84879496  | 84879496  | C | T | synonymous SNV    | CRISPLD2 | NM_031476    | exon3  | c.C345T   | p.G115G  |
| P2 | chr11 | 10800514  | 10800514  | C | T | synonymous SNV    | CTR9     | NM_014633    | exon25 | c.C3384T  | p.A1128A |
| P2 | chr9  | 105767032 | 105767032 | G | A | nonsynonymous SNV | CYLC2    | NM_001340    | exon4  | c.G236A   | p.R79H   |
| P2 | chr11 | 6647272   | 6647272   | C | A | stopgain          | DCHS1    | NM_003737    | exon17 | c.G6610T  | p.G2204X |
| P2 | chr5  | 112349113 | 112349113 | T | C | nonsynonymous SNV | DCP2     | NM_152624    | exon11 | c.T1195C  | p.F399L  |
| P2 | chr11 | 47236791  | 47236791  | A | T | nonsynonymous SNV | DDB2     | NM_000107    | exon1  | c.A104T   | p.K35M   |
| P2 | chrX  | 23019747  | 23019747  | G | T | nonsynonymous SNV | DDX53    | NM_182699    | exon1  | c.G1573T  | p.D525Y  |
| P2 | chr14 | 24766049  | 24766049  | G | A | synonymous SNV    | DHRS1    | NM_001136050 | exon3  | c.C189T   | p.C63C   |
| P2 | chr9  | 93375670  | 93375670  | A | C | nonsynonymous SNV | DIRAS2   | NM_017594    | exon2  | c.T440G   | p.F147C  |
| P2 | chr5  | 118482607 | 118482607 | T | C | nonsynonymous SNV | DMXL1    | NM_005509    | exon16 | c.T2645C  | p.L882S  |
| P2 | chr17 | 7701997   | 7701997   | C | T | synonymous SNV    | DNAH2    | NM_020877    | exon54 | c.C8520T  | p.G2840G |
| P2 | chr20 | 62560854  | 62560854  | C | T | synonymous SNV    | DNAJC5   | NM_025219    | exon3  | c.C297T   | p.F99F   |
| P2 | chr19 | 10244950  | 10244950  | C | A | nonsynonymous SNV | DNMT1    | NM_001130823 | exon40 | c.G4807T  | p.A1603S |
| P2 | chr13 | 99574324  | 99574324  | G | A | nonsynonymous SNV | DOCK9    | NM_001130049 | exon6  | c.C566T   | p.A189V  |
| P2 | chr19 | 2211180   | 2211180   | G | A | synonymous SNV    | DOT1L    | NM_032482    | exon15 | c.G1434A  | p.A478A  |
| P2 | chr6  | 30916772  | 30916772  | G | A | synonymous SNV    | DPCR1    | NM_080870    | exon2  | c.G531A   | p.T177T  |
| P3 | chr16 | 57735900  | 57735900  | G | C | nonsynonymous SNV | DRC7     | NM_001289162 | exon6  | c.G557C   | p.C186S  |
| P2 | chr18 | 28993551  | 28993551  | A | G | nonsynonymous SNV | DSG4     | NM_177986    | exon16 | c.A3116G  | p.Q1039R |
| P2 | chr12 | 89744510  | 89744510  | G | A | synonymous SNV    | DUSP6    | NM_001946    | exon2  | c.C693T   | p.F231F  |
| P2 | chr17 | 45421607  | 45421607  | A | G | nonsynonymous SNV | EFCAB13  | NM_152347    | exon7  | c.A383G   | p.Y128C  |
| P2 | chr11 | 10822143  | 10822143  | T | C | nonsynonymous SNV | EIF4G2   | NM_001172705 | exon17 | c.A1696G  | p.N566D  |
| P2 | chr11 | 10825838  | 10825838  | C | A | nonsynonymous SNV | EIF4G2   | NM_001172705 | exon6  | c.G479T   | p.S160I  |
| P2 | chr20 | 33868539  | 33868539  | C | T | nonsynonymous SNV | EIF6     | NM_001267810 | exon4  | c.G287A   | p.R96Q   |
| P3 | chr5  | 96129512  | 96129512  | A | G | synonymous SNV    | ERAP1    | NM_016442    | exon6  | c.T1068C  | p.A356A  |
| P2 | chr3  | 56026099  | 56026099  | G | A | synonymous SNV    | ERC2     | NM_015576    | exon11 | c.C2241T  | p.I747I  |
| P2 | chr2  | 97637859  | 97637859  | C | T | nonsynonymous SNV | FAM178B  | NM_001122646 | exon3  | c.G343A   | p.V115M  |
| P1 | chr12 | 50745820  | 50745820  | G | A | synonymous SNV    | FAM186A  | NM_001145475 | exon4  | c.C4795T  | p.L1599L |
| P2 | chr9  | 71998620  | 71998620  | C | A | nonsynonymous SNV | FAM189A2 | NM_004816    | exon7  | c.C569A   | p.P190H  |
| P2 | chr9  | 34726428  | 34726428  | C | T | nonsynonymous SNV | FAM205A  | NM_001141917 | exon4  | c.G809A   | p.R270Q  |
| P2 | chr5  | 137680706 | 137680706 | C | T | nonsynonymous SNV | FAM53C   | NM_001135647 | exon4  | c.C329T   | p.P110L  |
| P2 | chr7  | 128323029 | 128323029 | C | T | nonsynonymous SNV | FAM71F2  | NM_001290254 | exon6  | c.C461T   | p.T154I  |
| P1 | chr1  | 143906122 | 143906122 | C | A | nonsynonymous SNV | FAM72D   | NM_207418    | exon3  | c.C454T   | p.G82V   |
| P2 | chr19 | 13033565  | 13033565  | C | T | synonymous SNV    | FARSA    | NM_004461    | exon13 | c.G1524A  | p.A508A  |
| P2 | chr5  | 150911360 | 150911360 | G | A | nonsynonymous SNV | FAT2     | NM_001447    | exon13 | c.C9599T  | p.T3200M |
| P2 | chr11 | 92534441  | 92534441  | C | T | synonymous SNV    | FAT3     | NM_001008781 | exon9  | c.C8262T  | p.G2754G |
| P2 | chr16 | 747115    | 747115    | C | T | synonymous SNV    | FBXL16   | NM_153350    | exon2  | c.G291A   | p.T977T  |
| P2 | chr7  | 19184962  | 19184962  | G | A | synonymous SNV    | FERD3L   | NM_152898    | exon1  | c.C24T    | p.C8C    |
| P2 | chr7  | 4794165   | 4794165   | G | A | synonymous SNV    | FFOXK1   | NM_001037165 | exon3  | c.G822A   | p.S274S  |
| P2 | chr17 | 79496121  | 79496121  | C | A | synonymous SNV    | FSCN2    | NM_001077182 | exon1  | c.C564A   | p.S188S  |
