# Genomic and outcome analysis of adult T-cell lymphoblastic lymphoma

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# Supplementary information

# for

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## Methods

**Samples.** A total of 96 formalin-fixed, paraffin-embedded (FFPE) tumor tissues from T-LBL patients were obtained at the time of diagnosis from the First Affiliated Hospital of Zhengzhou University. All cases were reviewed and interpreted independently by three experienced pathologists, and the diagnoses were made according to the current World Health Organization classification criteria. Patients with predisposing diseases e.g. constitutional mismatch repair deficiency syndrome (CMMRD), ataxia telangiectasia (AT) or Nijmegen Breakage syndrome (NBS) were excluded. The study was conducted in accordance with the Declaration of Helsinki and with approval of the Institutional Review Board of the First Affiliated Hospital of Zhengzhou University. Signed informed consent was obtained from patients.

**Whole-exome sequencing.** To identify somatic genomic variants associated with T-LBL, whole-exome sequencing (Novogene Bioinformatics Institute, Beijing, China) was performed using DNA extracted from 96 T-LBL patient tumor samples, and 41 paired normal tissue. The 41 cases with paired normal tissue were deemed a "discovery cohort," and the remaining samples a "validation cohort." Genomic DNA (1–1.5 μg) was fragmented with a Covaris ultrasonicator targeting peak sizes ranging from 180 to 280 bp. The fragment ends were blunted and 5′ ends were phosphorylated with T4 polynucleotide kinase, T4 DNA polymerase, and Klenow Large Fragment (New England BioLabs). The 3′ ends were A-tailed using Klenow Exo-Minus (New England BioLabs), and the fragments were ligated to Illumina paired-end adaptors. Ligation products were purified with Agencourt AMPure XP beads and enriched by PCR using the Illumina PCR primers InPE1.0 and InPE2.0 and PCR primer indices. Pooled, indexed libraries were captured using the Agilent SureSelect Human All Exon 50 Mb kit (Agilent Technologies) according to the manufacturer's protocol and sequenced on an Illumina HiSeq X Ten instrument, the sequencing read length is paired-end 150bp (PE150).

**Mutation calling and annotation.** Sequencing reads were aligned to the human reference genome (hg19, downloaded from the UCSC Genome Browser http://genome.ucsc.edu/) using the Burrows-Wheeler Aligner (BWA)[1] version 0.5.8 with default parameter settings. SAMtools was used to convert the SAM files into BAM files and to pile up sequences after local alignment[2]. The Picard command was used to remove PCR duplications. Next, insertion or deletion (InDel) realignment and base quality score recalibration were performed with the Gnome Analysis Toolkit (GATK) version 2.6.5[3]. In the discovery cohort, somatic single-nucleotide variations (SNV) and somatic InDels were called using MuTect[4] and Strelka[5], respectively. In the validation cohort, variants from the 55 non-paired tumor samples were filtered to remove those present in dbSNP v135 (www.ncbi.nlm.nih.gov/SNP/), ExAC (http://exac.broadinstitute.org), the 1000 Genomes Project (http://browser.1000genomes.org), or an in-house database containing germline variants identified in approximately 500 Chinese exomes. However, variants were kept if they were reported as somatic in the discovery cohort or previous studies on T-cell acute lymphoblastic leukemia (T-ALL) [6, 7]. These variants were also visually inspected with the Integrative Genomics Viewer (IGV, https://www.broadinstitute.org/igv/) to exclude probable sequencing artifacts. Gene mutation annotation of the identified variants was carried out using ANNOVAR[8] .

**Bioinformatics analysis.** The mutational signature analysis was performed using a Bayesian version of the non-matrix factorization method[9]. Analysis of significance of mutated genes was performed by the MuSiC prediction method[10], and with a false discovery rate (FDR) Q value less than 0.1 and $p<0.05$ considered significant.

**Sanger sequencing**

SNVs (variant allele frequency more than 15%) detected by whole-exome sequencing were validated by Sanger sequencing. Primers specific to the regions of interest were designed and synthesized by Genesky Biotechnologies Inc (Shanghai, China). PCR was performed using standard procedures followed by direct sequencing on an ABI 3730xl automatic sequencer (PE Applied Biosystems, Foster City, CA, USA).

**Statistical analysis.** All data were expressed as mean ± s.e.m. Comparisons between and among groups were performed with Student's t-test and analysis of variance (ANOVA), respectively. Associations between categorical values were examined using the chi-square test or Fisher's exact test. Overall survival (OS) rates and progression-free survival (PFS) were calculated using the Kaplan–Meier method, and the significance was assessed by the log-rank test. A multivariable analysis of PFS and OS was performed using the Cox proportional-hazards regression model. Because most patients were asymptomatic or completely ambulatory (ECOG-PS 0 or 1), and no patients with ECOG-PS score ≥3. Therefore, the parameter ECOG-PS was not included in this study. Statistical analysis was carried out using IBM SPSS Statistics 19 software (IBM Corp., Armonk, NY, USA) and the online statistics calculator VassarStats (www.vassarstats.net). $p<0.05$ was considered significant.

## Data availability

The data supporting the main findings of this study are available within the article and its Supplemental Information and Supplemental Data files. Whole-exome sequencing data were deposited into the NCBI Sequence Read Archive with the BioProject ID: PRJNA473585 and Title: T-cell lymphoma sequencing. All other data are available from the authors upon request.

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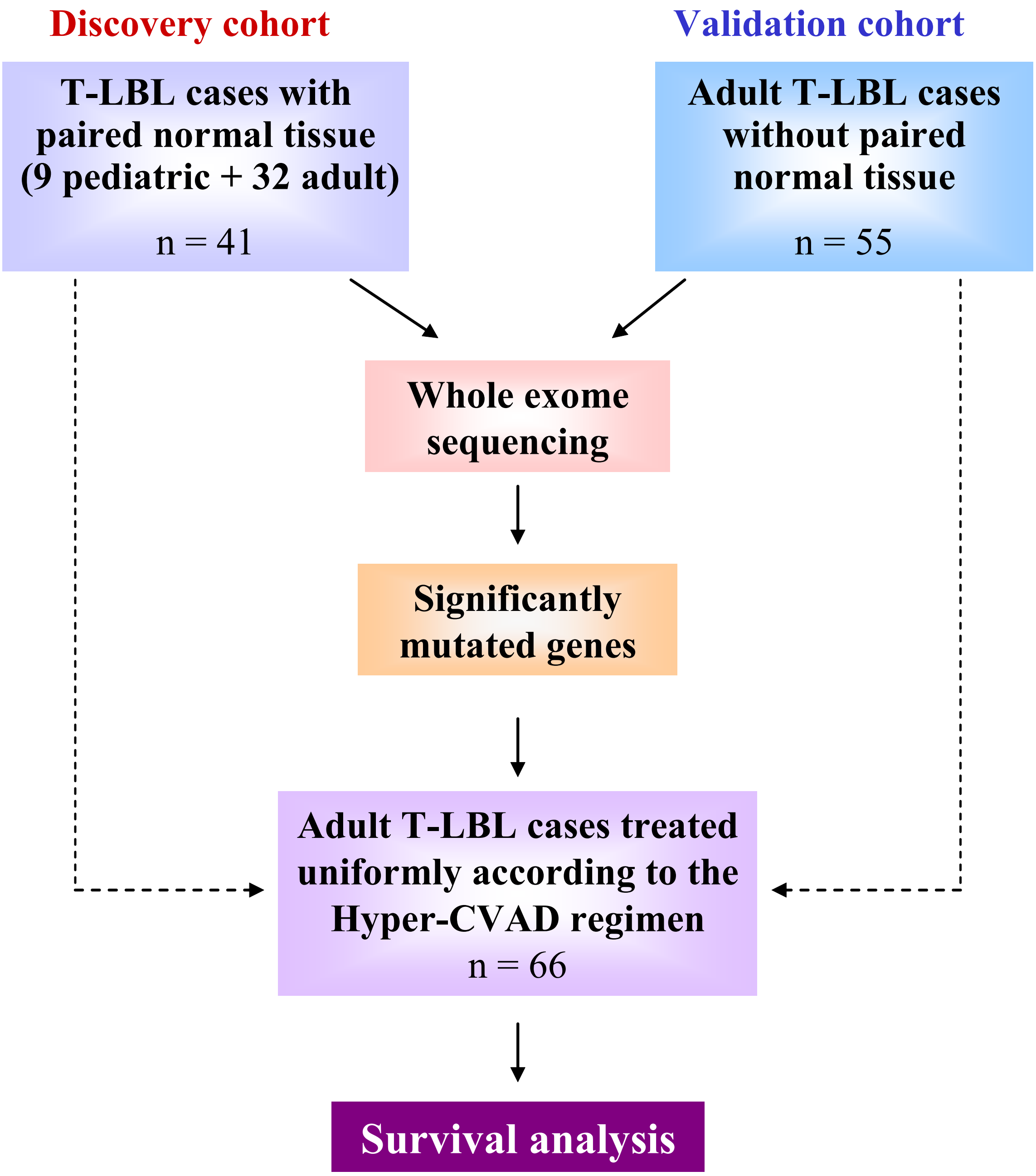
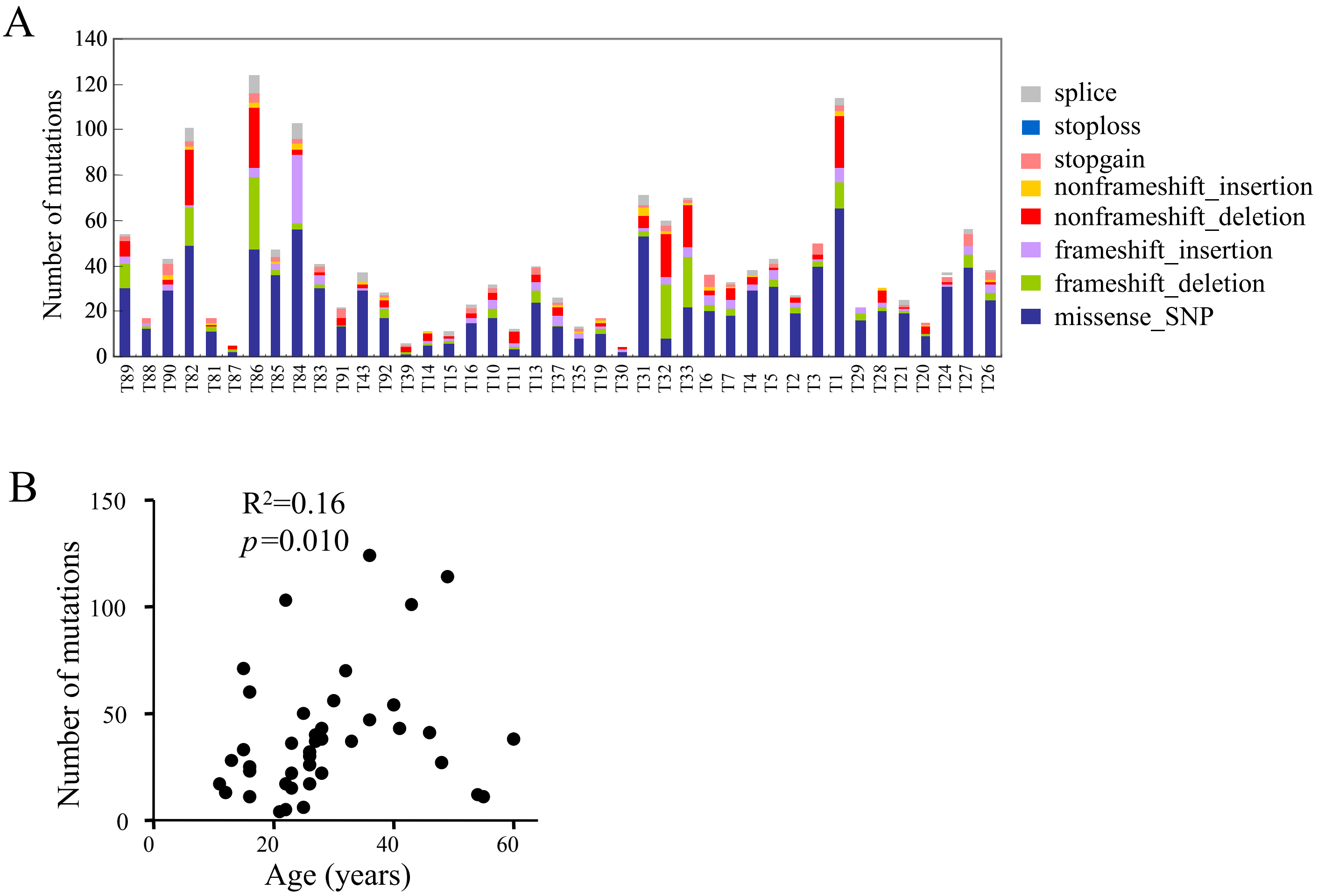
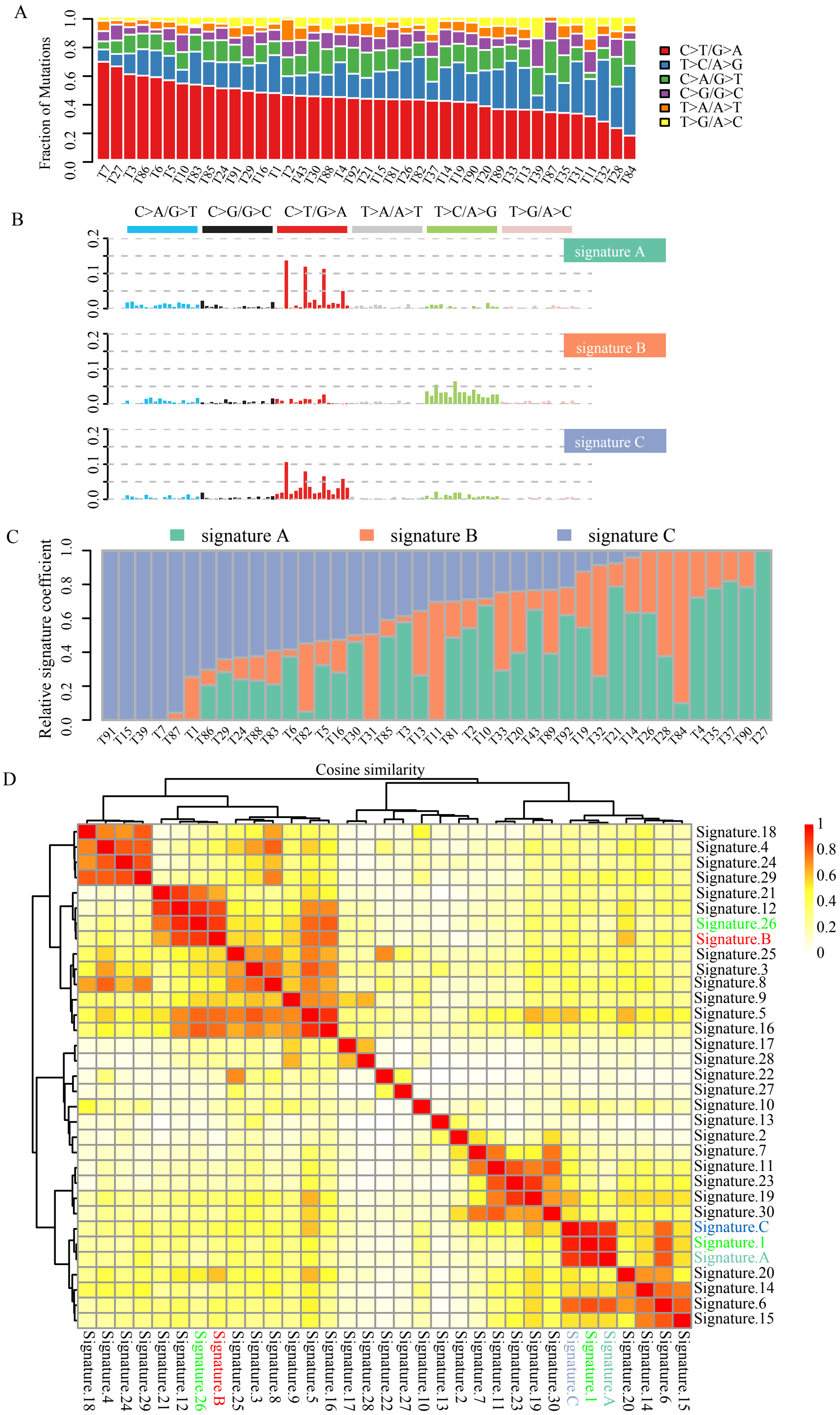


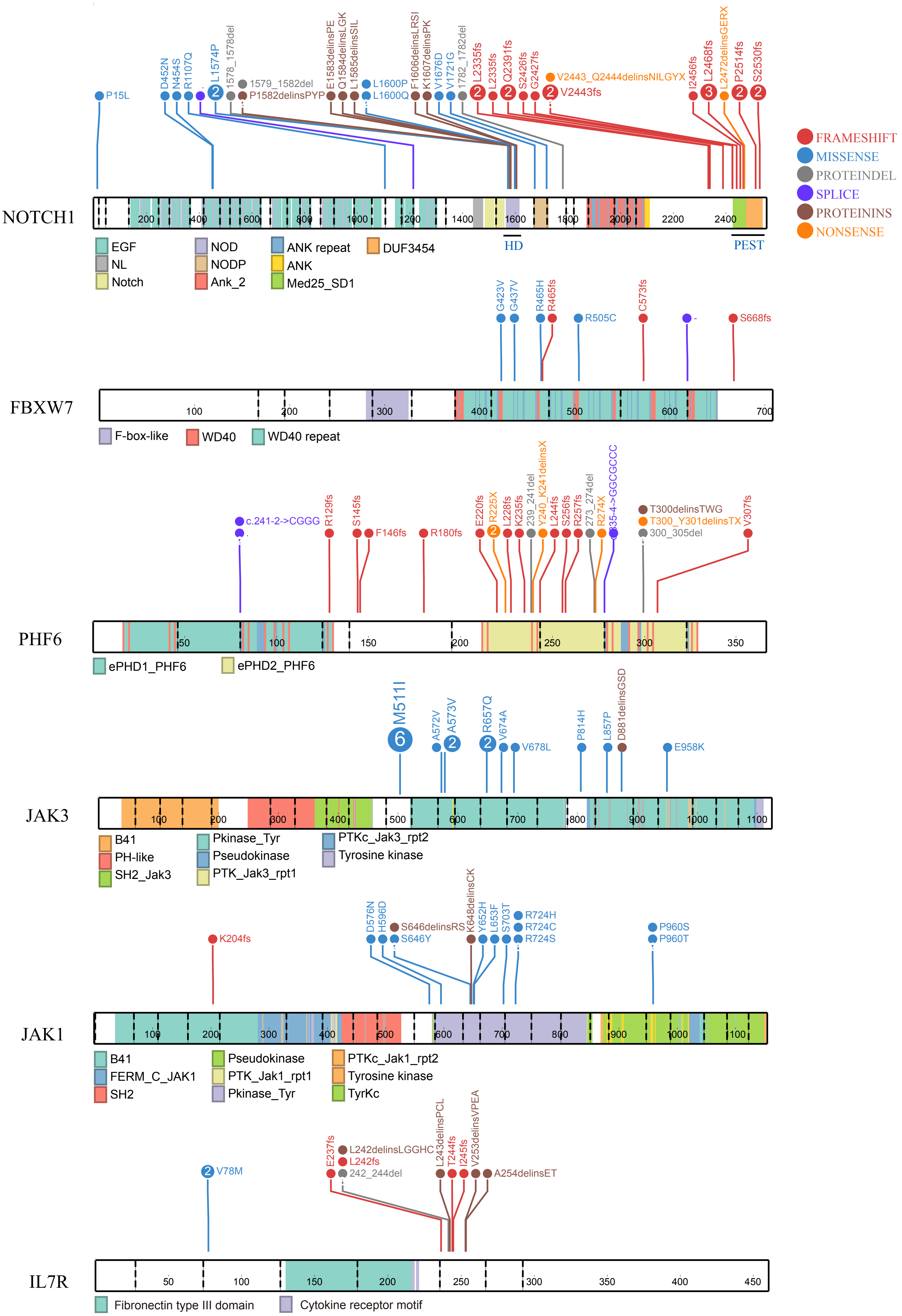
**Supplementary Figure 1**. Experimental design.