| P4 | chr4  | 47033734  | 47033734  | C | A | synonymous SNV    | GABRB1   | NM_000812    | exon1  | c.C66A    | p.V22V   |
| P2 | chr9  | 35739655  | 35739655  | G | A | nonsynonymous SNV | GBA2     | NM_020944    | exon9  | c.C1552T  | p.R518W  |
| P2 | chr9  | 74828816  | 74828816  | C | T | nonsynonymous SNV | GDA      | NM_001242505 | exon5  | c.C487T   | p.R163W  |
| P2 | chr22 | 25024113  | 25024113  | G | A | nonsynonymous SNV | GGT1     | NM_001288833 | exon14 | c.C1402A  | p.V468M  |
| P3 | chr22 | 25016939  | 25016939  | A | G | nonsynonymous SNV | GGT1     | NM_001288833 | exon9  | c.A635G   | p.Q212R  |
| P3 | chr22 | 25016941  | 25016941  | C | G | nonsynonymous SNV | GGT1     | NM_001288833 | exon9  | c.C637G   | p.L213V  |
| P2 | chr16 | 74499705  | 74499705  | C | T | nonsynonymous SNV | GLG1     | NM_001145667 | exon19 | c.G2536A  | p.E846K  |
| P2 | chr16 | 4383406   | 4383406   | T | C | synonymous SNV    | GLIS2    | NM_032575    | exon2  | c.T231C   | p.P77P   |
| P1 | chr15 | 22743379  | 22743379  | A | G | synonymous SNV    | GOLGA6L1 | NM_001001413 | exon8  | c.A1764G  | p.R588R  |
| P2 | chr17 | 36493026  | 36493026  | C | T | synonymous SNV    | GPR179   | NM_001004334 | exon4  | c.G1062A  | p.L354L  |
| P2 | chr9  | 139243183 | 139243183 | G | A | synonymous SNV    | GPSM1    | NM_001145638 | exon10 | c.G1242A  | p.A414A  |
| P2 | chr11 | 105483053 | 105483053 | G | A | nonsynonymous SNV | GRIA4    | NM_001112812 | exon2  | c.G139A   | p.A47T   |
| P1 | chr12 | 13715916  | 13715916  | G | A | nonsynonymous SNV | GRIN2B   | NM_000834    | exon13 | c.C4256T  | p.P1419L |
| P3 | chr19 | 48918157  | 48918157  | C | T | synonymous SNV    | GRIN2D   | NM_000836    | exon6  | c.C1449T  | p.C483C  |
| P3 | chr12 | 48723164  | 48723164  | C | T | synonymous SNV    | H1FNT    | NM_181788    | exon1  | c.C90T    | p.G30G   |
| P2 | chr12 | 112617039 | 112617039 | A | T | nonsynonymous SNV | HECTD4   | NM_001109662 | exon63 | c.T10748A | p.L3583H |
| P2 | chr2  | 197298108 | 197298108 | G | A | nonsynonymous SNV | HECW2    | NM_020760    | exon2  | c.C40T    | p.R14C   |
| P2 | chr3  | 124729314 | 124729314 | C | T | synonymous SNV    | HEG1     | NM_020733    | exon7  | c.G3042A  | p.P1014P |
| P2 | chr15 | 28389828  | 28389828  | G | A | nonsynonymous SNV | HERC2    | NM_004667    | exon72 | c.C11131T | p.P3711S |
| P2 | chr22 | 19379633  | 19379633  | A | G | synonymous SNV    | HIRA     | NM_003325    | exon9  | c.T927C   | p.L309L  |
| P2 | chr2  | 75112708  | 75112708  | C | T | nonsynonymous SNV | HK2      | NM_000189    | exon13 | c.C1927T  | p.R643W  |
| P2 | chr1  | 221057764 | 221057764 | G | T | nonsynonymous SNV | HLX      | NM_021958    | exon4  | c.G1185T  | p.E395D  |
| P2 | chr5  | 162902656 | 162902656 | C | A | nonsynonymous SNV | HMMR     | NM_012484    | exon11 | c.C1243A  | p.L415I  |
| P4 | chr1  | 13183226  | 13183226  | T | C | nonsynonymous SNV | HNRNPCL2 | NM_001136561 | exon2  | c.A647G   | p.K216R  |
| P4 | chr1  | 13183263  | 13183263  | T | C | nonsynonymous SNV | HNRNPCL2 | NM_001136561 | exon2  | c.A610G   | p.L204V  |
| P2 | chr3  | 148857851 | 148857851 | A | G | nonsynonymous SNV | HPS3     | NM_032383    | exon2  | c.A278G   | p.N93S   |
| P2 | chr4  | 3162014   | 3162014   | G | A | synonymous SNV    | HPT      | NM_002111    | exon29 | c.G3759A  | p.T1253T |
| P2 | chr3  | 50357001  | 50357001  | T | C | nonsynonymous SNV | HYAL1    | NM_033158    | exon3  | c.A920G   | p.E307G  |
| P2 | chr15 | 60747587  | 60747587  | G | A | synonymous SNV    | ICE2     | NM_001276385 | exon7  | c.C721T   | p.L241L  |
| P2 | chr1  | 159897253 | 159897253 | C | T | nonsynonymous SNV | IGSF9    | NM_020789    | exon21 | c.G3374A  | p.R1125H |
| P2 | chr8  | 42176889  | 42176889  | G | A | nonsynonymous SNV | IKBK     | NM_001242778 | exon13 | c.G1289A  | p.S430N  |
| P2 | chr10 | 124753476 | 124753476 | A | G | synonymous SNV    | IKZF5    | NM_001271840 | exon5  | c.T1080C  | p.P360P  |
| P2 | chr7  | 2629653   | 2629653   | G | A | nonsynonymous SNV | IQCE     | NM_152558    | exon14 | c.G1157A  | p.R386H  |
| P2 | chr12 | 250444    | 250444    | G | A | nonsynonymous SNV | IQSEC3   | NM_001170738 | exon5  | c.G2146A  | p.V716M  |
| P2 | chr4  | 185309945 | 185309945 | C | T | synonymous SNV    | IRF2     | NM_002199    | exon9  | c.G1017A  | p.S339S  |
| P3 | chr1  | 62713246  | 62713246  | G | A | synonymous SNV    | KANK4    | NM_181712    | exon9  | c.C2781T  | p.H927H  |
| P2 | chr12 | 5153884   | 5153884   | G | A | nonsynonymous SNV | KCNA5    | NM_002234    | exon1  | c.G571A   | p.V191I  |
| P2 | chr3  | 19492662  | 19492662  | C | T | nonsynonymous SNV | KCNH8    | NM_144633    | exon10 | c.C1591T  | p.P531S  |
| P2 | chr14 | 88652179  | 88652179  | G | A | synonymous SNV    | KCNK10   | NM_021161    | exon7  | c.C1317T  | p.S439S  |