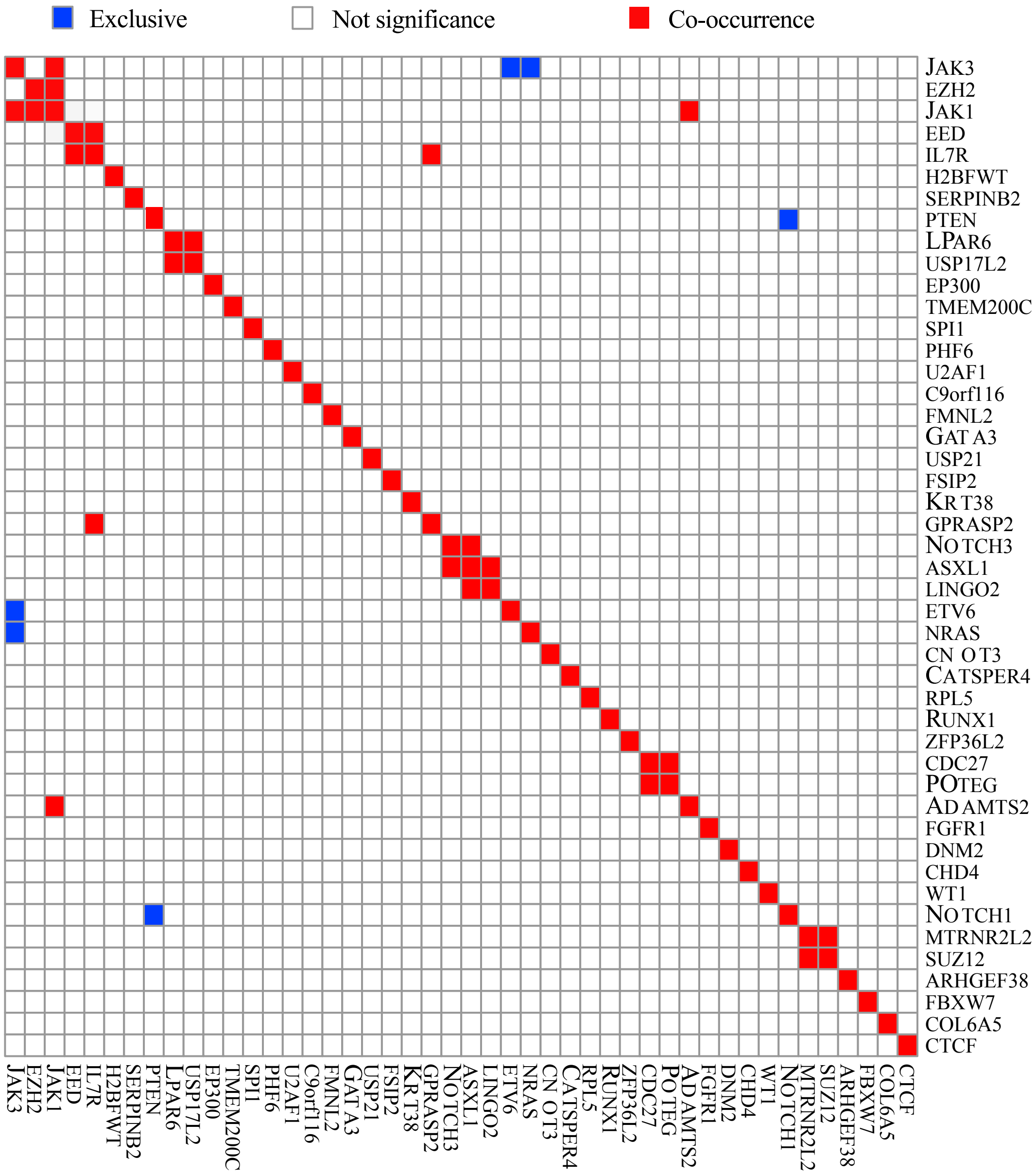
**Supplementary Figure 2**. Non-silent somatic mutations. A, Numbers and types of non-silent somatic mutations . B , Correlation between the numbers of non-silent mutations and age (B).



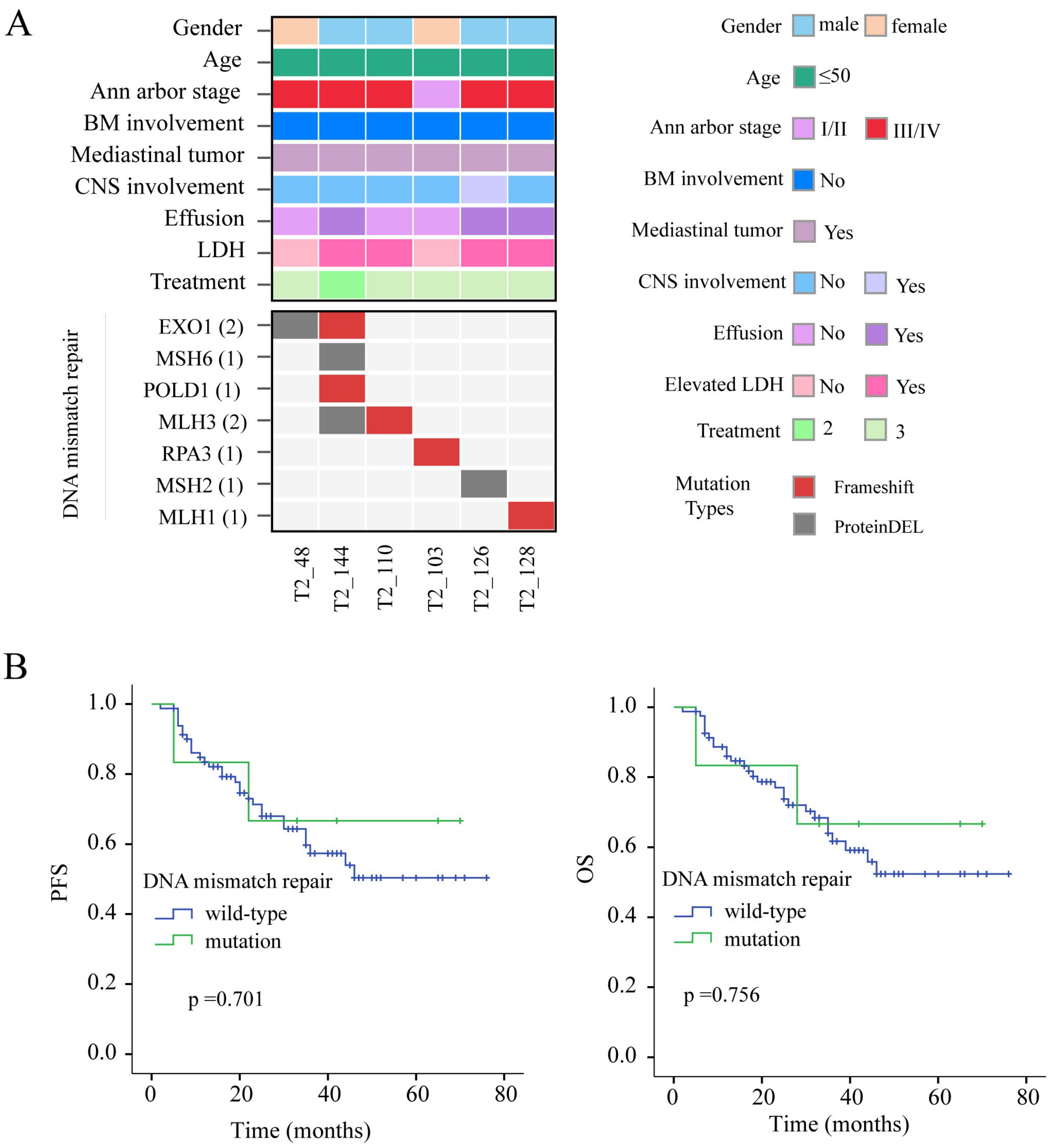
**Supplementary Figure 3**. Mutational signatures. A, The proportion of transitions and transversions is shown individually for each T-LBL samples in the discovery cohort. B and C, Combined non-negative matrix factorization clustering and correlation with the 30 curated mutational signatures defined by the Catalog of Somatic Mutations in Cancer (COSMIC) database revealed three predominant signatures in T-LBL. D, The three mutational signatures were annotated with the corresponding COSMIC signature determined by cosine similarity. Signature A (COSMIC signature 1, cosine similarity = 0.94), signature B (COSMIC signature 26, cosine similarity = 0.88), and signature C (COSMIC signature 1, cosine similarity = 0.93).



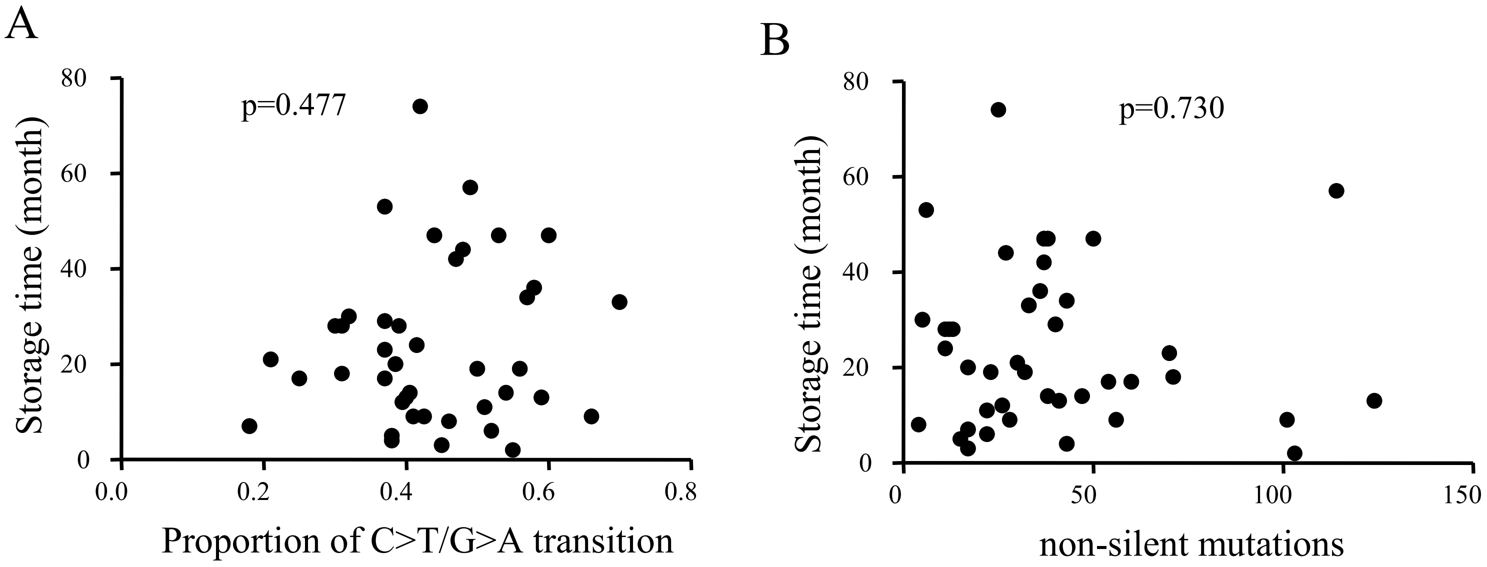
**Supplementary Figure 4**. ProteinPaint visualizations of recurrently mutated genes.



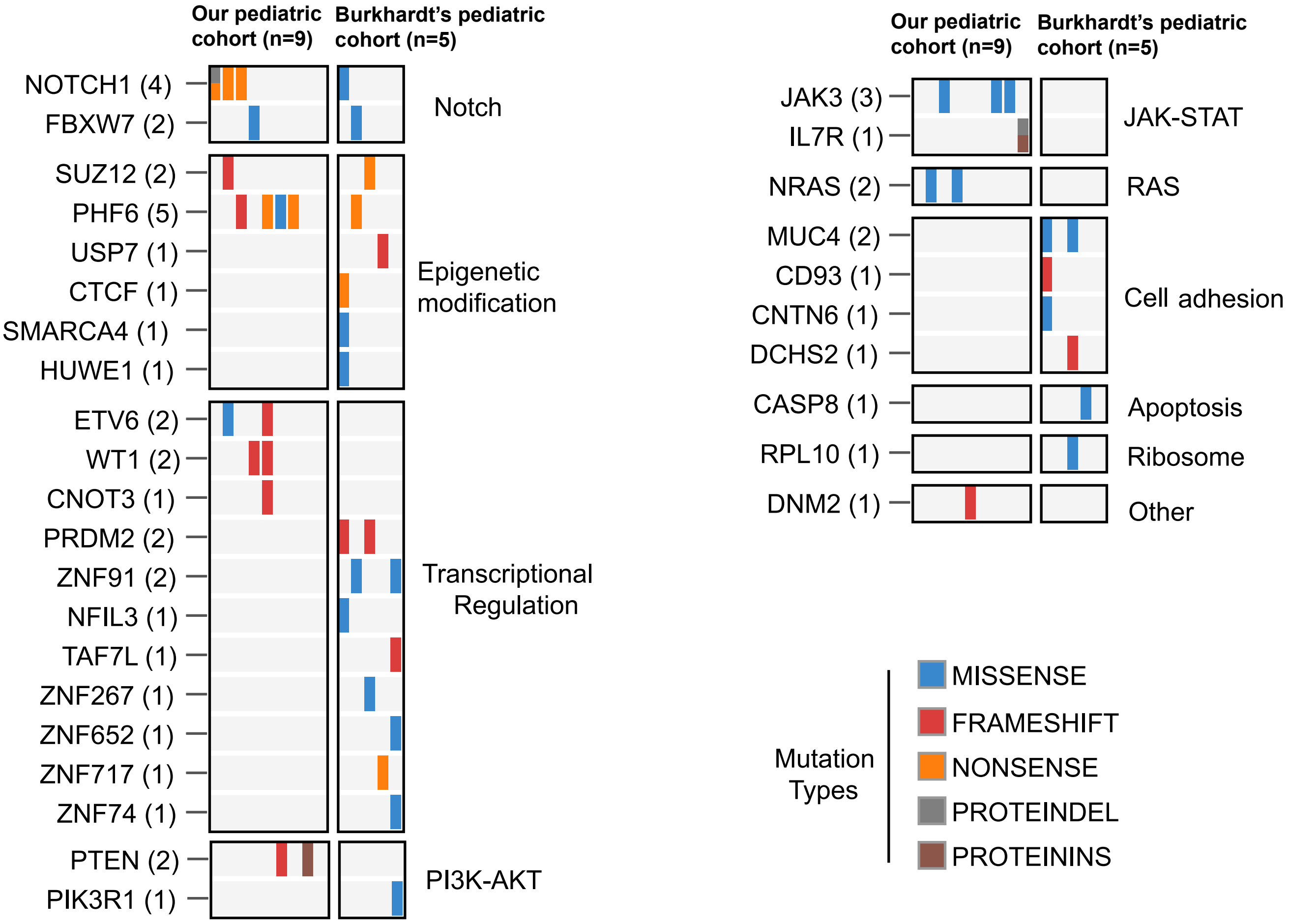
**Supplementary Figure 5**. Correlation analysis of significantly mutated genes.



**Supplementary Figure 6**. The mutation frequency of the DNA mismatch repair pathway and its prognostic impact in adult T-LBL.



**Supplementary Figure 7**. The relationship between tissue sample storage time and the proportion of C>T/G>A transitions or the nonsilent mutation burden.



**Supplementary Figure 8**. In silico comparison of pediatric samples in the discovery cohort with previous published dataset.

Supplementary Table 1. Clinical characteristics of the T-LBL patient cohort (n=96).

| Patient id | Gender | Age | Ann Arbor stage | Bone marrow involvement (blast %) | Mediastinal involvement | CNS involvement | Effusion | LDH | Treatment | OS event | OS | PFS event | PFS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T88 | male | 11 | 4 | - | yes | no | no | normal | CODOX-M | 0 | 6 | 0 | 6 |
| T35 | female | 12 | 4 | 11 | no | no | no | elevated | BFM-90 | 0 | 31 | 0 | 31 |
| T92 | male | 13 | 4 | 10 | yes | no | yes | elevated | BFM-90 | 0 | 12 | 1 | 12 |
| T31 | male | 15 | 2 | - | yes | no | no | normal | Hyper-CVAD | 1 | 15 | 1 | 15 |
| T7 | female | 15 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 36 | 0 | 36 |
| T14 | male | 16 | 4 | 8 | yes | no | no | normal | BFM-90 | 1 | 21 | 1 | 6 |
| T16 | male | 16 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 22 | 1 | 20 |
| T21 | male | 16 | 4 | 11 | yes | no | no | normal | CODOX-M | 0 | 77 | 0 | 77 |
| T32 | male | 16 | 4 | 7 | yes | no | no | elevated | BFM-90 | 0 | 20 | 0 | 20 |
| T2_55 | female | 18 | 4 | 17 | yes | no | no | elevated | CODOX-M | 0 | 33 | 0 | 33 |
| T2_104 | male | 19 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 25 | 1 | 22 |
| T2_126 | male | 19 | 4 | - | yes | yes | yes | elevated | Hyper-CVAD | 1 | 5 | 1 | 5 |
| T2_136 | male | 19 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 71 | 0 | 71 |
| T2_144 | male | 19 | 3 | - | yes | no | yes | elevated | CODOX-M | 0 | 65 | 0 | 65 |
| T2_145 | male | 20 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 51 | 0 | 51 |
| T2_95 | male | 20 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 46 | 1 | 46 |
| T2_110 | male | 21 | 3 | - | yes | no | no | elevated | Hyper-CVAD | 1 | 28 | 1 | 22 |
| T2_120 | male | 21 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 32 | 1 | 20 |
| T2_125 | male | 21 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 7 | 1 | 7 |
| T30 | male | 21 | 4 | 16 | no | no | no | normal | CODOX-M | 0 | 11 | 0 | 11 |
| T19 | female | 22 | 2 | - | yes | no | yes | normal | Hyper-CVAD | 1 | 16 | 1 | 16 |
| T2_65 | male | 22 | 3 | - | yes | no | no | normal | Hyper-CVAD | 0 | 21 | 0 | 21 |
| T2_94 | male | 22 | 2 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 35 | 0 | 35 |
| T84 | male | 22 | 4 | - | yes | no | no | normal | Hyper-CVAD | 0 | 5 | 0 | 5 |
| T87 | male | 22 | 4 | 15 | no | no | no | normal | CODOX-M | 1 | 9 | 1 | 9 |
| T20 | male | 23 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 8 | 0 | 8 |
| T29 | male | 23 | 4 | 15 | yes | no | no | normal | CODOX-M | 0 | 14 | 0 | 14 |
| T6 | female | 23 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 1 | 12 | 1 | 11 |
| T2_50 | male | 24 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 39 | 1 | 36 |
| T2_118 | male | 25 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 30 | 1 | 30 |
| T3 | male | 25 | 4 | 17 | yes | no | yes | elevated | BFM-90 | 0 | 50 | 0 | 50 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T39 | male | 25 | 4 | - | no | no | no | normal | Hyper-CVAD | 1 | 2 | 1 | 2 |
| T10 | male | 26 | 4 | 6 | yes | no | no | elevated | BFM-90 | 0 | 22 | 0 | 22 |
| T2_143 | male | 26 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 57 | 0 | 57 |
| T2_58 | male | 26 | 4 | 12 | yes | no | yes | elevated | Hyper-CVAD | 1 | 9 | 1 | 9 |
| T2_77 | male | 26 | 4 | 10 | yes | no | yes | elevated | Hyper-CVAD | 0 | 32 | 0 | 32 |
| T2_93 | male | 26 | 4 | - | yes | yes | yes | elevated | Hyper-CVAD | 0 | 8 | 0 | 8 |
| T28 | male | 26 | 4 | 8 | yes | no | no | elevated | BFM-90 | 1 | 7 | 1 | 6 |
| T37 | male | 26 | 4 | 16 | yes | no | yes | normal | Hyper-CVAD | 0 | 15 | 0 | 15 |
| T81 | male | 26 | 4 | 8 | yes | no | no | normal | Hyper-CVAD | 1 | 7 | 1 | 7 |
| T13 | male | 27 | 4 | 10 | yes | no | no | normal | BFM-90 | 1 | 13 | 1 | 13 |
| T2_52 | male | 27 | 2 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 41 | 0 | 41 |
| T43 | male | 27 | 4 | 6 | yes | no | no | normal | Hyper-CVAD | 0 | 45 | 0 | 45 |
| T2_138 | male | 28 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 42 | 0 | 42 |
| T2_53 | male | 28 | 4 | 14 | yes | no | no | elevated | BFM-90 | 0 | 16 | 0 | 16 |
| T2_60 | male | 28 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 31 | 0 | 31 |
| T4 | male | 28 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 50 | 1 | 25 |
| T90 | male | 28 | 4 | 6 | no | no | no | elevated | Hyper-CVAD | 0 | 7 | 0 | 7 |
| T91 | male | 28 | 4 | 8 | no | no | no | normal | CODOX-M | 1 | 8 | 1 | 8 |
| T2_135 | male | 29 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 25 | 0 | 25 |
| T2_71 | male | 29 | 2 | - | yes | no | no | elevated | Hyper-CVAD | 1 | 26 | 1 | 20 |
| T2_97 | male | 29 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 33 | 0 | 33 |
| T2_54 | male | 30 | 4 | - | yes | yes | yes | elevated | BFM-90 | 1 | 19 | 1 | 19 |
| T27 | male | 30 | 4 | 15 | yes | no | no | normal | Hyper-CVAD | 0 | 12 | 0 | 12 |
| T2_103 | female | 32 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 70 | 0 | 70 |
| T2_122 | male | 32 | 3 | - | yes | no | no | normal | Hyper-CVAD | 0 | 37 | 0 | 37 |
| T2_132 | male | 32 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 18 | 0 | 18 |
| T2_48 | female | 32 | 3 | - | yes | no | no | normal | Hyper-CVAD | 0 | 42 | 0 | 42 |
| T2_56 | male | 32 | 3 | - | yes | no | no | elevated | BFM-90 | 0 | 26 | 0 | 26 |
| T33 | male | 32 | 4 | 9 | yes | no | no | elevated | CODOX-M | 1 | 17 | 1 | 16 |
| T2_111 | male | 33 | 2 | - | yes | no | no | elevated | CODOX-M | 0 | 40 | 0 | 40 |
| T2_137 | male | 33 | 2 | - | yes | no | no | normal | Hyper-CVAD | 0 | 69 | 0 | 69 |
| T2_74 | male | 33 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 44 | 1 | 44 |
| T24 | male | 33 | 2 | - | no | no | no | normal | Hyper-CVAD | 0 | 50 | 0 | 50 |
| T2_141 | male | 34 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 48 | 0 | 48 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T2_63 | female | 34 | 4 | 13 | yes | no | no | normal | CODOX-M | 0 | 33 | 0 | 33 |
| T2_96 | male | 34 | 4 | - | yes | no | yes | elevated | CODOX-M | 0 | 52 | 0 | 52 |
| T2_146 | male | 35 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 25 | 0 | 25 |
| T2_69 | male | 35 | 4 | 7 | yes | no | yes | elevated | Hyper-CVAD | 0 | 65 | 0 | 65 |
| T2_128 | male | 36 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 33 | 0 | 33 |
| T2_72 | male | 36 | 2 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 46 | 0 | 46 |
| T85 | male | 36 | 4 | 9 | no | no | no | normal | BFM-90 | 0 | 17 | 0 | 17 |
| T86 | female | 36 | 4 | 8 | yes | no | no | normal | Hyper-CVAD | 0 | 16 | 0 | 16 |
| T2_61 | male | 37 | 4 | - | yes | no | yes | normal | BFM-90 | 1 | 25 | 1 | 25 |
| T2_73 | female | 37 | 2 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 66 | 0 | 66 |
| T2_116 | male | 39 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 27 | 0 | 27 |
| T2_134 | male | 39 | 3 | - | yes | no | no | elevated | Hyper-CVAD | 1 | 35 | 1 | 35 |
| T2_109 | male | 40 | 3 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 33 | 0 | 33 |
| T89 | male | 40 | 4 | 6 | no | no | no | normal | Hyper-CVAD | 0 | 20 | 0 | 20 |
| T5 | female | 41 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 37 | 1 | 9 |
| T2_129 | male | 43 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 43 | 0 | 43 |
| T82 | female | 43 | 4 | 11 | yes | no | yes | normal | BFM-90 | 0 | 12 | 0 | 12 |
| T2_142 | male | 45 | 2 | - | yes | no | no | elevated | Hyper-CVAD | 1 | 36 | 1 | 30 |
| T2_121 | male | 46 | 3 | - | yes | no | yes | elevated | Hyper-CVAD | 1 | 35 | 1 | 35 |
| T83 | female | 46 | 4 | - | yes | no | no | normal | Hyper-CVAD | 0 | 16 | 0 | 16 |
| T2 | female | 48 | 4 | - | no | yes | no | normal | BFM-90 | 0 | 47 | 0 | 47 |
| T2_70 | male | 48 | 2 | - | yes | no | no | elevated | Hyper-CVAD | 0 | 32 | 0 | 32 |
| T1 | male | 49 | 4 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 60 | 0 | 60 |
| T2_130 | female | 49 | 3 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 42 | 0 | 42 |
| T2_113 | male | 50 | 4 | - | yes | yes | no | elevated | Hyper-CVAD | 1 | 6 | 1 | 6 |
| T11 | female | 54 | 4 | 7 | no | no | no | normal | Hyper-CVAD | 1 | 12 | 1 | 12 |
| T15 | female | 55 | 4 | 9 | yes | no | yes | normal | Hyper-CVAD | 1 | 18 | 1 | 6 |
| T2_62 | male | 57 | 4 | 15 | yes | yes | yes | elevated | Hyper-CVAD | 1 | 23 | 1 | 23 |
| T2_108 | male | 58 | 2 | - | yes | no | yes | elevated | Hyper-CVAD | 0 | 76 | 0 | 76 |
| T2_139 | female | 59 | 4 | - | yes | no | yes | normal | Hyper-CVAD | 0 | 36 | 0 | 36 |
| T26 | male | 60 | 3 | - | yes | no | no | normal | Hyper-CVAD | 1 | 7 | 1 | 6 |

Supplementary Table 2. Summary of whole-exome sequencing.

| Patient_id | Total | Mapped | Fraction_of_effective_bases_on_target | Average_sequencing_depth_on_target | Coverage_of_target_region | Fraction_of_target_covered_with_at_least_10x | Fraction_of_target_covered_with_at_least_50x |
|---|---|---|---|---|---|---|---|
| L1 | 144503340 (100%) | 144376297 (99.91%) | 63.25% | 225 | 99.89% | 99.77% | 97.73% |
| L10 | 145365758 (100%) | 145235205 (99.91%) | 58.84% | 210 | 99.89% | 99.74% | 97.43% |
| L11 | 145878094 (100%) | 145576006 (99.79%) | 61.71% | 221 | 99.69% | 99.52% | 97.62% |
| L13 | 142909664 (100%) | 142737688 (99.88%) | 65.59% | 231 | 99.89% | 99.77% | 97.87% |
| L14 | 139490820 (100%) | 139285251 (99.85%) | 65.32% | 224 | 99.89% | 99.76% | 97.77% |
| L15 | 161816786 (100%) | 161626022 (99.88%) | 63.83% | 254 | 99.68% | 99.54% | 98.24% |
| L16 | 147668028 (100%) | 147474347 (99.87%) | 62.62% | 227 | 99.89% | 99.78% | 98.00% |
| L19 | 166103158 (100%) | 165927157 (99.89%) | 64.09% | 262 | 99.67% | 99.54% | 98.23% |
| L2 | 148533848 (100%) | 148400794 (99.91%) | 62.76% | 229 | 99.67% | 99.51% | 97.98% |
| L20 | 163967476 (100%) | 163764566 (99.88%) | 63.12% | 255 | 99.90% | 99.80% | 98.41% |
| L21 | 163392494 (100%) | 163221178 (99.90%) | 64.29% | 258 | 99.90% | 99.79% | 98.39% |
| L24 | 134852104 (100%) | 134709690 (99.89%) | 64.66% | 214 | 99.89% | 99.75% | 97.52% |
| L26 | 155405272 (100%) | 155064463 (99.78%) | 56.24% | 214 | 99.90% | 99.76% | 97.63% |
| L27 | 169011470 (100%) | 168850871 (99.90%) | 63.44% | 264 | 99.89% | 99.79% | 98.42% |
| L28 | 136660346 (100%) | 136546056 (99.92%) | 62.88% | 211 | 99.88% | 99.70% | 97.18% |
| L29 | 146351172 (100%) | 146205181 (99.90%) | 61.04% | 220 | 99.89% | 99.76% | 97.52% |
| L3 | 133523548 (100%) | 133245684 (99.79%) | 63.19% | 207 | 99.89% | 99.75% | 97.54% |
| L30 | 159093900 (100%) | 158959204 (99.92%) | 63.13% | 247 | 99.89% | 99.78% | 98.01% |
| L31 | 138871444 (100%) | 138719824 (99.89%) | 63.88% | 218 | 99.90% | 99.77% | 97.71% |
| L32 | 166358082 (100%) | 165983725 (99.77%) | 53.73% | 218 | 99.90% | 99.76% | 97.82% |
| L33 | 137874108 (100%) | 137715060 (99.88%) | 64.39% | 218 | 99.90% | 99.77% | 97.56% |
| L35 | 139119482 (100%) | 138954896 (99.88%) | 61.70% | 211 | 99.68% | 99.54% | 97.59% |
| L37 | 139395624 (100%) | 139222298 (99.88%) | 65.81% | 226 | 99.90% | 99.76% | 97.62% |
| L39 | 159784376 (100%) | 159614501 (99.89%) | 62.62% | 246 | 99.90% | 99.77% | 98.25% |
| L4 | 154531208 (100%) | 154359785 (99.89%) | 63.37% | 241 | 99.91% | 99.80% | 98.30% |
| L43 | 128793452 (100%) | 128617870 (99.86%) | 55.97% | 176 | 99.90% | 99.76% | 96.02% |