|    |       |           |           |   |   |                   |           |              |        |           |          |
|----|-------|-----------|-----------|---|---|-------------------|-----------|--------------|--------|-----------|----------|
| P2 | chr9  | 2718329   | 2718329   | G | A | nonsynonymous SNV | KCNV2     | NM_133497    | exon1  | c.G590A   | p.R197H  |
| P2 | chr9  | 2718811   | 2718811   | G | A | nonsynonymous SNV | KCNV2     | NM_133497    | exon1  | c.G1072A  | p.E358K  |
| P2 | chr5  | 93731993  | 93731993  | C | A | nonsynonymous SNV | KIAA0825  | NM_001145678 | exon17 | c.G3109T  | p.G1037C |
| P2 | chr4  | 123109168 | 123109168 | T | A | nonsynonymous SNV | KIAA1109  | NM_015312    | exon7  | c.T746A   | p.I249N  |
| P2 | chr7  | 86548553  | 86548553  | C | T | synonymous SNV    | KIAA1324L | NM_001291991 | exon10 | c.G753A   | p.L251L  |
| P2 | chr8  | 12878748  | 12878748  | G | C | nonsynonymous SNV | KIAA1456  | NM_020844    | exon5  | c.G560C   | p.G187A  |
| P2 | chr17 | 51901021  | 51901021  | G | A | synonymous SNV    | KIF2B     | NM_032559    | exon1  | c.G627A   | p.P209P  |
| P2 | chr16 | 57800795  | 57800795  | G | A | nonsynonymous SNV | KIFC3     | NM_001130100 | exon10 | c.C1321T  | p.R441W  |
| P2 | chr7  | 151860143 | 151860143 | G | A | stopgain          | KMT2C     | NM_170606    | exon43 | c.C10519T | p.R3507X |
| P2 | chr20 | 60897810  | 60897810  | G | A | synonymous SNV    | LAMA5     | NM_005560    | exon46 | c.C6069T  | p.C2023C |
| P2 | chr1  | 226127223 | 226127223 | C | T | nonsynonymous SNV | LEFTY2    | NM_001172425 | exon4  | c.G473A   | p.R158Q  |
| P2 | chr20 | 62369231  | 62369231  | G | T | nonsynonymous SNV | LIME1     | NM_017806    | exon3  | c.G156T   | p.Q52H   |
| P2 | chr7  | 141830756 | 141830756 | C | T | synonymous SNV    | LOC93432  | NM_001293626 | exon4  | c.C195T   | p.C65C   |
| P2 | chr7  | 141921015 | 141921015 | C | T | nonsynonymous SNV | LOC93432  | NM_001293626 | exon48 | c.C6704T  | p.A2235V |
| P2 | chr8  | 23198655  | 23198655  | C | T | nonsynonymous SNV | LOXL2     | NM_002318    | exon4  | c.G593A   | p.R198H  |
| P2 | chr2  | 74762810  | 74762810  | G | A | nonsynonymous SNV | LOXL3     | NM_032603    | exon8  | c.C1321T  | p.R441C  |
| P2 | chr3  | 188242554 | 188242554 | C | A | synonymous SNV    | LPP       | NM_001167672 | exon4  | c.C408A   | p.P136P  |
| P2 | chr3  | 188478021 | 188478021 | A | G | nonsynonymous SNV | LPP       | NM_001167672 | exon7  | c.A920G   | p.Q307R  |
| P2 | chr3  | 197541786 | 197541786 | G | A | synonymous SNV    | LRCH3     | NM_032773    | exon2  | c.G270A   | p.S90S   |
| P2 | chr12 | 12284925  | 12284925  | G | T | nonsynonymous SNV | LRP6      | NM_002336    | exon18 | c.C3800A  | p.A1267D |
| P2 | chr1  | 3703590   | 3703590   | G | A | synonymous SNV    | LRRRC47   | NM_020710    | exon2  | c.C900T   | p.D300D  |
| P2 | chr15 | 101514116 | 101514116 | G | A | nonsynonymous SNV | LRRK1     | NM_024652    | exon3  | c.G205A   | p.G69S   |
| P2 | chr21 | 47642621  | 47642621  | G | A | synonymous SNV    | LSS       | NM_001145437 | exon3  | c.C111T   | p.I37I   |
| P2 | chr2  | 33588519  | 33588519  | C | T | nonsynonymous SNV | LTBP1     | NM_001166266 | exon24 | c.C3070T  | p.R1024W |
| P2 | chr10 | 102762419 | 102762419 | C | G | nonsynonymous SNV | LZTS2     | NM_032429    | exon2  | c.C124G   | p.P42A   |
| P2 | chr19 | 12760769  | 12760769  | C | T | nonsynonymous SNV | MAN2B1    | NM_001173498 | exon18 | c.G2222A  | p.R741H  |
| P2 | chr11 | 65374772  | 65374772  | G | A | synonymous SNV    | MAP3K11   | NM_002419    | exon5  | c.C1458T  | p.R486R  |
| P2 | chr6  | 161519381 | 161519381 | C | T | nonsynonymous SNV | MAP3K4    | NM_001301072 | exon17 | c.C3584T  | p.A1195V |
| P2 | chr2  | 32094946  | 32094946  | C | T | nonsynonymous SNV | MEMO1     | NM_001137602 | exon7  | c.G664A   | p.G222R  |
| P2 | chr1  | 40431585  | 40431585  | G | A | nonsynonymous SNV | MFSD2A    | NM_001287808 | exon4  | c.G145A   | p.V49M   |
| P3 | chr13 | 24453442  | 24453442  | A | G | synonymous SNV    | MIPEP     | NM_005932    | exon4  | c.T504C   | p.D168D  |
| P2 | chr21 | 37713754  | 37713754  | C | T | synonymous SNV    | MORC3     | NM_015358    | exon6  | c.C666T   | p.P222P  |
| P2 | chr8  | 16035397  | 16035397  | G | A | nonsynonymous SNV | MSR1      | NM_002445    | exon2  | c.C101T   | p.P34L   |
| P2 | chr1  | 17085485  | 17085485  | G | A | synonymous SNV    | MST1L     | NM_001271733 | exon10 | c.C1206T  | p.A402A  |
| P2 | chr8  | 66620167  | 66620167  | G | A | nonsynonymous SNV | MTFR1     | NM_001145838 | exon5  | c.G755A   | p.R252Q  |
| P3 | chr17 | 56585872  | 56585872  | G | C | nonsynonymous SNV | MTRM4     | NM_004687    | exon7  | c.C508G   | p.L170V  |
| P3 | chr4  | 71347270  | 71347270  | A | C | nonsynonymous SNV | MUC7      | NM_152291    | exon3  | c.A809C   | p.D270A  |
| P2 | chr14 | 23855715  | 23855715  | G | A | nonsynonymous SNV | MYH6      | NM_002471    | exon33 | c.C4768T  | p.R1590C |
| P2 | chr17 | 27442424  | 27442424  | T | C | nonsynonymous SNV | MYO18A    | NM_078471    | exon13 | c.A2263G  | p.M755V  |
| P2 | chr20 | 44695742  | 44695742  | G | A | nonsynonymous SNV | NCOA5     | NM_020967    | exon5  | c.C581T   | p.A194V  |
| P2 | chr20 | 33345744  | 33345744  | C | T | synonymous SNV    | NCOA6     | NM_001242539 | exon7  | c.G807A   | p.Q269Q  |
| P2 | chr5  | 149932868 | 149932868 | C | T | stopgain          | NDST1     | NM_001301063 | exon14 | c.C2452T  | p.R818X  |
| P2 | chr14 | 75558144  | 75558144  | G | A | synonymous SNV    | NEK9      | NM_033116    | exon19 | c.C2271T  | p.G757G  |
| P2 | chr4  | 1985200   | 1985200   | A | T | nonsynonymous SNV | NELFA     | NM_005663    | exon11 | c.T1466A  | p.I489N  |
| P2 | chr17 | 46136248  | 46136248  | G | A | nonsynonymous SNV | NFE2L1    | NM_003204    | exon6  | c.G1564A  | p.G522S  |
| P2 | chr3  | 52522104  | 52522104  | C | T | nonsynonymous SNV | NISCH     | NM_007184    | exon16 | c.C2596T  | p.R866C  |
| P2 | chr6  | 28227287  | 28227287  | C | T | synonymous SNV    | NKAPL     | NM_001007531 | exon1  | c.C138T   | p.R46R   |
| P2 | chr19 | 55451566  | 55451566  | C | T | synonymous SNV    | NLRP7     | NM_206828    | exon4  | c.G621A   | p.A207A  |
| P2 | chr19 | 36339049  | 36339049  | C | T | stopgain          | NPHS1     | NM_004646    | exon11 | c.G1334A  | p.W445X  |
| P2 | chr7  | 24329150  | 24329150  | T | C | nonsynonymous SNV | NPY       | NM_000905    | exon3  | c.T221C   | p.I74T   |
| P2 | chr9  | 102595040 | 102595040 | C | T | stopgain          | NR4A3     | NM_173200    | exon5  | c.C1054T  | p.R352X  |
| P2 | chr10 | 123720940 | 123720940 | G | A | nonsynonymous SNV | NSMCE4A   | NM_001167865 | exon7  | c.C937T   | p.R313W  |
| P2 | chr12 | 96077428  | 96077428  | C | T | nonsynonymous SNV | NTN4      | NM_021229    | exon6  | c.G1240A  | p.D414N  |
| P2 | chr12 | 121458570 | 121458570 | C | T | nonsynonymous SNV | OASL      | NM_001261825 | exon4  | c.G949A   | p.A317T  |
| P2 | chr1  | 228494778 | 228494778 | C | A | nonsynonymous SNV | OBSCN     | NM_001271223 | exon56 | c.C14974A | p.L4992M |
| P2 | chr12 | 123463440 | 123463440 | C | T | synonymous SNV    | OGFOD2    | NM_024623    | exon7  | c.C492T   | p.Y164Y  |
| P2 | chr9  | 95179704  | 95179704  | C | T | nonsynonymous SNV | OMD       | NM_005014    | exon2  | c.G137A   | p.R46H   |
| P2 | chr3  | 193364934 | 193364934 | G | A | nonsynonymous SNV | OPA1      | NM_130833    | exon17 | c.G1673A  | p.R558Q  |
| P2 | chr11 | 6816103   | 6816103   | G | T | synonymous SNV    | OR6A2     | NM_003696    | exon1  | c.C837A   | p.V279V  |
| P2 | chr12 | 122064670 | 122064670 | C | A | nonsynonymous SNV | ORAI1     | NM_032790    | exon1  | c.C23A    | p.P8H    |
| P2 | chr11 | 3141665   | 3141665   | C | T | nonsynonymous SNV | OSBPL5    | NM_020896    | exon6  | c.G592A   | p.V198I  |
| P2 | chr11 | 73980711  | 73980711  | C | T | nonsynonymous SNV | P4HA3     | NM_182904    | exon11 | c.G1453A  | p.V485M  |
| P2 | chr17 | 79803557  | 79803557  | C | T | synonymous SNV    | P4HB      | NM_000918    | exon9  | c.G1239A  | p.T413T  |
| P2 | chr1  | 2453189   | 2453189   | C | T | nonsynonymous SNV | PANK4     | NM_018216    | exon2  | c.G175A   | p.A59T   |
| P2 | chr5  | 140237805 | 140237805 | G | A | synonymous SNV    | PCDHA10   | NM_031859    | exon1  | c.G2172A  | p.A724A  |
| P2 | chr5  | 140751739 | 140751739 | C | T | nonsynonymous SNV | PCDHGB3   | NM_032097    | exon1  | c.C1778T  | p.A593V  |
| P2 | chr5  | 140857873 | 140857873 | G | A | synonymous SNV    | PCDHGC3   | NM_032402    | exon1  | c.G2190A  | p.P730P  |
| P2 | chr3  | 33886989  | 33886989  | G | A | nonsynonymous SNV | PDCD6IP   | NM_001162429 | exon12 | c.G1565A  | p.R522H  |
| P2 | chr15 | 85660946  | 85660946  | C | T | nonsynonymous SNV | PDE8A     | NM_001243137 | exon17 | c.C1394T  | p.T465M  |
| P2 | chr5  | 176917897 | 176917897 | C | T | synonymous SNV    | PDLIM7    | NM_203352    | exon7  | c.C444A   | p.P148P  |
| P2 | chr19 | 7553881   | 7553881   | C | A | nonsynonymous SNV | PEX11G    | NM_001270539 | exon1  | c.G16T    | p.G6C    |
| P2 | chr3  | 179689389 | 179689389 | T | C | nonsynonymous SNV | PEX5L     | NM_016559    | exon2  | c.A86G    | p.Q29R   |
| P2 | chr12 | 48534546  | 48534546  | G | A | synonymous SNV    | PFKM      | NM_001166688 | exon13 | c.G1233A  | p.P411P  |
| P2 | chr11 | 3832637   | 3832637   | A | T | nonsynonymous SNV | PGAP2     | NM_001145438 | exon3  | c.A319T   | p.T107S  |
| P2 | chr13 | 50087264  | 50087264  | G | C | nonsynonymous SNV | PHF11     | NM_001040444 | exon4  | c.G169C   | p.E57Q   |
| P2 | chr11 | 118516526 | 118516526 | C | T | nonsynonymous SNV | PHLDB1    | NM_001144758 | exon17 | c.C3490T  | p.R1164W |