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|---|---|---|---|---|---|---|---|
| L5 | 157554328 (100%) | 157149003 (99.74%) | 61.05% | 236 | 99.69% | 99.54% | 97.97% |
| L6 | 138096800 (100%) | 137957080 (99.90%) | 62.56% | 212 | 99.67% | 99.52% | 97.50% |
| L7 | 163727904 (100%) | 163591502 (99.92%) | 63.63% | 256 | 99.70% | 99.55% | 98.30% |
| L81 | 156490058 (100%) | 156402107 (99.94%) | 59.26% | 228 | 99.90% | 99.79% | 98.21% |
| L82 | 173363864 (100%) | 173241457 (99.93%) | 53.25% | 226 | 99.70% | 99.57% | 98.00% |
| L83 | 149378004 (100%) | 149265376 (99.92%) | 60.71% | 223 | 99.67% | 99.54% | 97.90% |
| L84 | 134335756 (100%) | 134181169 (99.88%) | 58.28% | 192 | 99.90% | 99.76% | 96.37% |
| L85 | 153162278 (100%) | 153056425 (99.93%) | 60.87% | 229 | 99.89% | 99.78% | 98.28% |
| L86 | 152533622 (100%) | 152428558 (99.93%) | 59.93% | 225 | 99.68% | 99.57% | 98.15% |
| L87 | 153285604 (100%) | 153196178 (99.94%) | 59.69% | 225 | 99.91% | 99.80% | 98.20% |
| L88 | 126368720 (100%) | 126266149 (99.92%) | 61.57% | 191 | 99.90% | 99.76% | 96.54% |
| L89 | 165777468 (100%) | 165676276 (99.94%) | 59.48% | 243 | 99.89% | 99.79% | 98.44% |
| L90 | 155948036 (100%) | 155818253 (99.92%) | 58.28% | 223 | 99.91% | 99.80% | 98.28% |
| L91 | 162252720 (100%) | 162159879 (99.94%) | 60.84% | 243 | 99.90% | 99.80% | 98.40% |
| L92 | 159631876 (100%) | 159530354 (99.94%) | 57.88% | 227 | 99.90% | 99.78% | 98.32% |
| T1 | 132984590 (100%) | 132792621 (99.86%) | 68.30% | 200 | 99.76% | 99.04% | 93.09% |
| T10 | 155281222 (100%) | 155028599 (99.84%) | 64.79% | 225 | 99.88% | 99.56% | 96.15% |
| T11 | 123558248 (100%) | 123381557 (99.86%) | 61.56% | 153 | 99.70% | 99.37% | 91.38% |
| T13 | 163697938 (100%) | 163446343 (99.85%) | 59.60% | 199 | 99.90% | 99.72% | 94.48% |
| T14 | 142415562 (100%) | 142213930 (99.86%) | 64.70% | 213 | 99.88% | 99.66% | 96.77% |
| T15 | 128339228 (100%) | 128236173 (99.92%) | 63.77% | 185 | 99.67% | 99.45% | 95.80% |
| T16 | 207617154 (100%) | 207451768 (99.92%) | 62.24% | 306 | 99.90% | 99.75% | 98.40% |
| T19 | 142584146 (100%) | 142363261 (99.85%) | 63.80% | 201 | 99.72% | 99.43% | 96.63% |
| T2 | 134674408 (100%) | 134553513 (99.91%) | 64.80% | 206 | 99.65% | 99.41% | 96.71% |
| T20 | 130146974 (100%) | 130020490 (99.90%) | 62.19% | 189 | 99.89% | 99.56% | 95.76% |
| T21 | 195280416 (100%) | 195084138 (99.90%) | 57.88% | 265 | 99.90% | 99.73% | 98.02% |
| T24 | 129908706 (100%) | 129742174 (99.87%) | 62.08% | 187 | 99.89% | 99.60% | 95.54% |
| T26 | 139107876 (100%) | 138885903 (99.84%) | 66.11% | 190 | 99.89% | 99.68% | 94.92% |
| T27 | 144233626 (100%) | 144049790 (99.87%) | 63.04% | 211 | 99.89% | 99.70% | 96.33% |

|  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| T28 | 145588136 (100%) | 145382647 (99.86%) | 64.55% | 202 | 99.89% | 99.64% | 89.75% |
| T29 | 149705500 (100%) | 149582469 (99.92%) | 66.01% | 219 | 99.88% | 99.68% | 96.33% |
| T3 | 164583200 (100%) | 164451237 (99.92%) | 62.88% | 240 | 99.89% | 99.71% | 97.19% |
| T30 | 143583900 (100%) | 143461543 (99.91%) | 64.53% | 216 | 99.88% | 99.61% | 96.54% |
| T31 | 157838332 (100%) | 157684161 (99.90%) | 63.33% | 222 | 99.91% | 99.70% | 96.79% |
| T32 | 141804476 (100%) | 141621911 (99.87%) | 68.56% | 189 | 99.89% | 99.64% | 92.47% |
| T33 | 139815172 (100%) | 139676704 (99.90%) | 65.52% | 184 | 99.89% | 99.69% | 94.69% |
| T35 | 166718428 (100%) | 166507012 (99.87%) | 61.74% | 233 | 99.73% | 99.50% | 95.34% |
| T37 | 140347964 (100%) | 140248465 (99.93%) | 64.21% | 212 | 99.90% | 99.73% | 97.08% |
| T39 | 127536608 (100%) | 127415289 (99.90%) | 62.93% | 183 | 99.88% | 99.60% | 95.42% |
| T4 | 157130170 (100%) | 156899176 (99.85%) | 64.02% | 232 | 99.90% | 99.73% | 97.15% |
| T43 | 145637011 (100%) | 145298815 (99.77%) | 59.99% | 215 | 99.90% | 99.70% | 96.90% |
| T5 | 146636804 (100%) | 146473020 (99.89%) | 63.65% | 221 | 99.69% | 99.48% | 96.96% |
| T6 | 122728750 (100%) | 122590967 (99.89%) | 62.99% | 172 | 99.67% | 99.37% | 94.18% |
| T7 | 136678926 (100%) | 136471035 (99.85%) | 65.28% | 208 | 99.74% | 99.46% | 96.47% |
| T81 | 129792613 (100%) | 129568015 (99.83%) | 61.69% | 199 | 99.90% | 99.75% | 91.76% |
| T82 | 107960301 (100%) | 107735056 (99.79%) | 63.10% | 172 | 99.85% | 99.45% | 93.66% |
| T83 | 144351175 (100%) | 143903429 (99.69%) | 59.32% | 212 | 99.70% | 99.50% | 95.77% |
| T84 | 158897149 (100%) | 158431562 (99.71%) | 59.85% | 234 | 99.91% | 99.77% | 95.35% |
| T85 | 119974869 (100%) | 119773846 (99.83%) | 59.74% | 178 | 99.89% | 99.71% | 96.08% |
| T86 | 121897884 (100%) | 121598814 (99.75%) | 65.79% | 203 | 99.75% | 99.47% | 93.36% |
| T87 | 136276165 (100%) | 136017793 (99.81%) | 59.96% | 202 | 99.91% | 99.73% | 96.99% |
| T88 | 140724201 (100%) | 140435530 (99.79%) | 59.51% | 206 | 99.91% | 99.76% | 93.19% |
| T89 | 107547401 (100%) | 107162394 (99.64%) | 52.60% | 143 | 99.91% | 99.69% | 93.93% |
| T90 | 134625557 (100%) | 134414124 (99.84%) | 63.68% | 212 | 99.90% | 99.75% | 95.70% |
| T91 | 139063515 (100%) | 138751179 (99.78%) | 59.49% | 204 | 99.91% | 99.78% | 96.87% |
| T92 | 149000671 (100%) | 148707579 (99.80%) | 61.67% | 228 | 99.91% | 99.74% | 97.25% |
| T2_109 | 51187444 (100%) | 51005720 (99.64%) | 65.36% | 84 | 99.87% | 98.21% | 56.89% |
| T2_48 | 42149869 (100%) | 41964979 (99.56%) | 64.42% | 68 | 99.85% | 97.51% | 48.79% |

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|---|---|---|---|---|---|---|---|
| T2_103 | 37269009 (100%) | 36742403 (98.59%) | 53.01% | 49 | 99.77% | 95.52% | 32.78% |
| T2_128 | 28744505 (100%) | 28550916 (99.33%) | 61.85% | 49 | 99.40% | 94.42% | 36.56% |
| T2_93 | 36993602 (100%) | 36819927 (99.53%) | 61.17% | 56 | 99.84% | 97.78% | 48.15% |
| T2_110 | 34847453 (100%) | 34731638 (99.67%) | 63.79% | 57 | 99.74% | 95.64% | 41.42% |
| T2_137 | 31385317 (100%) | 31246142 (99.56%) | 68.46% | 57 | 99.18% | 93.06% | 42.81% |
| T2_95 | 32802531 (100%) | 32722246 (99.76%) | 69.14% | 58 | 99.72% | 94.61% | 40.76% |
| T2_94 | 36377049 (100%) | 36282745 (99.74%) | 69.36% | 63 | 99.79% | 96.66% | 49.09% |
| T2_144 | 34230016 (100%) | 34061881 (99.51%) | 71.14% | 64 | 99.24% | 93.17% | 45.61% |
| T2_116 | 43841229 (100%) | 43676741 (99.62%) | 64.75% | 72 | 99.85% | 97.26% | 47.22% |
| T2_52 | 50567573 (100%) | 50375390 (99.62%) | 62.27% | 78 | 99.76% | 97.68% | 66.63% |
| T2_121 | 45659077 (100%) | 45543852 (99.75%) | 68.46% | 79 | 99.77% | 96.16% | 48.10% |
| T2_145 | 51138861 (100%) | 51040251 (99.81%) | 66.74% | 85 | 99.80% | 98.33% | 65.17% |
| T2_61 | 54885898 (100%) | 54751691 (99.76%) | 64.97% | 88 | 99.81% | 98.55% | 72.68% |
| T2_104 | 63245429 (100%) | 62998188 (99.61%) | 56.32% | 89 | 99.83% | 98.65% | 66.41% |
| T2_139 | 56108694 (100%) | 56033504 (99.87%) | 65.05% | 90 | 99.60% | 98.65% | 68.41% |
| T2_132 | 61962123 (100%) | 61892555 (99.89%) | 59.70% | 91 | 99.85% | 99.03% | 70.63% |
| T2_138 | 61395576 (100%) | 61298318 (99.84%) | 59.96% | 91 | 99.86% | 99.07% | 69.25% |
| T2_74 | 56053934 (100%) | 55929280 (99.78%) | 65.90% | 91 | 99.85% | 98.53% | 59.96% |
| T2_143 | 58001894 (100%) | 57926311 (99.87%) | 65.27% | 94 | 99.81% | 98.74% | 73.55% |
| T2_130 | 63113173 (100%) | 63018539 (99.85%) | 62.12% | 97 | 99.63% | 98.89% | 68.70% |
| T2_96 | 64235605 (100%) | 64073830 (99.75%) | 61.45% | 98 | 99.87% | 99.32% | 77.68% |
| T2_135 | 63209384 (100%) | 63077719 (99.79%) | 63.31% | 99 | 99.84% | 99.09% | 73.71% |
| T2_50 | 58084316 (100%) | 57906838 (99.69%) | 68.56% | 99 | 99.86% | 98.80% | 61.93% |
| T2_146 | 61947025 (100%) | 61859474 (99.86%) | 68.00% | 104 | 99.84% | 98.98% | 74.23% |
| T2_113 | 63992302 (100%) | 63813057 (99.72%) | 66.54% | 105 | 99.84% | 99.02% | 77.11% |
| T2_129 | 68916126 (100%) | 68832958 (99.88%) | 62.14% | 106 | 99.85% | 99.05% | 73.62% |
| T2_134 | 70115273 (100%) | 70010808 (99.85%) | 61.36% | 106 | 99.87% | 99.25% | 73.27% |
| T2_142 | 64293443 (100%) | 64173779 (99.81%) | 66.09% | 106 | 99.82% | 98.82% | 73.30% |
| T2_62 | 66867054 (100%) | 66759354 (99.84%) | 64.25% | 106 | 99.86% | 99.17% | 78.77% |

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|---|---|---|---|---|---|---|---|
| T2_126 | 66939171 (100%) | 66772768 (99.75%) | 65.28% | 108 | 99.85% | 98.90% | 72.20% |
| T2_73 | 67300087 (100%) | 67193187 (99.84%) | 66.76% | 112 | 99.64% | 98.50% | 63.31% |
| T2_58 | 72708988 (100%) | 72549405 (99.78%) | 63.01% | 114 | 99.87% | 99.01% | 68.84% |
| T2_136 | 72703695 (100%) | 72629763 (99.90%) | 64.15% | 115 | 99.85% | 99.26% | 82.29% |
| T2_63 | 71959502 (100%) | 71721441 (99.67%) | 66.25% | 117 | 99.63% | 99.10% | 77.41% |
| T2_65 | 76417995 (100%) | 76110154 (99.60%) | 63.09% | 119 | 99.87% | 99.25% | 78.58% |
| T2_53 | 76758605 (100%) | 76631103 (99.83%) | 63.29% | 120 | 99.81% | 98.68% | 83.94% |
| T2_56 | 76772869 (100%) | 76629194 (99.81%) | 63.69% | 120 | 99.87% | 99.39% | 83.54% |
| T2_141 | 75292631 (100%) | 75174763 (99.84%) | 65.00% | 121 | 99.84% | 99.15% | 82.13% |
| T2_120 | 83069771 (100%) | 82881084 (99.77%) | 59.94% | 123 | 99.88% | 99.21% | 71.33% |
| T2_71 | 76756662 (100%) | 76568367 (99.75%) | 66.04% | 125 | 99.66% | 99.05% | 70.59% |
| T2_118 | 75082131 (100%) | 74958034 (99.83%) | 68.72% | 129 | 99.86% | 99.22% | 79.16% |
| T2_70 | 80314875 (100%) | 80154068 (99.80%) | 65.23% | 129 | 99.88% | 99.39% | 79.02% |
| T2_108 | 91234929 (100%) | 91010727 (99.75%) | 58.45% | 131 | 99.88% | 99.28% | 74.12% |
| T2_60 | 84601950 (100%) | 84437473 (99.81%) | 63.70% | 133 | 99.86% | 99.25% | 87.71% |
| T2_97 | 85968823 (100%) | 85795651 (99.80%) | 65.74% | 139 | 99.87% | 99.48% | 84.44% |
| T2_54 | 97001902 (100%) | 96792209 (99.78%) | 63.12% | 151 | 99.86% | 99.28% | 90.29% |
| T2_72 | 93132468 (100%) | 92765561 (99.61%) | 65.99% | 151 | 99.89% | 99.53% | 85.13% |
| T2_122 | 94881964 (100%) | 94607891 (99.71%) | 65.77% | 154 | 99.89% | 99.43% | 76.62% |
| T2_55 | 100768025 (100%) | 100597654 (99.83%) | 62.82% | 156 | 99.64% | 99.12% | 91.19% |
| T2_125 | 96155088 (100%) | 95999175 (99.84%) | 66.67% | 158 | 99.89% | 99.53% | 85.57% |
| T2_111 | 100819561 (100%) | 100688644 (99.87%) | 66.67% | 166 | 99.88% | 99.53% | 88.34% |
| T2_69 | 114138495 (100%) | 113961352 (99.84%) | 66.45% | 188 | 99.89% | 99.61% | 94.72% |
| T2_77 | 158488242 (100%) | 158207625 (99.82%) | 65.28% | 255 | 99.89% | 99.68% | 97.31% |

Supplementary Table 3. List of somatic non-silent mutations in the discovery cohort.

| Patient_id | Hugo Symbol | Entrez Gene Id | Chromosome | Position | Variant Classification | Reference Allele | Tumor Allele | Variant allele frequency | Protein Change |
|---|---|---|---|---|---|---|---|---|---|
| T1 | ZNF596 | 169270 | 8 | 193778 | Missense | T | G | 0.409 | p.S66A |
| T1 | SLC9A3 | 6550 | 5 | 475104 | Missense | A | G | 0.12 | p.C790R |
| T1 | REXO1 | 57455 | 19 | 1819125 | Missense | T | C | 0.091 | p.S886G |
| T1 | FASTKD5 | 60493 | 20 | 3128180 | Frame_Shift_Del | AGGTCAAACT | C | 0.029 | p.E504fs |
| T1 | CSMD1 | 64478 | 8 | 3224607 | Missense | C | T | 0.382 | p.R1021Q |
| T1 | MXRA5 | 25878 | X | 3240343 | Missense | G | A | 0.088 | p.A1128V |
| T1 | CACTIN | 58509 | 19 | 3623886 | In_Frame_Del | CCCGCAG | C | 0.041 | p.146_147del |
| T1 | ADCY9 | 115 | 16 | 4057515 | Missense | G | A | 0.393 | p.R580C |
| T1 | GLIS3 | 169792 | 9 | 4117997 | In_Frame_Del | TCCATCTCCC | T | 0.043 | p.336_339del |
| T1 | TMEM200C | 645369 | 18 | 5891373 | In_Frame_Del | GCGGCGGCGG | G | 0.208 | p.226_230del |
| T1 | WSCD1 | 23302 | 17 | 5991424 | Missense | G | A | 0.565 | p.R181Q |
| T1 | SGK223 | 157285 | 8 | 8234303 | Missense | C | T | 0.333 | p.R539K |
| T1 | CLDN23 | 137075 | 8 | 8560475 | In_Frame_Del | TCGC | T | 0.111 | p.190_190del |
| T1 | SLC6A11 | 6538 | 3 | 10975797 | Missense | G | A | 0.095 | p.R507Q |
| T1 | GREB1 | 9687 | 2 | 11774324 | Missense | G | A | 0.081 | p.D1687N |
| T1 | LPIN1 | 23175 | 2 | 11817812 | Missense | G | C | 0.141 | p.E13D |
| T1 | USP17L7 | 392197 | 8 | 11990882 | Missense | C | T | 0.098 | p.V213I |
| T1 | ETV6 | 2120 | 12 | 12038875 | Missense | A | G | 0.531 | p.T390A |
| T1 | PEMT | 10400 | 17 | 17409560 | Missense | C | T | 0.14 | p.V190M |
| T1 | CRLF1 | 9244 | 19 | 18717389 | In_Frame_Del | GAGC | G | 0.375 | p.25_26del |
| T1 | VWA5B1 | 127731 | 1 | 20664231 | Frame_Shift_Del | ATGCCAGC | A | 0.036 | p.M679fs |
| T1 | APOB | 338 | 2 | 21228263 | Missense | G | A | 0.479 | p.T3826M |
| T1 | SLC39A2 | 29986 | 14 | 21469424 | Frame_Shift_Del | GTGGTGTT | G | 0.021 | p.V206fs |
| T1 | YY2 | 404281 | X | 21875012 | In_Frame_Del | CAGCAAAAAG | G | 0.047 | p.137_141del |
| T1 | HR | 55806 | 8 | 21982854 | Missense | G | A | 0.268 | p.R574W |
| T1 | NCAM2 | 4685 | 21 | 22906929 | Missense | G | T | 0.244 | p.G785V |
| T1 | SLC34A2 | 10568 | 4 | 25674846 | Missense | G | A | 0.348 | p.A395T |
| T1 | ASXL2 | 55252 | 2 | 25972909 | Frame_Shift_Ins | G | GA | 0.309 | p.L506fs |
| T1 | NEK8 | 284086 | 17 | 27066172 | Missense | C | A | 0.485 | p.A457D |
| T1 | FAM189A1 | 23359 | 15 | 29421054 | Missense | C | T | 0.116 | p.G314D |
| T1 | MICA | 100507436 | 6 | 31379115 | Missense | G | A | 0.08 | p.G198S |
| T1 | CDK12 | 51755 | 17 | 37627173 | Nonsense | C | G | 0.404 | p.S363X |
| T1 | GSDMB | 55876 | 17 | 38065203 | Frame_Shift_Del | GTCTCCTTGTT | T | 0.044 | p.Q211fs |
| T1 | HAP1 | 9001 | 17 | 39883350 | Missense | G | A | 0.114 | p.T424M |
| T1 | PTPRT | 11122 | 20 | 40827928 | Missense | G | A | 0.359 | p.R815C |
| T1 | SLC25A15 | 10166 | 13 | 41382711 | Missense | A | T | 0.088 | p.I254L |
| T1 | LRFN5 | 145581 | 14 | 42357213 | Missense | G | A | 0.086 | p.R462K |
| T1 | CYP2D6 | 1565 | 22 | 42526694 | Missense | G | A | 0.085 | p.P34S |
| T1 | TMEM87A | 25963 | 15 | 42565557 | Missense | G | T | 0.516 | p.L14I |
| T1 | TBCC | 6903 | 6 | 42713535 | Missense | C | T | 0.379 | p.G93R |
| T1 | YIPF3 | 25844 | 6 | 43483703 | In_Frame_Del | GCAGCTGCAT | G | 0.023 | p.68_71del |
| T1 | SPATA31A6 | 389730 | 9 | 43627428 | Missense | G | A | 0.152 | p.P420L |
| T1 | FKBP3 | 2287 | 14 | 45603598 | In_Frame_Del | AGCTGCTCAC | G | 0.02 | p.16_21del |
| T1 | KRTAP10-8 | 386681 | 21 | 46032450 | In_Frame_Del | TGCCAGCAGT | T | 0.042 | p.145_150del |
| T1 | PHB | 5245 | 17 | 47489116 | Frame_Shift_Del | GATGAGAAA | G | 0.033 | p.F56fs |
| T1 | IFRD2 | 7866 | 3 | 50326771 | Frame_Shift_Del | CGGGGCAGCT | T | 0.026 | p.R324fs |
| T1 | IKZF1 | 10320 | 7 | 50468285 | Missense | C | T | 0.455 | p.S237L |
| T1 | A1CF | 29974 | 10 | 52580341 | Missense | C | T | 0.402 | p.V280I |
| T1 | ZCCHC11 | 23318 | 1 | 52933851 | Splice_Site | A | C | 0.357 | - |
| T1 | ZNF701 | 55762 | 19 | 53077410 | Frame_Shift_Del | TTCTCGGGGG | C | 0.034 | p.L4fs |
| T1 | KDM5C | 8242 | X | 53226127 | Missense | C | T | 0.933 | p.G841R |
| T1 | SMC1A | 8243 | X | 53438721 | In_Frame_Del | TCCAGATCCA | A | 0.041 | p.402_415del |
| T1 | UNC13C | 440279 | 15 | 54919258 | Missense | A | G | 0.167 | p.K2198E |
| T1 | 4-Sep | 5414 | 17 | 56618030 | Missense | C | T | 0.108 | p.R2K |
| T1 | PPM1E | 22843 | 17 | 56833457 | In_Frame_Ins | G | GGAACCC | 0.025 | p.P33delinsPEP |
| T1 | ZNF835 | 90485 | 19 | 57176085 | Missense | G | A | 0.125 | p.T161M |
| T1 | LIPC | 3990 | 15 | 58855794 | Nonsense | G | A | 0.108 | p.W420X |
| T1 | C17orf82 | 388407 | 17 | 59489893 | Missense | T | C | 0.207 | p.L186P |
| T1 | SIX4 | 51804 | 14 | 61190487 | In_Frame_Del | CGCGGCG | C | 0.068 | p.100_102del |
| T1 | GAL3ST3 | 89792 | 11 | 65810590 | Frame_Shift_Ins | G | GGCCTC | 0.035 | p.I228fs |
| T1 | GAL3ST3 | 89792 | 11 | 65810592 | Frame_Shift_Del | TGAGGC | T | 0.034 | p.G226fs |
| T1 | PTPRCAP | 5790 | 11 | 67203696 | In_Frame_Del | GAGCAGC | G | 0.032 | p.41_43del |
| T1 | FAM104A | 84923 | 17 | 71205858 | In_Frame_Del | ATGCTGCTGC | A | 0.036 | p.88_90del |
| T1 | UNC5B | 219699 | 10 | 73053281 | Missense | G | A | 0.431 | p.R620H |
| T1 | VPS37D | 155382 | 7 | 73082404 | Frame_Shift_Ins | G | GA | 0.15 | p.R39fs |
| T1 | MAGEE2 | 139599 | X | 75004529 | Nonsense | C | A | 0.158 | p.E120X |
| T1 | ADAMTS18 | 170692 | 16 | 77328990 | Missense | C | A | 0.091 | p.A946S |
| T1 | SGSH | 6448 | 17 | 78188018 | Missense | G | A | 0.373 | p.R206C |
| T1 | NAV3 | 89795 | 12 | 78511828 | Missense | C | T | 0.333 | p.R931C |
| T1 | BMP2K | 55589 | 4 | 79792163 | In_Frame_Del | GCACCAC | G | 0.034 | p.487_488del |
| T1 | SFTPD | 6441 | 10 | 81706324 | Missense | A | G | 0.093 | p.M31T |
| T1 | CTBS | 1486 | 1 | 85039998 | In_Frame_Del | CGCAGCGCCA | C | 0.034 | p.31_34del |
| T1 | AMOTL1 | 154810 | 11 | 94602414 | Missense | C | T | 0.087 | p.P847L |
| T1 | PROM2 | 150696 | 2 | 95947085 | Missense | A | G | 0.13 | p.Q508R |
| T1 | GIGYF1 | 64599 | 7 | 100281685 | In_Frame_Del | AGCTGCT | A | 0.025 | p.607_609del |
| T1 | H2BFWT | 158983 | X | 103267865 | Missense | C | T | 0.143 | p.R123H |
| T1 | FBXW4 | 6468 | 10 | 103454357 | In_Frame_Del | GCCTCCTCCT | G | 0.052 | p.11_14del |
| T1 | CEP170B | 283638 | 14 | 105352884 | In_Frame_Del | CGCAGGA | C | 0.052 | p.700_702del |
| T1 | AHNAK2 | 113146 | 14 | 105415352 | Missense | G | C | 0.085 | p.L2146V |
| T1 | AHNAK2 | 113146 | 14 | 105417036 | Missense | G | C | 0.091 | p.F1584L |
| T1 | EXPH5 | 23086 | 11 | 108383640 | Frame_Shift_Del | CATTTTGAGTA | T | 0.025 | p.Q860fs |
| T1 | ATXN2 | 6311 | 12 | 112036776 | In_Frame_Del | CTGCTGT | C | 0.172 | p.179_181del |
| T1 | PHTF1 | 10745 | 1 | 114256017 | Missense | C | A | 0.4 | p.D223Y |
| T1 | RFX6 | 222546 | 6 | 117243214 | In_Frame_Del | ACTGAAGGAT | T | 0.028 | p.446_460del |
| T1 | KIAA1210 | 57481 | X | 118219352 | In_Frame_Del | TTTAGGCTCC | T | 0.064 | p.1611_1614del |
| T1 | INSIG2 | 51141 | 2 | 118860789 | Missense | A | T | 0.486 | p.L87F |
| T1 | SYNPO2 | 171024 | 4 | 119952523 | Missense | C | T | 0.435 | p.L865F |
| T1 | TMEM120B | 144404 | 12 | 122186317 | Missense | G | A | 0.087 | p.D92N |
| T1 | PRDM6 | 93166 | 5 | 122435627 | Missense | G | A | 0.133 | p.A291T |
| T1 | OR10G4 | 390264 | 11 | 123886865 | Missense | T | A | 0.094 | p.V195E |
| T1 | RPUSD4 | 84881 | 11 | 126075504 | Missense | T | C | 0.511 | p.T219A |
| T1 | GPR39 | 2863 | 2 | 133175090 | Missense | G | A | 0.429 | p.V159I |
| T1 | PHF6 | 84295 | X | 133551195 | Splice_Site | A | AGGCGCC | 0.821 | - |
| T1 | KNDC1 | 85442 | 10 | 135000159 | Missense | A | G | 0.091 | p.E436G |
| T1 | C9orf116 | 138162 | 9 | 138391606 | Missense | C | T | 0.5 | p.S31N |
| T1 | NOTCH1 | 4851 | 9 | 139390823 | Frame_Shift_Ins | A | AGT | 0.363 | p.I2456fs |
| T1 | NOTCH1 | 4851 | 9 | 139440195 | Missense | G | A | 0.533 | p.P15L |
| T1 | SASH1 | 23328 | 6 | 148664242 | In_Frame_Ins | T | TGAGCCC | 0.083 | p.P13delinsPEP |
| T1 | GABRQ | 55879 | X | 151806739 | Frame_Shift_Ins | C | CT | 0.1 | p.P28fs |
| T1 | FLG | 2312 | 1 | 152282917 | Missense | G | T | 0.091 | p.S1482Y |
| T1 | CRNN | 49860 | 1 | 152382120 | Missense | C | T | 0.092 | p.G480S |
| T1 | LCE2D | 353141 | 1 | 152636718 | In_Frame_Del | TGGTCCCAGCT | C | 0.022 | p.46_54del |
| T1 | KPRP | 448834 | 1 | 152732567 | Missense | G | A | 0.123 | p.R168H |
| T1 | FMNL2 | 114793 | 2 | 153417442 | Frame_Shift_Ins | C | CCGTATCA | 0.023 | p.D163fs |
| T1 | DCHS2 | 54798 | 4 | 155180860 | In_Frame_Del | ACTTCAAAAT | T | 0.053 | p.1747_1754del |
| T1 | ARHGAP30 | 257106 | 1 | 161022080 | Frame_Shift_Del | AGCACTCAGT | A | 0.027 | p.A148fs |
| T1 | FRMD1 | 79981 | 6 | 168458023 | Splice_Site | C | T | 0.5 | - |
| T1 | FAT1 | 2195 | 4 | 187629770 | Missense | A | C | 0.128 | p.S404R |

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|---|---|---|---|---|---|---|---|---|---|
| T1 | IGFN1 | 91156 | 1 | 201176018 | Missense | A | G | 0.098 | p.D666G |
| T1 | KCNH1 | 3756 | 1 | 210971044 | Frame_Shift_Del | TGCGGTTCAG | T | 0.06 | p.H543fs |
| T1 | RUFY4 | 285180 | 2 | 218939825 | Missense | G | A | 0.412 | p.A204T |
| T1 | GLB1L | 79411 | 2 | 220101865 | Frame_Shift_Del | TGCAAAGTAC | T | 0.03 | p.T537fs |
| T1 | AQP12B | 653437 | 2 | 241622187 | Missense | C | T | 0.167 | p.R23Q |
| T1 | OR2AK2 | 391191 | 1 | 248129240 | Missense | G | A | 0.094 | p.V203M |
| T10 | GNB1 | 2782 | 1 | 1737954 | Missense | T | C | 0.515 | p.D76G |
| T10 | SRL | 6345 | 16 | 4292061 | Missense | G | A | 0.286 | p.A3V |
| T10 | RPL22 | 6146 | 1 | 6257711 | Splice_Site | C | G | 0.583 | - |
| T10 | UPF2 | 26019 | 10 | 12071401 | Missense | C | T | 0.365 | p.R163H |
| T10 | NOTCH3 | 4854 | 19 | 15281517 | Missense | C | A | 0.393 | p.R1619L |
| T10 | PLXDC2 | 84898 | 10 | 20500624 | Missense | G | A | 0.528 | p.R314Q |
| T10 | ASXL1 | 171023 | 20 | 31022441 | Frame_Shift_Ins | A | AG | 0.353 | p.G642fs |
| T10 | KRTAP19-8 | 728299 | 21 | 32410681 | Missense | C | T | 0.433 | p.G28S |
| T10 | IL7R | 3575 | 5 | 35867418 | Missense | G | A | 0.503 | p.V78M |
| T10 | IL7R | 3575 | 5 | 35874553 | Frame_Shift_Del | AGATGGATCC | G | 0.374 | p.E237fs |
| T10 | IL7R | 3575 | 5 | 35874568 | In_Frame_Del | TTACTAA | T | 0.376 | p.242_244del |
| T10 | IL7R | 3575 | 5 | 35874576 | Frame_Shift_Ins | C | CA | 0.371 | p.T244fs |
| T10 | IL7R | 3575 | 5 | 35874578 | Frame_Shift_Del | TCA | T | 0.368 | p.I245fs |
| T10 | RUNX1 | 861 | 21 | 36206776 | Frame_Shift_Ins | T | TG | 0.426 | p.T219fs |
| T10 | MAP4K1 | 11184 | 19 | 39101907 | Frame_Shift_Del | GTAGCCACTC | G | 0.051 | p.M227fs |
| T10 | ANK1 | 286 | 8 | 41566384 | Missense | G | A | 0.392 | p.T637M |
| T10 | CDC27 | 996 | 17 | 45234298 | Missense | G | C | 0.161 | p.L275V |
| T10 | CDC27 | 996 | 17 | 45234343 | Missense | T | G | 0.183 | p.N260H |
| T10 | CDC27 | 996 | 17 | 45234360 | Nonsense | A | C | 0.093 | p.L254X |
| T10 | MBD1 | 4152 | 18 | 47800590 | Missense | T | A | 0.409 | p.K348M |
| T10 | CKAP2 | 26586 | 13 | 53035971 | Nonsense | C | A | 0.441 | p.S338X |
| T10 | PITPNM1 | 9600 | 11 | 67262666 | Missense | A | G | 0.528 | p.I837T |
| T10 | RANBP10 | 57610 | 16 | 67763241 | In_Frame_Del | GAGTAATTGA | T | 0.059 | p.424_431del |
| T10 | IPO5 | 3843 | 13 | 98642362 | Frame_Shift_Del | TTTTAGGAAC | G | 0.025 | p.W174fs |
| T10 | GPRASP2 | 114928 | X | 101970123 | Missense | G | A | 0.911 | p.R109H |
| T10 | NOTCH2 | 4853 | 1 | 120459020 | Frame_Shift_Ins | T | TGGCACTC | 0.378 | p.K2109fs |
| T10 | LRRC43 | 254050 | 12 | 122667705 | In_Frame_Del | ACGAGTC | A | 0.028 | p.5_7del |
| T10 | SFSWAP | 6433 | 12 | 132210074 | Missense | G | A | 0.387 | p.R244H |
| T10 | MYB | 4602 | 6 | 135509033 | Missense | A | T | 0.479 | p.N68I |
| T10 | NOTCH1 | 4851 | 9 | 139399344 | Missense | A | T | 0.086 | p.L1600Q |
| T10 | ATR | 545 | 3 | 142186911 | Splice_Site | TAAAAAAGAC | C | 0.031 | - |
| T10 | ZEB2 | 9839 | 2 | 145156518 | Missense | C | T | 0.449 | p.E722K |
| T11 | POTEC | 388468 | 18 | 14522310 | Missense | C | T | 0.093 | p.R451K |
| T11 | FREM1 | 158326 | 9 | 14737520 | Frame_Shift_Del | GGCAACAGGT | T | 0.056 | p.W662fs |
| T11 | SNRPB2 | 6629 | 20 | 16717968 | In_Frame_Del | AAGAAAAGA | C | 0.05 | p.101_104del |
| T11 | LGI4 | 163175 | 19 | 35624594 | In_Frame_Del | GGACAGGCCC | C | 0.044 | p.91_105del |
| T11 | YAE1D1 | 57002 | 7 | 39612080 | In_Frame_Del | ATGAAGCTA | T | 0.031 | p.153_156del |
| T11 | MYCL | 4610 | 1 | 40366749 | In_Frame_Del | GCGCGCCAGG | C | 0.256 | p.113_119del |
| T11 | CDC27 | 996 | 17 | 45234343 | Missense | T | G | 0.114 | p.N260H |
| T11 | PCLO | 27445 | 7 | 82583029 | Frame_Shift_Ins | G | GC | 0.143 | p.P2414fs |
| T11 | PCLO | 27445 | 7 | 82583047 | Frame_Shift_Ins | G | GCA | 0.121 | p.P2408fs |
| T11 | NFKBIZ | 64332 | 3 | 101576029 | Splice_Site | T | GAAAGCTT | 0.029 | - |
| T11 | CSMD3 | 114788 | 8 | 113326278 | Missense | G | A | 0.098 | p.P2414L |
| T11 | SYNE1 | 23345 | 6 | 152771921 | In_Frame_Del | ATGATGAGGA | T | 0.075 | p.1070_1085del |
| T13 | APC2 | 10297 | 19 | 1453004 | Missense | G | T | 0.4 | p.A2S |
| T13 | PAFAH1B1 | 5048 | 17 | 2573547 | Missense | C | T | 0.083 | p.L164F |
| T13 | CHD4 | 1108 | 12 | 6697096 | Missense | C | T | 0.314 | p.R1162Q |
| T13 | DNM2 | 1785 | 19 | 10904475 | Missense | G | A | 0.365 | p.G358R |
| T13 | BTBD10 | 84280 | 11 | 13410408 | Frame_Shift_Ins | G | GGATCA | 0.041 | p.L466fs |
| T13 | PALM3 | 342979 | 19 | 14165249 | Frame_Shift_Del | TTTCTC | T | 0.4 | p.K395fs |
| T13 | NPIPA1 | 9284 | 16 | 15045788 | In_Frame_Del | TCCACCCTCAC | C | 0.057 | p.320_324del |
| T13 | ARRDC2 | 27106 | 19 | 18119808 | Missense | C | T | 0.443 | p.H119Y |
| T13 | POTEG | 404785 | 14 | 19563537 | Missense | A | C | 0.102 | p.N351H |
| T13 | ST8SIA1 | 6489 | 12 | 22408316 | Missense | G | A | 0.467 | p.P130L |
| T13 | SRRM1 | 10250 | 1 | 24997987 | In_Frame_Del | GGCTGCAGCT | G | 0.114 | p.838_840del |
| T13 | RPL23A | 6147 | 17 | 27049740 | Splice_Site | G | GAGAAAC | 0.047 | - |
| T13 | RABEP2 | 79874 | 16 | 28919982 | Frame_Shift_Ins | T | TG | 0.395 | p.Q398fs |
| T13 | TAOK2 | 9344 | 16 | 29997150 | Missense | C | T | 0.4 | p.R654W |
| T13 | SUZ12 | 23512 | 17 | 30323843 | Missense | T | A | 0.683 | p.N607K |
| T13 | ANKRD18B | 441459 | 9 | 33567163 | Missense | A | T | 0.091 | p.K872N |
| T13 | NBEA | 26960 | 13 | 35632928 | Frame_Shift_Del | CGTGTATGT | C | 0.055 | p.V390fs |
| T13 | SPTBN4 | 57731 | 19 | 41073771 | Missense | G | A | 0.489 | p.R2180H |
| T13 | PSG11 | 5680 | 19 | 43529031 | Frame_Shift_Del | GATGTA | G | 0.025 | p.I79fs |
| T13 | CDC27 | 996 | 17 | 45234298 | Missense | G | C | 0.14 | p.L275V |
| T13 | CDC27 | 996 | 17 | 45234343 | Missense | T | G | 0.143 | p.N260H |
| T13 | MYO5B | 4645 | 18 | 47352878 | In_Frame_Del | GGGATGT | G | 0.045 | p.1835_1837del |
| T13 | FTO | 79068 | 16 | 53907767 | Missense | G | A | 0.494 | p.R322Q |
| T13 | LRP1 | 4035 | 12 | 57578177 | Missense | G | A | 0.449 | p.R2043H |
| T13 | JAK1 | 3716 | 1 | 65312382 | Missense | G | T | 0.327 | p.S646Y |
| T13 | C8orf44 | 56260 | 8 | 67590131 | Missense | A | G | 0.114 | p.K63R |
| T13 | MED12 | 9968 | X | 70345909 | Nonsense | C | T | 0.851 | p.R816X |
| T13 | MTRNR2L2 | 100462981 | 5 | 79945871 | Missense | G | A | 0.269 | p.S12L |
| T13 | CYLC1 | 1538 | X | 83128698 | Nonsense | A | T | 0.869 | p.K328X |
| T13 | FAT3 | 120114 | 11 | 92088481 | Missense | G | A | 0.385 | p.R1068Q |
| T13 | MANEA | 79694 | 6 | 96054242 | Frame_Shift_Del | AG | A | 0.421 | p.A451fs |
| T13 | BCO2 | 83875 | 11 | 112085513 | Frame_Shift_Del | CTAGAAAAGG | A | 0.047 | p.Q381fs |
| T13 | NOTCH1 | 4851 | 9 | 139390789 | Frame_Shift_Ins | G | GCGCCC | 0.38 | p.L2468fs |
| T13 | SRA1 | 10011 | 5 | 139937048 | Missense | G | T | 0.496 | p.A9E |
| T13 | KMT2C | 58508 | 7 | 151846177 | Nonsense | G | A | 0.479 | p.Q4279X |
| T13 | INSRR | 3645 | 1 | 156811239 | Missense | C | A | 0.374 | p.K1203N |
| T13 | CLK1 | 1195 | 2 | 201718108 | Frame_Shift_Ins | T | TC | 0.257 | p.E501fs |
| T13 | TRPM8 | 79054 | 2 | 234869582 | Missense | C | A | 0.443 | p.L509M |
| T13 | HDAC4 | 9759 | 2 | 239975241 | Missense | C | T | 0.434 | p.E1044K |
| T13 | OR2M2 | 391194 | 1 | 248343801 | Missense | C | T | 0.448 | p.R172W |
| T14 | SLC17A1 | 6568 | 6 | 25811627 | Missense | T | C | 0.36 | p.R393G |
| T14 | IL7R | 3575 | 5 | 35874567 | In_Frame_Del | CTTA | C | 0.236 | p.242_242del |
| T14 | IL7R | 3575 | 5 | 35874575 | In_Frame_Ins | C | TGTAGGC | 0.243 | p.T244delinsTCRG |
| T14 | KRT25 | 147183 | 17 | 38906668 | Missense | A | G | 0.479 | p.I380T |
| T14 | C6orf132 | 647024 | 6 | 42073263 | Frame_Shift_Ins | C | GAGGAGG | 0.029 | p.G796fs |
| T14 | SKOR2 | 652991 | 18 | 44773549 | In_Frame_Del | GGGT | G | 0.176 | p.668_669del |
| T14 | SUCLA2 | 8803 | 13 | 48528638 | Frame_Shift_Del | AGGCTGAATT | T | 0.031 | p.N276fs |
| T14 | RUVBL2 | 10856 | 19 | 49517841 | In_Frame_Del | AAGC | A | 0.269 | p.368_369del |
| T14 | LAMA5 | 3911 | 20 | 60898559 | Missense | C | G | 0.385 | p.C2006S |
| T14 | LRRC49 | 54839 | 15 | 71193315 | Missense | G | A | 0.452 | p.R88H |
| T14 | RNF213 | 57674 | 17 | 78343390 | Missense | G | A | 0.413 | p.A4082T |
| T15 | GNRH2 | 2797 | 20 | 3026345 | Frame_Shift_Del | AGCCCC | A | 0.027 | p.E109fs |
| T15 | TNRC18 | 84629 | 7 | 5352508 | In_Frame_Del | GAGGAAGAA | T | 0.046 | p.2668_2671del |
| T15 | FAM9A | 171482 | X | 8764355 | Missense | T | A | 0.23 | p.T148S |
| T15 | ETV6 | 2120 | 12 | 12022356 | Splice_Site | A | AG | 0.21 | - |
| T15 | TNFRSF17 | 608 | 16 | 12060183 | Missense | G | A | 0.256 | p.E88K |
| T15 | FBXW10 | 10517 | 17 | 18673325 | Missense | G | A | 0.199 | p.G645R |
| T15 | KRAS | 3845 | 12 | 25398285 | Frame_Shift_Ins | C | CGCGTG | 0.051 | p.G12fs |
| T15 | HEATR6 | 63897 | 17 | 58136883 | Splice_Site | CT | C | 0.316 | - |
| T15 | MYBPC1 | 4604 | 12 | 102061552 | Missense | C | T | 0.29 | p.T749M |
| T15 | NRAS | 4893 | 1 | 115258744 | Missense | C | T | 0.168 | p.G13D |
| T15 | PODXL | 5420 | 7 | 131190736 | Missense | C | T | 0.316 | p.R425H |
| T16 | C1orf233 | 643988 | 1 | 1534860 | In_Frame_Del | CGGCGGTGAA | C | 0.03 | p.169_179del |
| T16 | PRPF8 | 10594 | 17 | 1565303 | Missense | T | C | 0.453 | p.M1307V |