| P2 | chr19 | 43982212  | 43982212  | C | T | nonsynonymous SNV | PHLDB3    | NM_198850    | exon15 | c.G1775A  | p.R592H  |
| P2 | chr4  | 527610    | 527610    | A | G | nonsynonymous SNV | PILG      | NM_001127178 | exon12 | c.A2575G  | p.N859D  |
| P3 | chr19 | 44082791  | 44082791  | T | C | synonymous SNV    | PINLYP    | NM_001193621 | exon3  | c.T192C   | p.H64H   |
| P2 | chr8  | 22212997  | 22212997  | C | T | synonymous SNV    | PIWIL2    | NM_001135721 | exon23 | c.C2901T  | p.C967C  |
| P2 | chr8  | 145024752 | 145024752 | G | A | synonymous SNV    | PLEC      | NM_201380    | exon1  | c.C123T   | p.P41P   |
| P2 | chr3  | 48465810  | 48465810  | C | T | nonsynonymous SNV | P�XNB1    | NM_002673    | exon3  | c.G211A   | p.G71S   |

|    |       |           |           |   |   |                   |               |              |         |           |          |
|----|-------|-----------|-----------|---|---|-------------------|---------------|--------------|---------|-----------|----------|
| P2 | chrX  | 153037428 | 153037428 | G | A | nonsynonymous SNV | PLXNB3        | NM_001163257 | exon16  | c.G2696A  | p.R899Q  |
| P2 | chr9  | 140357909 | 140357909 | C | T | nonsynonymous SNV | PNPLA7        | NM_152286    | exon28  | c.G3226A  | p.G1076R |
| P2 | chr9  | 140409916 | 140409916 | G | A | synonymous SNV    | PNPLA7        | NM_152286    | exon11  | c.C1065T  | p.S355S  |
| P2 | chr10 | 79769417  | 79769417  | G | A | nonsynonymous SNV | POLR3A        | NM_007055    | exon14  | c.C1787T  | p.T596M  |
| P2 | chr19 | 621497    | 621497    | G | A | nonsynonymous SNV | POLRMT        | NM_005035    | exon10  | c.C2201T  | p.P734L  |
| P2 | chr8  | 128429072 | 128429072 | A | G | nonsynonymous SNV | POU5F1B       | NM_001159542 | exon1   | c.A961G   | p.T321A  |
| P2 | chr3  | 20043420  | 20043420  | T | C | synonymous SNV    | PP2D1         | NM_001252657 | exon2   | c.A192G   | p.L64L   |
| P2 | chr5  | 149206366 | 149206366 | C | T | nonsynonymous SNV | PPARGC1B      | NM_001172698 | exon3   | c.C383T   | p.S128L  |
| P2 | chr11 | 70224300  | 70224300  | C | T | synonymous SNV    | PPFIA1        | NM_177423    | exon26  | c.C3549T  | p.D1183D |
| P2 | chr12 | 81653435  | 81653435  | G | A | synonymous SNV    | PPFIA2        | NM_001220473 | exon31  | c.C3720T  | p.G1240G |
| P4 | chr19 | 49643309  | 49643309  | C | T | stopgain          | PPFIA3        | NM_003660    | exon18  | c.C2332T  | p.R778X  |
| P2 | chr12 | 27820121  | 27820121  | G | T | nonsynonymous SNV | PPFIBP1       | NM_003622    | exon13  | c.G1014T  | p.E338D  |
| P2 | chr1  | 12853385  | 12853385  | C | T | synonymous SNV    | PRAMEF1       | NM_023013    | exon2   | c.C9T     | p.I3I    |
| P2 | chr1  | 12921367  | 12921367  | C | A | nonsynonymous SNV | PRAMEF2       | NM_023014    | exon4   | c.C1158A  | p.S386R  |
| P2 | chr1  | 12921387  | 12921387  | C | T | nonsynonymous SNV | PRAMEF2       | NM_023014    | exon4   | c.C1178T  | p.A393V  |
| P2 | chr1  | 12921451  | 12921451  | C | T | synonymous SNV    | PRAMEF2       | NM_023014    | exon4   | c.C1242T  | p.A414A  |
| P2 | chr6  | 57185336  | 57185336  | G | A | nonsynonymous SNV | PRIME2        | NM_001282488 | exon3   | c.C36A    | p.R79Q   |
| P2 | chr4  | 16026930  | 16026930  | C | T | nonsynonymous SNV | PROM1         | NM_001145850 | exon5   | c.G515A   | p.G172D  |
| P2 | chr2  | 95954292  | 95954292  | C | T | nonsynonymous SNV | PROM2         | NM_144707    | exon22  | c.C2396T  | p.A799V  |
| P2 | chr2  | 95954294  | 95954294  | G | A | nonsynonymous SNV | PROM2         | NM_144707    | exon22  | c.G2398A  | p.V800I  |
| P2 | chr16 | 30666043  | 30666043  | G | A | nonsynonymous SNV | PRR14         | NM_024031    | exon8   | c.G752A   | p.R251H  |
| P2 | chr12 | 72176363  | 72176363  | G | A | nonsynonymous SNV | RAB21         | NM_014999    | exon6   | c.G460A   | p.V154M  |
| P3 | chr7  | 102232889 | 102232889 | T | C | nonsynonymous SNV | RASA4B        | NM_001277335 | exon16  | c.A1673G  | p.Q558R  |
| P3 | chr7  | 102246378 | 102246378 | C | T | nonsynonymous SNV | RASA4B        | NM_001277335 | exon5   | c.G355A   | p.E119K  |
| P2 | chr11 | 66411150  | 66411150  | G | A | synonymous SNV    | RBM14-RBM4    | NM_001198845 | exon2   | c.G567A   | p.A189A  |
| P2 | chr13 | 49085916  | 49085916  | C | T | nonsynonymous SNV | RCBTB2        | NM_001286832 | exon5   | c.G94A    | p.V32M   |
| P2 | chr5  | 98128962  | 98128962  | C | T | synonymous SNV    | RGMB          | NM_001012761 | exon5   | c.C942T   | p.A314A  |
| P2 | chr1  | 26881684  | 26881684  | C | T | nonsynonymous SNV | RPS6KA1       | NM_002953    | exon10  | c.C799T   | p.R267W  |
| P2 | chr1  | 218504376 | 218504376 | G | T | nonsynonymous SNV | RRP15         | NM_016052    | exon5   | c.G792T   | p.K264N  |
| P4 | chr21 | 45108081  | 45108081  | A | G | nonsynonymous SNV | RRP1B         | NM_015056    | exon13  | c.A1826G  | p.N609S  |
| P4 | chr11 | 63487376  | 63487376  | G | A | nonsynonymous SNV | RTN3          | NM_001265589 | exon3   | c.G1402A  | p.V468M  |
| P2 | chr3  | 187088638 | 187088638 | C | T | nonsynonymous SNV | RTP4          | NM_022147    | exon2   | c.C218T   | p.T73M   |
| P2 | chr18 | 76753731  | 76753731  | C | T | synonymous SNV    | SALL3         | NM_171999    | exon2   | c.C1740T  | p.T580T  |
| P2 | chr11 | 10014581  | 10014581  | G | A | stopgain          | SBF2          | NM_030962    | exon11  | c.C1123T  | p.Q375X  |
| P2 | chr17 | 71361403  | 71361403  | C | T | nonsynonymous SNV | SDK2          | NM_001144952 | exon38  | c.G5299A  | p.V1767M |
| P2 | chr17 | 71382626  | 71382626  | C | T | nonsynonymous SNV | SDK2          | NM_001144952 | exon31  | c.G4456A  | p.E1486K |
| P2 | chr1  | 156142697 | 156142697 | G | A | synonymous SNV    | SEMA4A        | NM_001193300 | exon11  | c.G1215A  | p.T405T  |
| P2 | chr3  | 47164963  | 47164963  | C | T | nonsynonymous SNV | SETD2         | NM_014159    | exon3   | c.G1163A  | p.R388Q  |
| P2 | chr3  | 20225420  | 20225420  | C | A | nonsynonymous SNV | SGOL1         | NM_001199257 | exon2   | c.G100T   | p.G34C   |
| P2 | chr17 | 7534963   | 7534963   | C | T | synonymous SNV    | SHBG          | NM_001146280 | exon5   | c.C612T   | p.A204A  |
| P2 | chr19 | 55944952  | 55944952  | C | T | synonymous SNV    | SHISA7        | NM_001145176 | exon4   | c.G1188A  | p.S396S  |
| P2 | chr4  | 77661881  | 77661881  | A | G | nonsynonymous SNV | SHROOM3       | NM_020859    | exon5   | c.A2555G  | p.E852G  |
| P2 | chr20 | 44685925  | 44685925  | G | A | nonsynonymous SNV | SLC12A5       | NM_001134771 | exon25  | c.G3311A  | p.R1104H |
| P2 | chr11 | 793531    | 793531    | G | A | synonymous SNV    | SLC25A22      | NM_024698    | exon5   | c.C291T   | p.D97D   |
| P2 | chr6  | 35911729  | 35911729  | C | T | nonsynonymous SNV | SLC26A8       | NM_001193476 | exon20  | c.G2861A  | p.R954H  |
| P2 | chr9  | 131118031 | 131118031 | C | T | nonsynonymous SNV | SLC27A4       | NM_005094    | exon12  | c.C1730T  | p.A577V  |
| P2 | chr12 | 7967015   | 7967015   | C | T | nonsynonymous SNV | SLC2A14       | NM_001286236 | exon10  | c.C1133A  | p.R378Q  |
| P2 | chr6  | 88210308  | 88210308  | G | A | nonsynonymous SNV | SLC35A1       | NM_006416    | exon3   | c.G277A   | p.V93M   |
| P2 | chr5  | 150856184 | 150856184 | C | T | nonsynonymous SNV | SLC36A1       | NM_078483    | exon9   | c.C856T   | p.R286W  |
| P2 | chr21 | 43999880  | 43999880  | G | A | nonsynonymous SNV | SLC37A1       | NM_018964    | exon20  | c.G1556A  | p.C519Y  |
| P2 | chr12 | 56630942  | 56630942  | G | A | nonsynonymous SNV | SLC39A5       | NM_173596    | exon12  | c.G1297A  | p.A433T  |
| P2 | chr11 | 57254576  | 57254576  | G | A | nonsynonymous SNV | SLC43A1       | NM_003627    | exon14  | c.C1525T  | p.P509S  |
| P2 | chr12 | 48172839  | 48172839  | G | A | synonymous SNV    | SLC48A1       | NM_017842    | exon2   | c.G165A   | p.T55T   |
| P2 | chr12 | 101595962 | 101595962 | G | T | nonsynonymous SNV | SLC5A8        | NM_145913    | exon3   | c.C449A   | p.P150H  |
| P2 | chr1  | 110737350 | 110737350 | G | A | synonymous SNV    | SLC6A17       | NM_001010898 | exon9   | c.G1449A  | p.T483T  |
| P2 | chr10 | 98799812  | 98799812  | C | T | nonsynonymous SNV | SLIT1         | NM_003061    | exon21  | c.G2230A  | p.V744M  |
| P2 | chr3  | 164908587 | 164908587 | C | A | nonsynonymous SNV | SLITRK3       | NM_014926    | exon2   | c.G32T    | p.R11I   |
| P2 | chr5  | 176056580 | 176056580 | C | T | nonsynonymous SNV | SNCB          | NM_001001502 | exon3   | c.G76A    | p.V26I   |
| P3 | chr6  | 158357041 | 158357041 | A | G | nonsynonymous SNV | SNX9          | NM_016224    | exon14  | c.A1412G  | p.Y471C  |
| P1 | chr1  | 109890149 | 109890149 | G | A | nonsynonymous SNV | SORT1         | NM_001205228 | exon7   | c.C380T   | p.S127L  |
| P2 | chr4  | 52926593  | 52926593  | G | A | synonymous SNV    | SPATA18       | NM_145263    | exon2   | c.G96A    | p.T32T   |
| P2 | chr9  | 90538055  | 90538055  | C | T | nonsynonymous SNV | SPATA31C1     | NM_001145124 | exon4   | c.C3233T  | p.A1078V |
| P2 | chr1  | 32256451  | 32256451  | C | T | nonsynonymous SNV | SPOCD1        | NM_001281987 | exon16  | c.G3365A  | p.R1122H |
| P2 | chr12 | 53461960  | 53461960  | G | A | synonymous SNV    | SPRYD3        | NM_032840    | exon7   | c.C822T   | p.I274I  |
| P2 | chr19 | 411029363 | 411029363 | C | G | nonsynonymous SNV | SPBTN4        | NM_020971    | exon17  | c.C3674G  | p.A1225G |
| P2 | chr5  | 179260189 | 179260189 | G | A | synonymous SNV    | SQSTM1        | NM_001142298 | exon7   | c.C660A   | p.T220T  |
| P2 | chr14 | 35482700  | 35482700  | C | T | nonsynonymous SNV | SRP54         | NM_003136    | exon9   | c.C785T   | p.A262V  |