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| T16 | MYBBP1A | 10514 | 17 | 4455180 | Missense | C | T | 0.503 | p.A340T |
| T16 | WT1 | 7490 | 11 | 32414233 | Frame_Shift_Ins | T | TTGCC | 0.464 | p.R423fs |
| T16 | WT1 | 7490 | 11 | 32417910 | Frame_Shift_Ins | G | GAAGGA | 0.457 | p.S364fs |
| T16 | CSF2RB | 1439 | 22 | 37326786 | Missense | C | T | 0.472 | p.P309L |
| T16 | ANKRD30A | 91074 | 10 | 37418858 | Nonsense | G | T | 0.454 | p.E31X |
| T16 | CCND3 | 896 | 6 | 41903731 | Nonsense | G | A | 0.431 | p.Q204X |
| T16 | CHST1 | 8534 | 11 | 45672052 | Missense | G | A | 0.514 | p.P141L |
| T16 | MAPK4 | 5596 | 18 | 48255571 | Missense | C | T | 0.473 | p.R371W |
| T16 | CAPN1 | 823 | 11 | 64977924 | Splice_Site | G | A | 0.377 | - |
| T16 | PALD1 | 27143 | 10 | 72289648 | Missense | C | T | 0.465 | p.R98C |
| T16 | HEATR4 | 399671 | 14 | 73969700 | Missense | C | A | 0.332 | p.L668F |
| T16 | AATK | 9625 | 17 | 79094687 | Missense | C | T | 0.383 | p.G914R |
| T16 | BCL11B | 64919 | 14 | 99737497 | Splice_Site | C | G | 0.456 | - |
| T16 | ARHGEF38 | 54848 | 4 | 106566356 | Missense | A | G | 0.415 | p.N229S |
| T16 | BUB1 | 699 | 2 | 111427100 | Missense | T | C | 0.525 | p.Q146R |
| T16 | SOX1 | 6656 | 13 | 112722079 | Missense | G | T | 0.148 | p.G36V |
| T16 | NRAS | 4893 | 1 | 115258747 | Missense | C | T | 0.406 | p.G12D |
| T16 | SLC35F1 | 222553 | 6 | 118588185 | Missense | G | A | 0.428 | p.V169M |
| T16 | CCDC136 | 64753 | 7 | 128449663 | In_Frame_Del | ACACTGC | A | 0.028 | p.589_591del |
| T16 | SH3TC2 | 79628 | 5 | 148411215 | Missense | C | T | 0.392 | p.R346K |
| T16 | FBXW7 | 55294 | 4 | 153247289 | Missense | G | A | 0.462 | p.R505C |
| T19 | UNCX | 340260 | 7 | 1276066 | In_Frame_Del | ACGC | A | 0.111 | p.350_351del |
| T19 | WHSC1 | 7468 | 4 | 1962801 | Missense | G | A | 0.387 | p.E1099K |
| T19 | TP53 | 7157 | 17 | 7578413 | Missense | C | A | 0.443 | p.V41L |
| T19 | MTRR | 4552 | 5 | 7895904 | In_Frame_Del | GTGGGTCCAG | C | 0.039 | p.539_550del |
| T19 | ARID3C | 138715 | 9 | 34627905 | Missense | C | T | 0.413 | p.R36Q |
| T19 | NFXL1 | 152518 | 4 | 47905242 | Frame_Shift_Del | TCATCAGTCA | A | 0.038 | p.V202fs |
| T19 | HNRNPA1 | 3178 | 12 | 54676632 | Missense | A | G | 0.43 | p.D242G |
| T19 | MITF | 4286 | 3 | 70014383 | Missense | C | T | 0.508 | p.T415M |
| T19 | ZNF821 | 55565 | 16 | 71895679 | Missense | C | T | 0.446 | p.S153N |
| T19 | ANKRD17 | 26057 | 4 | 73968203 | Frame_Shift_Ins | C | TTTTGTT | 0.025 | p.R1237fs |
| T19 | TRPM6 | 140803 | 9 | 77407606 | Frame_Shift_Del | AACCAAAATG | G | 0.021 | p.E803fs |
| T19 | TBX22 | 50945 | X | 79286158 | Missense | C | G | 0.402 | p.L371V |
| T19 | OR5K4 | 403278 | 3 | 98073381 | Missense | G | A | 0.49 | p.M228I |
| T19 | DYNC2H1 | 79659 | 11 | 103055668 | Missense | A | G | 0.434 | p.N2174S |
| T19 | TET2 | 54790 | 4 | 106156288 | In_Frame_Ins | A | ACAC | 0.386 | p.T397delinsTP |
| T19 | C8orf76 | 84933 | 8 | 124253523 | Nonsense | C | A | 0.44 | p.E22X |
| T19 | FBXW7 | 55294 | 4 | 153247289 | Missense | G | A | 0.415 | p.R505C |
| T2 | UCN3 | 114131 | 10 | 5416083 | Missense | C | T | 0.404 | p.L134F |
| T2 | ETV6 | 2120 | 12 | 12022491 | Frame_Shift_Ins | G | GC | 0.35 | p.R199fs |
| T2 | BNC2 | 54796 | 9 | 16436411 | Missense | A | G | 0.302 | p.I594T |
| T2 | AC004019.13 | - | 22 | 18064297 | Missense | C | T | 0.391 | p.G98R |
| T2 | IGSF21 | 84966 | 1 | 18692039 | Missense | G | A | 0.364 | p.R288H |
| T2 | SLCO1C1 | 53919 | 12 | 20870072 | Missense | T | G | 0.307 | p.V110G |
| T2 | ADAM7 | 8756 | 8 | 24333998 | Missense | T | C | 0.426 | p.M229T |
| T2 | GGT1 | 2678 | 22 | 25019155 | Missense | T | C | 0.135 | p.V272A |
| T2 | CNKSR1 | 10256 | 1 | 26515362 | Missense | G | A | 0.391 | p.R597Q |
| T2 | ITGAX | 3687 | 16 | 31373155 | Splice_Site | A | T | 0.418 | - |
| T2 | ZNF703 | 80139 | 8 | 37554953 | In_Frame_Del | CTCCTCCTCG | C | 0.036 | p.179_181del |
| T2 | PGC | 5225 | 6 | 41708749 | Frame_Shift_Ins | C | CAACCA | 0.03 | p.R304fs |
| T2 | FAM216B | 144809 | 13 | 43362741 | Missense | C | T | 0.354 | p.R79W |
| T2 | OC10099675 | 100996758 | 10 | 47087160 | Missense | C | T | 0.161 | p.T126M |
| T2 | LDLRAD1 | 388633 | 1 | 54479980 | Frame_Shift_Del | AGCAGAGAG | A | 0.039 | p.A41fs |
| T2 | OGFOD1 | 55239 | 16 | 56504676 | Missense | G | C | 0.489 | p.E420Q |
| T2 | ZIM2 | 23619 | 19 | 57286460 | Missense | C | T | 0.3 | p.V394I |
| T2 | AAK1 | 22848 | 2 | 69741759 | In_Frame_Del | TTGTTGC | T | 0.033 | p.538_540del |
| T2 | PCSK5 | 5125 | 9 | 78638654 | Frame_Shift_Del | CAATACACAT | C | 0.034 | p.H138fs |
| T2 | ZMIZ1 | 57178 | 10 | 81052027 | Missense | G | C | 0.368 | p.A291P |
| T2 | VPS13B | 157680 | 8 | 100287404 | Missense | C | G | 0.447 | p.P916A |
| T2 | MUC17 | 140453 | 7 | 100682097 | Missense | C | T | 0.404 | p.P2467L |
| T2 | TMTC4 | 84899 | 13 | 101287069 | Missense | A | T | 0.37 | p.L369H |
| T2 | NRAS | 4893 | 1 | 115258748 | Missense | C | A | 0.388 | p.G12C |
| T2 | ASTN1 | 460 | 1 | 176915222 | Missense | G | A | 0.333 | p.R697C |
| T2 | LAMC2 | 3918 | 1 | 183200138 | Missense | G | A | 0.315 | p.R586Q |
| T2 | NEU2 | 4759 | 2 | 233899459 | Frame_Shift_Del | CCCCGCTCG | T | 0.023 | p.F279fs |
| T20 | WFS1 | 7466 | 4 | 6293694 | Missense | C | T | 0.419 | p.R228C |
| T20 | MUC16 | 94025 | 19 | 9017469 | Missense | G | A | 0.299 | p.R12619C |
| T20 | RGL3 | 57139 | 19 | 11516069 | Missense | G | A | 0.452 | p.R344C |
| T20 | THSD7A | 221981 | 7 | 11676142 | Missense | C | T | 0.401 | p.G213R |
| T20 | CABLES1 | 91768 | 18 | 20716014 | In_Frame_Del | GGGCGCCGGC | G | 0.2 | p.97_99del |
| T20 | CARD10 | 29775 | 22 | 37906308 | In_Frame_Del | GCTCCTT | G | 0.037 | p.272_273del |
| T20 | ZNF526 | 116115 | 19 | 42730105 | Missense | G | A | 0.472 | p.R517H |
| T20 | TCEB3CL | 728929 | 18 | 44555147 | Missense | T | G | 0.098 | p.E356A |
| T20 | FRYL | 285527 | 4 | 48536568 | Nonsense | A | T | 0.544 | p.Y2233X |
| T20 | RLIM | 51132 | X | 73812351 | Frame_Shift_Del | GC | G | 0.111 | p.R266fs |
| T20 | CEP131 | 22994 | 17 | 79163753 | Missense | T | C | 0.4 | p.K1008E |
| T20 | ADAMTS19 | 171019 | 5 | 128797038 | Missense | C | A | 0.538 | p.P106Q |
| T20 | C9orf116 | 138162 | 9 | 138387325 | Missense | C | T | 0.509 | p.R120Q |
| T20 | NOTCH1 | 4851 | 9 | 139399396 | In_Frame_Ins | C | CCGG | 0.351 | p.E1583delinsPE |
| T20 | GPR50 | 9248 | X | 150349557 | In_Frame_Del | ACCACTGGC | C | 0.021 | p.501_505del |
| T21 | UBE2I | 7329 | 16 | 1370216 | Missense | T | C | 0.437 | p.S89P |
| T21 | PXDN | 7837 | 2 | 1652917 | Missense | C | T | 0.385 | p.V879M |
| T21 | ZBTB7A | 51341 | 19 | 4055212 | Missense | C | T | 0.919 | p.G7S |
| T21 | GPR108 | 56927 | 19 | 6736697 | Missense | A | G | 0.947 | p.L49P |
| T21 | PHF23 | 79142 | 17 | 7139248 | Splice_Site | C | T | 0.398 | - |
| T21 | MUC16 | 94025 | 19 | 9089908 | Missense | G | C | 0.942 | p.T636R |
| T21 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.944 | p.M511I |
| T21 | HOXA6 | 3203 | 7 | 27187164 | Missense | G | A | 0.248 | p.R69W |
| T21 | NEUROD6 | 63974 | 7 | 31378653 | Missense | C | T | 0.442 | p.R77K |
| T21 | PLEKHA4 | 57664 | 19 | 49357512 | Missense | G | A | 0.445 | p.P328S |
| T21 | KCNH5 | 27133 | 14 | 63175035 | Missense | G | A | 0.406 | p.R720W |
| T21 | DYSF | 8291 | 2 | 71838661 | Missense | G | A | 0.456 | p.V1344M |
| T21 | LDB3 | 11155 | 10 | 88477870 | Missense | T | C | 0.484 | p.L499P |
| T21 | FAT3 | 120114 | 11 | 92616217 | Missense | G | A | 0.085 | p.A4199T |
| T21 | SORBS1 | 10580 | 10 | 97197313 | Splice_Site | C | A | 0.175 | - |
| T21 | LRRC17 | 10234 | 7 | 102580026 | Missense | G | A | 0.383 | p.D308N |
| T21 | ARHGEF38 | 54848 | 4 | 106473956 | Frame_Shift_Del | AT | A | 0.322 | p.M12fs |
| T21 | ARHGEF38 | 54848 | 4 | 106473958 | Frame_Shift_Ins | G | CCCTTCA | 0.319 | p.M12fs |
| T21 | IGSF1 | 3547 | X | 130420579 | Missense | G | A | 0.926 | p.R24W |
| T21 | PHF6 | 84295 | X | 133551319 | Nonsense | C | T | 0.941 | p.R319X |
| T21 | TIGD5 | 84948 | 8 | 144681088 | Missense | G | A | 0.504 | p.G339S |
| T21 | ANKUB1 | 389161 | 3 | 149485559 | Missense | A | T | 0.461 | p.M297K |
| T21 | SCN1A | 6323 | 2 | 166900483 | Missense | C | T | 0.457 | p.R580Q |
| T21 | FAM117B | 150864 | 2 | 203500141 | In_Frame_Del | AGGC | A | 0.121 | p.78_78del |
| T21 | CNTN2 | 6900 | 1 | 205036304 | Missense | G | A | 0.333 | p.R684Q |
| T24 | MISP | 126353 | 19 | 758441 | Missense | G | A | 0.411 | p.V499M |
| T24 | SLC35E2B | 728661 | 1 | 1602963 | Missense | G | T | 0.247 | p.T231N |
| T24 | MXD4 | 10608 | 4 | 2252952 | Missense | G | A | 0.3 | p.R111W |
| T24 | MEGF6 | 1953 | 1 | 3416377 | Missense | C | G | 0.433 | p.G940A |
| T24 | OR51I1 | 390063 | 11 | 5462321 | Missense | G | A | 0.379 | p.R142C |
| T24 | JAG1 | 182 | 20 | 10630906 | Missense | G | A | 0.375 | p.T408M |
| T24 | CCDC144A | 9720 | 17 | 16667443 | Missense | G | T | 0.456 | p.R1351I |
| T24 | RSU1 | 6251 | 10 | 16794991 | Missense | G | A | 0.521 | p.R84C |
| T24 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.377 | p.M511I |