| P2 | chr15 | 42983298  | 42983298  | G | A | synonymous SNV    | STARDB        | NM_020759    | exon23  | c.G9522A  | p.K3174K |
| P2 | chr12 | 56750351  | 56750351  | G | A | nonsynonymous SNV | STAT2         | NM_005419    | exon2   | c.C5T     | p.A2V    |
| P2 | chr2  | 48808621  | 48808621  | T | C | synonymous SNV    | STON1-GTF2A1L | NM_001198594 | exon1   | c.T849C   | p.P283P  |
| P2 | chr9  | 130440720 | 130440720 | G | A | nonsynonymous SNV | STXBP1        | NM_001032221 | exon16  | c.G1370A  | p.R457H  |
| P2 | chr20 | 46318966  | 46318966  | C | A | nonsynonymous SNV | SULF2         | NM_198596    | exon5   | c.G641T   | p.R214M  |
| P2 | chr6  | 152557290 | 152557290 | A | G | nonsynonymous SNV | SYNE1         | NM_033071    | exon109 | c.T20135C | p.M6712T |
| P3 | chr19 | 36497373  | 36497373  | A | G | synonymous SNV    | SYNE4         | NM_001297735 | exon3   | c.T480C   | p.C160C  |
| P2 | chr6  | 132966980 | 132966980 | G | T | nonsynonymous SNV | TAAR1         | NM_138327    | exon1   | c.C163A   | p.H55N   |
| P2 | chr10 | 123843251 | 123843251 | G | A | synonymous SNV    | TACC2         | NM_001291877 | exon4   | c.G1236A  | p.P412P  |
| P1 | chr12 | 11183722  | 11183722  | A | C | nonsynonymous SNV | TAS2R31       | NM_176885    | exon1   | c.T213G   | p.F71L   |
| P4 | chr12 | 11183421  | 11183421  | C | T | nonsynonymous SNV | TAS2R31       | NM_176885    | exon1   | c.G514A   | p.V172M  |
| P4 | chr12 | 11183427  | 11183427  | T | G | nonsynonymous SNV | TAS2R31       | NM_176885    | exon1   | c.A508C   | p.S170R  |
| P2 | chr17 | 59482684  | 59482684  | C | T | synonymous SNV    | TBX2          | NM_005994    | exon6   | c.C1173T  | p.T391T  |
| P2 | chr5  | 149755432 | 149755432 | C | T | nonsynonymous SNV | TCOF1         | NM_001135244 | exon12  | c.C1853T  | p.A618V  |
| P2 | chr16 | 10729667  | 10729667  | T | C | nonsynonymous SNV | TKO5          | NM_144674    | exon6   | c.A1195G  | p.T399A  |

|    |       |           |           |   |   |                   |           |              |         |           |           |
|----|-------|-----------|-----------|---|---|-------------------|-----------|--------------|---------|-----------|-----------|
| P2 | chr4  | 183601429 | 183601429 | C | T | synonymous SNV    | TENM3     | NM_001080477 | exon8   | c.C1566T  | p.C522C   |
| P2 | chr4  | 183675584 | 183675584 | A | G | nonsynonymous SNV | TENM3     | NM_001080477 | exon21  | c.A4064G  | p.N1355S  |
| P2 | chr2  | 74328243  | 74328243  | G | T | nonsynonymous SNV | TET3      | NM_001287491 | exon11  | c.G4328T  | p.S1443I  |
| P2 | chr8  | 133953708 | 133953708 | C | T | synonymous SNV    | TG        | NM_003235    | exon26  | c.C5154T  | p.T1718T  |
| P2 | chr15 | 90168813  | 90168813  | A | G | nonsynonymous SNV | TICRR     | NM_152259    | exon20  | c.A5272G  | p.K1758E  |
| P2 | chr6  | 43466794  | 43466794  | C | T | nonsynonymous SNV | TJAP1     | NM_001146018 | exon5   | c.C55T    | p.R19W    |
| P2 | chr4  | 186997978 | 186997978 | G | A | nonsynonymous SNV | TLR3      | NM_003265    | exon2   | c.G205A   | p.A69T    |
| P2 | chr10 | 98287041  | 98287041  | T | C | nonsynonymous SNV | TM9SF3    | NM_020123    | exon14  | c.A1631G  | p.Y544C   |
| P2 | chr1  | 9661353   | 9661353   | C | A | nonsynonymous SNV | TMEM201   | NM_001010866 | exon5   | c.C797A   | p.P266H   |
| P3 | chr12 | 83251095  | 83251095  | G | A | synonymous SNV    | TMTC2     | NM_152588    | exon2   | c.G390A   | p.T130T   |
| P2 | chr9  | 117848307 | 117848307 | T | C | nonsynonymous SNV | TNC       | NM_002160    | exon3   | c.A1703G  | p.H568R   |
| P2 | chr1  | 151131714 | 151131714 | G | A | nonsynonymous SNV | TNFAIP8L2 | NM_024575    | exon2   | c.G541A   | p.E181K   |
| P2 | chr8  | 22974499  | 22974499  | C | T | synonymous SNV    | TNFRSF10C | NM_003841    | exon5   | c.C735T   | p.I245I   |
| P2 | chr7  | 5415779   | 5415779   | G | A | synonymous SNV    | TNRC18    | NM_001080495 | exon9   | c.C2685T  | p.H895H   |
| P2 | chr9  | 140174129 | 140174129 | G | A | nonsynonymous SNV | TOR4A     | NM_017723    | exon2   | c.G988A   | p.E330K   |
| P4 | chr17 | 7578406   | 7578406   | C | T | nonsynonymous SNV | TP53      | NM_001126115 | exon1   | c.G128A   | p.R43H    |
| P2 | chr3  | 36898406  | 36898406  | G | A | nonsynonymous SNV | TRANK1    | NM_014831    | exon12  | c.C2675T  | p.T892M   |
| P2 | chr6  | 42236388  | 42236388  | A | T | nonsynonymous SNV | TRERF1    | NM_001297574 | exon5   | c.T941A   | p.L314Q   |
| P4 | chr22 | 38120429  | 38120429  | T | C | synonymous SNV    | TRIOBP    | NM_001039141 | exon7   | c.T1866C  | p.D622D   |
| P2 | chr3  | 101284699 | 101284699 | T | C | synonymous SNV    | TRMT10C   | NM_017819    | exon2   | c.T1074C  | p.R358R   |
| P2 | chr17 | 16330832  | 16330832  | C | T | synonymous SNV    | TRPV2     | NM_016113    | exon8   | c.C1321T  | p.L441L   |