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|---|---|---|---|---|---|---|---|---|---|
| T24 | ZFHX2 | 85446 | 14 | 23994131 | Missense | G | A | 0.179 | p.R1674C |
| T24 | SARM1 | 23098 | 17 | 26708481 | Missense | C | T | 0.351 | p.R243C |
| T24 | SUZ12 | 23512 | 17 | 30303634 | Splice_Site | G | T | 0.375 | - |
| T24 | SUZ12 | 23512 | 17 | 30325743 | In_Frame_Del | AATT | A | 0.3 | p.648_648del |
| T24 | RNF40 | 9810 | 16 | 30774604 | Nonsense | C | T | 0.289 | p.Q100X |
| T24 | NECAB3 | 63941 | 20 | 32247523 | Missense | G | T | 0.452 | p.A220D |
| T24 | KRTAP4-4 | 84616 | 17 | 39316505 | Missense | G | A | 0.346 | p.R147C |
| T24 | FCGBP | 8857 | 19 | 40433211 | Missense | C | T | 0.444 | p.G353D |
| T24 | MYLK3 | 91807 | 16 | 46766279 | Missense | C | T | 0.422 | p.D435N |
| T24 | PTPN23 | 25930 | 3 | 47450743 | Missense | G | A | 0.126 | p.R578H |
| T24 | OR5M8 | 219484 | 11 | 56258392 | Missense | G | A | 0.09 | p.A152V |
| T24 | USP1 | 7398 | 1 | 62907248 | Frame_Shift_Ins | G | GGGGC | 0.321 | p.G87fs |
| T24 | USP1 | 7398 | 1 | 62907251 | Missense | A | G | 0.321 | p.N88S |
| T24 | JAK1 | 3716 | 1 | 65312362 | Missense | G | A | 0.365 | p.L653F |
| T24 | MTHFD2L | 441024 | 4 | 75147252 | Missense | G | A | 0.425 | p.D306N |
| T24 | MTRNR2L2 | 100462981 | 5 | 79945871 | Missense | G | A | 0.143 | p.S12L |
| T24 | WNK2 | 65268 | 9 | 96079838 | Missense | C | G | 0.345 | p.L2185V |
| T24 | GRIN3A | 116443 | 9 | 104432526 | Missense | C | G | 0.46 | p.C723S |
| T24 | NOTCH1 | 4851 | 9 | 139390864 | Nonsense | C | TTAATAT | 0.159 | 43_Q2444delinsNILGYX |
| T24 | NOTCH1 | 4851 | 9 | 139412284 | Missense | T | C | 0.434 | p.N454S |
| T24 | ZNF827 | 152485 | 4 | 146791446 | Missense | C | A | 0.431 | p.R644S |
| T24 | GRIA1 | 2890 | 5 | 153026664 | Missense | C | T | 0.318 | p.L133F |
| T24 | FBXW7 | 55294 | 4 | 153249468 | Missense | C | A | 0.507 | p.G437V |
| T24 | GABRA6 | 2559 | 5 | 161115962 | Missense | C | T | 0.344 | p.T78M |
| T24 | PBX1 | 5087 | 1 | 164815912 | Nonstop | G | T | 0.435 | p.X431L |
| T24 | GPRIN1 | 114787 | 5 | 176025652 | Missense | G | A | 0.417 | p.T395M |
| T24 | USP13 | 8975 | 3 | 179499560 | Missense | G | A | 0.129 | p.G816E |
| T24 | FAT1 | 2195 | 4 | 187521311 | Missense | G | T | 0.415 | p.N3948K |
| T26 | AGRN | 375790 | 1 | 981860 | Frame_Shift_Ins | G | GC | 0.419 | p.A999fs |
| T26 | SNTG2 | 54221 | 2 | 1133411 | Frame_Shift_Del | TTCTTACTTTG | A | 0.043 | p.V124fs |
| T26 | TGM3 | 7053 | 20 | 2297798 | Missense | G | A | 0.421 | p.G252S |
| T26 | UBALD1 | 124402 | 16 | 4659678 | Missense | T | A | 0.495 | p.T164S |
| T26 | ADCY2 | 108 | 5 | 7695884 | Missense | G | A | 0.51 | p.V297I |
| T26 | FAM90A1 | 55138 | 12 | 8375278 | Missense | C | T | 0.5 | p.V179I |
| T26 | ANKRD62 | 342850 | 18 | 12122424 | Missense | G | A | 0.431 | p.V455I |
| T26 | GOLGA6L1 | 283767 | 15 | 22743132 | Missense | A | C | 0.29 | p.D506A |
| T26 | HTR1D | 3352 | 1 | 23519593 | Missense | G | A | 0.392 | p.R374W |
| T26 | RUNX1 | 861 | 21 | 36252937 | Frame_Shift_Ins | G | GCAGCA | 0.448 | p.A115fs |
| T26 | MED1 | 5469 | 17 | 37599785 | Frame_Shift_Del | CCTTTGAGAC | T | 0.051 | p.L62fs |
| T26 | CTAGE5 | 4253 | 14 | 39748703 | Missense | A | T | 0.138 | p.S61C |
| T26 | AXL | 558 | 19 | 41765541 | Missense | C | T | 0.402 | p.T538I |
| T26 | PNPLA3 | 80339 | 22 | 44328758 | Nonsense | C | T | 0.303 | p.R163X |
| T26 | CDC27 | 996 | 17 | 45234298 | Missense | G | C | 0.158 | p.L275V |
| T26 | CDC27 | 996 | 17 | 45234343 | Missense | T | G | 0.158 | p.N260H |
| T26 | KIR3DL2 | 3812 | 19 | 55363726 | Missense | T | C | 0.439 | p.I115T |
| T26 | C20orf85 | 128602 | 20 | 56735720 | Missense | T | C | 0.544 | p.F86L |
| T26 | AR | 367 | X | 66942759 | Frame_Shift_Ins | G | GA | 0.909 | p.R847fs |
| T26 | CTNNA3 | 29119 | 10 | 69407205 | Missense | C | T | 0.267 | p.V23M |
| T26 | ZNF410 | 57862 | 14 | 74391415 | Missense | C | T | 0.138 | p.P487L |
| T26 | NAV3 | 89795 | 12 | 78392230 | Missense | C | T | 0.364 | p.P285L |
| T26 | SEMA3A | 10371 | 7 | 83592585 | Missense | G | A | 0.527 | p.P599L |
| T26 | SLITRK5 | 26050 | 13 | 88328236 | Missense | G | A | 0.443 | p.R198H |
| T26 | SLC24A4 | 123041 | 14 | 92908467 | Missense | C | A | 0.534 | p.T143N |
| T26 | DLX6 | 1750 | 7 | 96635363 | In_Frame_Del | GGCAGCA | G | 0.027 | p.25_27del |
| T26 | ARHGAP42 | 143872 | 11 | 100814520 | Frame_Shift_Del | TTTAAA | T | 0.092 | p.F322fs |
| T26 | SH2B3 | 10019 | 12 | 111885334 | Nonsense | C | T | 0.764 | p.Q408X |
| T26 | CSMD3 | 114788 | 8 | 113418903 | Missense | C | T | 0.462 | p.G1783R |
| T26 | ROBO3 | 64221 | 11 | 124747075 | Missense | C | T | 0.485 | p.P933L |
| T26 | BCORL1 | 63035 | X | 129149689 | Nonsense | A | T | 0.92 | p.K981X |
| T26 | COL6A5 | 256076 | 3 | 130174322 | Frame_Shift_Ins | A | AT | 0.348 | p.D2201fs |
| T26 | KNDC1 | 85442 | 10 | 135012267 | Missense | G | A | 0.409 | p.R752H |
| T26 | NOTCH1 | 4851 | 9 | 139399392 | In_Frame_Ins | T | TTCCCCA | 0.331 | p.Q1584delinsLGK |
| T26 | CDX1 | 1044 | 5 | 149546662 | Missense | G | A | 0.409 | p.A75T |
| T26 | SMC4 | 10051 | 3 | 160142811 | Splice_Site | T | GCGTGAG | 0.061 | - |
| T26 | CDHR2 | 54825 | 5 | 175992384 | Missense | C | T | 0.442 | p.L11F |
| T26 | FGFR4 | 2264 | 5 | 176524321 | Missense | G | A | 0.5 | p.A688T |
| T27 | TUBB8 | 347688 | 10 | 94040 | Missense | C | T | 0.57 | p.G98R |
| T27 | MKNK2 | 2872 | 19 | 2042871 | Splice_Site | TGGGCA | T | 0.021 | - |
| T27 | COL5A3 | 50509 | 19 | 10071557 | Missense | C | T | 0.143 | p.V1621M |
| T27 | BLK | 640 | 8 | 11418935 | Frame_Shift_Ins | T | TCAGC | 0.158 | p.I385fs |
| T27 | ETV6 | 2120 | 12 | 11905444 | Frame_Shift_Del | CTTCATGTTCC | C | 0.277 | p.P32fs |
| T27 | ETV6 | 2120 | 12 | 11905463 | Frame_Shift_Del | GAGCGCTCAC | C | 0.291 | p.P38fs |
| T27 | MYCN | 4613 | 2 | 16082944 | Missense | G | T | 0.469 | p.S253I |
| T27 | AEBP2 | 121536 | 12 | 19671020 | Splice_Site | G | A | 0.51 | - |
| T27 | CCDC116 | 164592 | 22 | 21989236 | Missense | G | A | 0.426 | p.R295H |
| T27 | POLR3E | 55718 | 16 | 22324983 | Missense | G | A | 0.303 | p.R100Q |
| T27 | ERN2 | 10595 | 16 | 23717680 | Missense | G | A | 0.421 | p.A235V |
| T27 | KCTD1 | 284252 | 18 | 24039685 | Missense | C | T | 0.393 | p.G172S |
| T27 | YME1L1 | 10730 | 10 | 27436579 | Missense | G | T | 0.445 | p.L63M |
| T27 | LINGO2 | 158038 | 9 | 27949217 | Missense | C | T | 0.436 | p.A485T |
| T27 | INMT | 11185 | 7 | 30795084 | Missense | C | T | 0.473 | p.R136W |
| T27 | ASXL1 | 171023 | 20 | 31022286 | Nonsense | T | TTTTATT | 0.406 | 591_Q592delinsFVLLX |
| T27 | NLRC4 | 58484 | 2 | 32466113 | Frame_Shift_Del | ATCTTCTTCA | G | 0.037 | p.N776fs |
| T27 | SLC39A6 | 25800 | 18 | 33704592 | Missense | G | C | 0.484 | p.F12L |
| T27 | ADAMTS12 | 81792 | 5 | 33891855 | Missense | C | T | 0.128 | p.R36H |
| T27 | DCTN3 | 11258 | 9 | 34613841 | Nonsense | G | A | 0.452 | p.Q139X |
| T27 | GJD2 | 57369 | 15 | 35045055 | Missense | C | T | 0.102 | p.R197H |
| T27 | SOGA1 | 140710 | 20 | 35422035 | Missense | C | T | 0.426 | p.V1484I |
| T27 | IL7R | 3575 | 5 | 35867418 | Missense | G | A | 0.415 | p.V78M |
| T27 | SBSN | 374897 | 19 | 36019114 | Missense | C | T | 0.472 | p.A24T |
| T27 | VIT | 5212 | 2 | 37035765 | Missense | G | A | 0.498 | p.V478I |
| T27 | STAT5B | 6777 | 17 | 40354460 | Missense | A | T | 0.403 | p.V712E |
| T27 | G6PC | 2538 | 17 | 41063405 | Missense | G | A | 0.239 | p.A346T |
| T27 | HIVEP3 | 59269 | 1 | 42048592 | Missense | C | T | 0.088 | p.S626N |
| T27 | CELSR1 | 9620 | 22 | 46763007 | Missense | G | T | 0.517 | p.F2696L |
| T27 | KRT2 | 3849 | 12 | 53045898 | Missense | C | T | 0.439 | p.R10Q |
| T27 | KANK4 | 163782 | 1 | 62739772 | Missense | G | A | 0.161 | p.A335V |
| T27 | PRICKLE2 | 166336 | 3 | 64085079 | Missense | C | T | 0.406 | p.R728H |
| T27 | CACHD1 | 57685 | 1 | 65068580 | Nonsense | C | T | 0.446 | p.R117X |
| T27 | JAK1 | 3716 | 1 | 65304237 | Missense | G | T | 0.257 | p.P960T |
| T27 | JAK1 | 3716 | 1 | 65312365 | Missense | A | G | 0.121 | p.Y652H |
| T27 | LPHN2 | 23266 | 1 | 82372740 | Nonsense | C | T | 0.594 | p.R38X |
| T27 | TSPAN19 | 144448 | 12 | 85409696 | Missense | C | T | 0.887 | p.G217R |
| T27 | EED | 8726 | 11 | 85988161 | Missense | C | T | 0.175 | p.S369F |
| T27 | EML5 | 161436 | 14 | 89093362 | Missense | G | C | 0.492 | p.H1520Q |
| T27 | ATP2B1 | 490 | 12 | 90005107 | Frame_Shift_Del | CAG | C | 0.898 | p.T703fs |
| T27 | AMPD2 | 271 | 1 | 110169899 | Missense | G | T | 0.133 | p.G209V |
| T27 | SH2B3 | 10019 | 12 | 111884605 | Missense | C | T | 0.845 | p.R261W |
| T27 | HTR2C | 3358 | X | 114141727 | Nonsense | C | T | 0.164 | p.R376X |
| T27 | ZNF202 | 7753 | 11 | 123601323 | Missense | C | T | 0.425 | p.E92K |
| T27 | OR8G5 | 219865 | 11 | 124135738 | Missense | C | T | 0.451 | p.T339M |
| T27 | CCDC92 | 80212 | 12 | 124421689 | Missense | C | A | 0.29 | p.Q304H |
| T27 | PHF6 | 84295 | X | 133549087 | Frame_Shift_Ins | A | AG | 0.897 | p.R257fs |
| T27 | NOTCH1 | 4851 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.382 | p.L2335fs |