| P2 | chr7  | 128802240 | 128802240 | G | A | nonsynonymous SNV | TSPAN33   | NM_178562    | exon3   | c.G166A   | p.A56T    |
| P2 | chr5  | 112769438 | 112769438 | G | T | nonsynonymous SNV | TSSK1B    | NM_032028    | exon1   | c.C1099A  | p.Q367K   |
| P2 | chr2  | 179418902 | 179418902 | T | C | nonsynonymous SNV | TTN       | NM_001256850 | exon283 | c.A84013G | p.T28005A |
| P2 | chr2  | 220116419 | 220116419 | G | A | synonymous SNV    | TUBA4A    | NM_006000    | exon3   | c.C243T   | p.G81G    |
| P1 | chr1  | 162557345 | 162557345 | T | A | nonsynonymous SNV | UAP1      | NM_003115    | exon6   | c.T915A   | p.S305R   |
| P2 | chr1  | 11345759  | 11345759  | G | A | synonymous SNV    | UBIAD1    | NM_013319    | exon2   | c.G588A   | p.P196P   |
| P2 | chr16 | 4910928   | 4910928   | C | T | nonsynonymous SNV | UBN1      | NM_001288656 | exon7   | c.C935T   | p.T312M   |
| P2 | chr2  | 170936456 | 170936456 | G | T | nonsynonymous SNV | UBR3      | NM_172070    | exon37  | c.G5332T  | p.V1778F  |
| P2 | chr2  | 128903396 | 128903396 | A | G | nonsynonymous SNV | UGGT1     | NM_020120    | exon18  | c.A1871G  | p.E624G   |
| P2 | chr9  | 6497255   | 6497255   | G | C | synonymous SNV    | UHRF2     | NM_152896    | exon11  | c.G1662C  | p.R554R   |
| P2 | chr17 | 73809925  | 73809925  | G | A | nonsynonymous SNV | UNK       | NM_001080419 | exon6   | c.G842A   | p.C281Y   |
| P2 | chr21 | 33706597  | 33706597  | G | A | nonsynonymous SNV | URB1      | NM_014825    | exon29  | c.C4732T  | p.R1578W  |
| P2 | chr6  | 133034996 | 133034996 | A | C | nonsynonymous SNV | VNN1      | NM_004666    | exon1   | c.T179G   | p.L60W    |
| P2 | chr3  | 51475690  | 51475690  | C | T | nonsynonymous SNV | VPRBP     | NM_001171904 | exon7   | c.G734A   | p.G245D   |
| P2 | chr12 | 122748206 | 122748206 | C | T | nonsynonymous SNV | VPS33A    | NM_022916    | exon3   | c.G209A   | p.R70H    |
| P2 | chr15 | 83478514  | 83478514  | G | A | stopgain          | WHAMM     | NM_001080435 | exon1   | c.G36A    | p.W12X    |
| P2 | chr8  | 10756026  | 10756026  | A | G | synonymous SNV    | XKR6      | NM_173683    | exon3   | c.T1362C  | p.A454A   |
| P2 | chr11 | 102100535 | 102100535 | G | T | nonsynonymous SNV | YAP1      | NM_006106    | exon7   | c.G1217T  | p.G406V   |
| P2 | chr12 | 10875506  | 10875506  | C | T | nonsynonymous SNV | YBX3      | NM_003651    | exon1   | c.G205A   | p.A69T    |
| P2 | chr1  | 154987895 | 154987895 | C | T | synonymous SNV    | ZBTB7B    | NM_001256455 | exon2   | c.C759T   | p.S253S   |
| P2 | chr14 | 75537900  | 75537900  | G | A | synonymous SNV    | ZC2HC1C   | NM_024643    | exon2   | c.G624A   | p.T208T   |
| P3 | chr5  | 840661    | 840661    | A | G | nonsynonymous SNV | ZDHHC11   | NM_024786    | exon5   | c.T733C   | p.F245L   |
| P2 | chr20 | 50768945  | 50768945  | C | T | nonsynonymous SNV | ZFP64     | NM_199426    | exon6   | c.G1780A  | p.E594K   |
| P2 | chr1  | 40928756  | 40928756  | T | C | nonsynonymous SNV | ZFP69B    | NM_023070    | exon5   | c.T1100C  | p.V367A   |
| P2 | chr3  | 124952610 | 124952610 | C | T | synonymous SNV    | ZNF148    | NM_021964    | exon9   | c.G960A   | p.T320T   |
| P2 | chr19 | 12243837  | 12243837  | C | T | synonymous SNV    | ZNF20     | NM_001203250 | exon4   | c.G1155A  | p.T385T   |
| P2 | chr11 | 123596938 | 123596938 | G | A | nonsynonymous SNV | ZNF202    | NM_001301780 | exon7   | c.C1714T  | p.R572C   |
| P2 | chr17 | 30696676  | 30696676  | G | A | synonymous SNV    | ZNF207    | NM_003457    | exon11  | c.G1335A  | p.P445P   |
| P2 | chr19 | 45575818  | 45575818  | A | G | synonymous SNV    | ZNF296    | NM_145288    | exon3   | c.T469C   | p.L157L   |
| P2 | chr19 | 57868510  | 57868510  | G | C | nonsynonymous SNV | ZNF304    | NM_020657    | exon3   | c.G1273C  | p.G425R   |
| P2 | chr20 | 44582471  | 44582471  | G | A | synonymous SNV    | ZNF335    | NM_022095    | exon18  | c.C2559T  | p.G853G   |
| P2 | chr19 | 44418260  | 44418260  | G | A | nonsynonymous SNV | ZNF45     | NM_003425    | exon10  | c.C1328T  | p.P443L   |
| P2 | chr15 | 64967247  | 64967247  | A | C | nonsynonymous SNV | ZNF609    | NM_015042    | exon4   | c.A2194C  | p.K732Q   |
| P2 | chr16 | 31090677  | 31090677  | T | C | nonsynonymous SNV | ZNF646    | NM_014699    | exon2   | c.T3032C  | p.I1011T  |
| P2 | chr8  | 37555536  | 37555536  | C | T | stopgain          | ZNF703    | NM_025069    | exon2   | c.C1117T  | p.Q373X   |
| P4 | chr3  | 75787576  | 75787576  | A | G | nonsynonymous SNV | ZNF717    | NM_001290208 | exon5   | c.T1198C  | p.C400R   |
| P2 | chr7  | 149557821 | 149557821 | G | A | synonymous SNV    | ZNF862    | NM_001099220 | exon7   | c.G1572A  | p.A524A   |
| P2 | chr19 | 22940393  | 22940393  | A | C | nonsynonymous SNV | ZNF99     | NM_001080409 | exon4   | c.T2318G  | p.F773C   |