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|---|---|---|---|---|---|---|---|---|---|
| T27 | NBPF10 | 100132406 | 1 | 145298252 | Missense | C | G | 0.141 | p.Q222E |
| T27 | SLC6A7 | 6534 | 5 | 149578909 | Frame_Shift_Del | GGT | G | 0.101 | p.G235fs |
| T27 | HMP19 | 51617 | 5 | 173534464 | Missense | G | A | 0.408 | p.A158T |
| T27 | MTNR1A | 4543 | 4 | 187476471 | Missense | G | A | 0.433 | p.R17C |
| T27 | COL5A2 | 1290 | 2 | 189949935 | Missense | G | A | 0.158 | p.P250L |
| T27 | SLC4A3 | 6508 | 2 | 220505284 | Missense | C | T | 0.082 | p.P1137L |
| T27 | PTMA | 5757 | 2 | 232577548 | Frame_Shift_Ins | A | AC | 0.409 | p.D108fs |
| T27 | OR2T2 | 401992 | 1 | 248616704 | Frame_Shift_Del | CTGCTGCG | C | 0.027 | p.C203fs |
| T28 | PIK3CD | 5293 | 1 | 9787030 | Missense | G | A | 0.326 | p.E1021K |
| T28 | NOTCH3 | 4854 | 19 | 15281634 | Missense | G | A | 0.366 | p.S1580L |
| T28 | DERA | 51071 | 12 | 16185506 | In_Frame_Del | CACCTTCCCG | A | 0.04 | p.223_237del |
| T28 | HEATR9 | 256957 | 17 | 34192322 | In_Frame_Del | AGCAGTACGG | A | 0.025 | p.70_72del |
| T28 | DPH6 | 89978 | 15 | 35814354 | Missense | G | T | 0.106 | p.S146R |
| T28 | ZNF345 | 25850 | 19 | 37368236 | Missense | C | A | 0.093 | p.H168Q |
| T28 | SPATA5L1 | 79029 | 15 | 45706846 | Frame_Shift_Del | ATGTGCTAAA | T | 0.037 | p.G505fs |
| T28 | CACNG6 | 59285 | 19 | 54496375 | In_Frame_Del | GAAGGCGTG | G | 0.023 | p.82_90del |
| T28 | TFAP2C | 7022 | 20 | 55206457 | Frame_Shift_Ins | C | CA | 0.362 | p.A82fs |
| T28 | CLHC1 | 130162 | 2 | 55404795 | Missense | C | A | 0.098 | p.A381S |
| T28 | ZNF444 | 55311 | 19 | 56671272 | In_Frame_Del | ACCCCGGCAG | A | 0.039 | p.228_231del |
| T28 | CELF6 | 60677 | 15 | 72581257 | Missense | C | T | 0.409 | p.V349M |
| T28 | FABP5 | 2171 | 8 | 82196169 | Missense | G | C | 0.45 | p.S105T |
| T28 | SPATA31E1 | 286234 | 9 | 90500399 | Missense | G | A | 0.369 | p.D333N |
| T28 | ATP11A | 23250 | 13 | 113439560 | Missense | G | A | 0.437 | p.V51I |
| T28 | NR5A1 | 2516 | 9 | 127262802 | Missense | C | G | 0.351 | p.G146A |
| T28 | FPGS | 2356 | 9 | 130565267 | Missense | A | G | 0.4 | p.I22V |
| T28 | PODXL | 5420 | 7 | 131241026 | In_Frame_Ins | G | GAAGGGC | 0.026 | p.S31delinsSPF |
| T28 | SET | 6418 | 9 | 131456941 | In_Frame_Del | TA | T | 0.148 | p.X291X |
| T28 | SURF6 | 6838 | 9 | 136199551 | Missense | G | A | 0.276 | p.R147W |
| T28 | CCDC183 | 84960 | 9 | 139694569 | Missense | A | C | 0.235 | p.D129A |
| T28 | OR2F2 | 135948 | 7 | 143633166 | Missense | G | T | 0.239 | p.V281F |
| T28 | OR2F2 | 135948 | 7 | 143633167 | Missense | T | G | 0.243 | p.V281G |
| T28 | NBPF15 | 284565 | 1 | 148579683 | Missense | C | A | 0.345 | p.Q85K |
| T28 | ZNF862 | 643641 | 7 | 149544896 | Missense | C | T | 0.344 | p.P105L |
| T28 | FBXW7 | 55294 | 4 | 153244155 | Frame_Shift_Ins | T | TC | 0.378 | p.S550fs |
| T28 | TTN | 7273 | 2 | 179438150 | Missense | C | A | 0.105 | p.D15172Y |
| T28 | HLX | 3142 | 1 | 221057831 | Missense | G | T | 0.328 | p.A418S |
| T28 | TAF1A | 9015 | 1 | 222734779 | Frame_Shift_Del | TG | T | 0.115 | p.A275fs |
| T28 | TTC13 | 79573 | 1 | 231081178 | Missense | G | T | 0.114 | p.A179E |
| T29 | STK35 | 140901 | 20 | 2097986 | Missense | C | G | 0.413 | p.L523V |
| T29 | SLC2A4 | 6517 | 17 | 7189833 | Missense | G | A | 0.481 | p.R472Q |
| T29 | FGD5 | 152273 | 3 | 14862436 | Missense | G | A | 0.422 | p.D620N |
| T29 | OR11H1 | 81061 | 22 | 16449104 | Missense | G | A | 0.464 | p.T234I |
| T29 | ZNF536 | 9745 | 19 | 30936514 | Missense | C | T | 0.549 | p.S682L |
| T29 | COL11A2 | 1302 | 6 | 33137252 | Missense | G | A | 0.203 | p.R1129C |
| T29 | TMEM178A | 130733 | 2 | 39944282 | Missense | G | T | 0.436 | p.W80L |
| T29 | PVRL2 | 5819 | 19 | 45385512 | Missense | G | A | 0.128 | p.G363R |
| T29 | ZNF528 | 84436 | 19 | 52919655 | Missense | G | A | 0.446 | p.G517E |
| T29 | HUWE1 | 10075 | X | 53634648 | Missense | C | T | 0.828 | p.E778K |
| T29 | OR5F1 | 338674 | 11 | 55762079 | Missense | G | A | 0.475 | p.S8L |
| T29 | CTCF | 10664 | 16 | 67645919 | Missense | C | T | 0.337 | p.R283C |
| T29 | MTRNR2L2 | 100462981 | 5 | 79945871 | Missense | G | A | 0.226 | p.S12L |
| T29 | PLXNC1 | 10154 | 12 | 94543724 | Frame_Shift_Ins | C | GTCCCCG | 0.429 | p.T326fs |
| T29 | BCL11B | 64919 | 14 | 99641778 | Frame_Shift_Ins | C | CAA | 0.457 | p.S393fs |
| T29 | ZBTB11 | 27107 | 3 | 101374971 | Frame_Shift_Del | TG | T | 0.352 | p.Q723fs |
| T29 | COL6A5 | 256076 | 3 | 130095517 | Missense | G | T | 0.434 | p.V169L |
| T29 | NOTCH1 | 4851 | 9 | 139397639 | Missense | A | C | 0.479 | p.V1721G |
| T29 | AGO2 | 27161 | 8 | 141549499 | Frame_Shift_Del | CTT | C | 0.438 | p.K696fs |
| T29 | KMT2C | 58508 | 7 | 151859336 | Frame_Shift_Del | GTT | G | 0.39 | p.E3775fs |
| T29 | RSPH3 | 83861 | 6 | 159420663 | Frame_Shift_Ins | G | GAACAT | 0.02 | p.L116fs |
| T29 | KIAA1804 | 84451 | 1 | 233507889 | Missense | G | C | 0.527 | p.R553P |
| T3 | EXOC3 | 11336 | 5 | 446429 | Missense | G | A | 0.452 | p.A37T |
| T3 | SCRT2 | 85508 | 20 | 644779 | Missense | G | A | 0.512 | p.R154W |
| T3 | TPPP | 11076 | 5 | 665303 | Missense | G | A | 0.427 | p.R192C |
| T3 | MUC2 | 4583 | 11 | 1093286 | Missense | C | G | 0.148 | p.T1702S |
| T3 | APC2 | 10297 | 19 | 1455418 | Missense | G | T | 0.203 | p.Q186H |
| T3 | ASMT | 438 | X | 1761894 | Nonsense | T | A | 0.363 | p.L295X |
| T3 | NAA60 | 79903 | 16 | 3526253 | Missense | C | T | 0.45 | p.A9V |
| T3 | ADAMTS16 | 170690 | 5 | 5182334 | Nonsense | G | T | 0.42 | p.E227X |
| T3 | DSP | 1832 | 6 | 7579973 | Missense | C | T | 0.449 | p.R1184W |
| T3 | DNAH2 | 146754 | 17 | 7646391 | Missense | G | A | 0.443 | p.R612Q |
| T3 | MFSD6L | 162387 | 17 | 8701244 | Missense | C | T | 0.465 | p.G399S |
| T3 | NTN1 | 9423 | 17 | 9143249 | Missense | G | C | 0.369 | p.Q593H |
| T3 | GRIN2B | 2904 | 12 | 13717393 | Missense | G | A | 0.471 | p.R927W |
| T3 | RRAS2 | 22800 | 11 | 14380350 | Missense | C | T | 0.94 | p.G23S |
| T3 | JAK3 | 3718 | 19 | 17945918 | Missense | A | G | 0.924 | p.V674A |
| T3 | KIAA1683 | 80726 | 19 | 18375295 | Missense | C | T | 0.444 | p.A1019T |
| T3 | TUBA3C | 7278 | 13 | 19751657 | Missense | G | A | 0.469 | p.R156W |
| T3 | NOVA1 | 4857 | 14 | 26918057 | Missense | G | A | 0.446 | p.P187L |
| T3 | KDM8 | 79831 | 16 | 27226307 | Missense | T | C | 0.442 | p.I297T |
| T3 | SUZ12 | 23512 | 17 | 30315460 | Frame_Shift_Del | CAG | C | 0.455 | p.S382fs |
| T3 | SUZ12 | 23512 | 17 | 30323848 | Missense | G | A | 0.48 | p.G609E |
| T3 | PATZ1 | 23598 | 22 | 31740484 | Missense | G | T | 0.447 | p.H369N |
| T3 | WT1 | 7490 | 11 | 32417915 | Frame_Shift_Ins | T | AGAGTCC | 0.42 | p.V362fs |
| T3 | KCNG3 | 170850 | 2 | 42720545 | Missense | G | A | 0.504 | p.R33C |
| T3 | PDK2 | 5164 | 17 | 48174898 | Missense | G | A | 0.484 | p.S13N |
| T3 | ANKRD33 | 341405 | 12 | 52284407 | Missense | C | T | 0.441 | p.T101M |
| T3 | MYO5C | 55930 | 15 | 52536611 | Nonsense | G | A | 0.395 | p.R778X |
| T3 | LRTM1 | 57408 | 3 | 54959131 | Missense | C | A | 0.305 | p.G40V |
| T3 | IL31RA | 133396 | 5 | 55147430 | Missense | C | T | 0.426 | p.T11M |
| T3 | JAK1 | 3716 | 1 | 65316516 | Missense | C | T | 0.509 | p.D576N |
| T3 | RIMS1 | 22999 | 6 | 72961032 | Nonsense | C | T | 0.414 | p.R361X |
| T3 | SEMA3C | 10512 | 7 | 80433459 | Missense | G | A | 0.441 | p.T255M |
| T3 | PIEZO1 | 9780 | 16 | 88789411 | Missense | C | T | 0.491 | p.S1501N |
| T3 | UBE2D3 | 7323 | 4 | 103730846 | Missense | C | T | 0.429 | p.A35T |
| T3 | FRMPD3 | 84443 | X | 106846477 | In_Frame_Del | ACAGCAG | A | 0.024 | p.1770_1771del |
| T3 | LAMB1 | 3912 | 7 | 107618590 | Missense | C | T | 0.42 | p.R301K |
| T3 | ANKRD10 | 55608 | 13 | 111545417 | Missense | C | T | 0.466 | p.E217K |
| T3 | MBD4 | 8930 | 3 | 129158577 | Missense | G | A | 0.452 | p.L34F |
| T3 | PHF6 | 84295 | X | 133547940 | Nonsense | C | T | 0.951 | p.R225X |
| T3 | EPHB1 | 2047 | 3 | 134967309 | Missense | G | A | 0.396 | p.R883Q |
| T3 | NOTCH1 | 4851 | 9 | 139391169 | Frame_Shift_Del | GGGCCTGTGT | G | 0.321 | p.L2335fs |
| T3 | NOTCH1 | 4851 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.483 | p.1578_1578del |
| T3 | CNTNAP2 | 26047 | 7 | 146818214 | Missense | C | T | 0.426 | p.R300C |
| T3 | FAM153B | 202134 | 5 | 175528103 | Missense | G | T | 0.348 | p.A129S |
| T3 | HOXD10 | 3236 | 2 | 176982174 | Missense | G | A | 0.446 | p.V205M |
| T3 | ELF3 | 1999 | 1 | 201981863 | Missense | G | A | 0.457 | p.G192S |
| T3 | SPEG | 10290 | 2 | 220313057 | Missense | C | A | 0.484 | p.L393M |
| T3 | DNER | 92737 | 2 | 230231694 | Missense | C | T | 0.429 | p.R666H |
| T3 | COL6A3 | 1293 | 2 | 238234341 | Missense | C | T | 0.51 | p.G2512R |
| T3 | OR2L2 | 26246 | 1 | 248202045 | Missense | C | A | 0.474 | p.T159K |
| T30 | CHD3 | 1107 | 17 | 7788211 | In_Frame_Del | CGAG | C | 0.176 | p.30_30del |
| T30 | ANKRD30B | 374860 | 18 | 14797674 | Missense | G | A | 0.183 | p.D648N |
| T30 | IQGAP2 | 10788 | 5 | 75896757 | Missense | G | A | 0.081 | p.A348T |
| T30 | NOTCH1 | 4851 | 9 | 139391019 | Frame_Shift_Ins | T | TC | 0.165 | p.Q2391fs |

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|---|---|---|---|---|---|---|---|---|---|
| T31 | SERPINB6 | 5269 | 6 | 2955802 | Missense | T | C | 0.113 | p.M104V |
| T31 | MXRA5 | 25878 | X | 3239545 | Missense | C | T | 0.171 | p.G1394D |
| T31 | MXRA5 | 25878 | X | 3241256 | Missense | T | C | 0.121 | p.I824V |
| T31 | OR51I2 | 390064 | 11 | 5475506 | Missense | G | A | 0.081 | p.R263H |
| T31 | HDHD1 | 8226 | X | 6975752 | Missense | G | T | 0.123 | p.T208N |
| T31 | ALOX15B | 247 | 17 | 7942821 | In_Frame_Ins | T | CGCTGGT | 0.027 | p.C89delinsCRWFR |
| T31 | MID1 | 4281 | X | 10474513 | Missense | C | T | 0.096 | p.V219I |
| T31 | MASP2 | 10747 | 1 | 11090897 | Missense | A | G | 0.118 | p.V377A |
| T31 | USP17L2 | 377630 | 8 | 11996087 | Missense | C | G | 0.11 | p.Q61H |
| T31 | SEH1L | 81929 | 18 | 12986926 | In_Frame_Del | TTCCTCC | T | 0.021 | p.379_381del |
| T31 | LYL1 | 4066 | 19 | 13210464 | Frame_Shift_Ins | G | GCA | 0.389 | p.A171fs |
| T31 | SPEN | 23013 | 1 | 16256007 | Missense | T | C | 0.091 | p.L1091P |
| T31 | JAK3 | 3718 | 19 | 17949108 | Missense | C | A | 0.385 | p.M511I |
| T31 | TWIST1 | 7291 | 7 | 19156668 | In_Frame_Del | CCGCCGCCG | T | 0.031 | p.87_92del |
| T31 | RIN2 | 54453 | 20 | 19951534 | Missense | T | A | 0.094 | p.S197T |
| T31 | EDDM3B | 64184 | 14 | 21238322 | Missense | C | G | 0.085 | p.L5V |
| T31 | ZNF645 | 158506 | X | 22291606 | Missense | C | A | 0.095 | p.D166E |
| T31 | CSTL1 | 128817 | 20 | 23421101 | Missense | G | A | 0.114 | p.R66K |
| T31 | WSB1 | 26118 | 17 | 25628820 | Missense | T | C | 0.081 | p.L16S |
| T31 | ESCO2 | 157570 | 8 | 27634064 | Missense | C | T | 0.103 | p.A80V |
| T31 | HLA-DPB1 | 3115 | 6 | 33052981 | Missense | C | A | 0.357 | p.L207M |
| T31 | FUT10 | 84750 | 8 | 33246591 | Missense | G | C | 0.084 | p.L368V |
| T31 | UGDH | 7358 | 4 | 39515806 | Splice_Site | TAAAAAGA | T | 0.04 | - |
| T31 | NCR2 | 9436 | 6 | 41318424 | Missense | T | A | 0.13 | p.I218K |
| T31 | JPH2 | 57158 | 20 | 42788753 | Missense | G | A | 0.154 | p.A225V |
| T31 | MAOB | 4129 | X | 43626868 | Splice_Site | A | G | 0.094 | - |
| T31 | CFAP57 | 149465 | 1 | 43649508 | Missense | A | G | 0.088 | p.N241D |
| T31 | ZNF223 | 7766 | 19 | 44570393 | Missense | C | A | 0.083 | p.L138I |
| T31 | CXorf36 | 79742 | X | 45051111 | Missense | C | T | 0.098 | p.R128K |
| T31 | LPAR6 | 10161 | 13 | 48985622 | Frame_Shift_Ins | T | AGCTTCC | 0.311 | p.D313fs |
| T31 | LPAR6 | 10161 | 13 | 48985624 | Missense | A | C | 0.343 | p.S312R |
| T31 | LPAR6 | 10161 | 13 | 48985626 | Missense | T | A | 0.357 | p.S312C |
| T31 | SHROOM4 | 57477 | X | 50350758 | In_Frame_Ins | C | CTGCTGC | 0.032 | .Q1128delinsQQQQQ |
| T31 | ZNF615 | 284370 | 19 | 52497250 | Missense | G | A | 0.1 | p.T360I |
| T31 | PSME4 | 23198 | 2 | 54125495 | Splice_Site | T | C | 0.089 | - |
| T31 | LILRB3 | 11025 | 19 | 54745907 | Missense | A | G | 0.091 | p.M117T |
| T31 | GFRAL | 389400 | 6 | 55216330 | Missense | C | T | 0.373 | p.P217L |
| T31 | KIR3DL1 | 3811 | 19 | 55340836 | Missense | A | G | 0.084 | p.I341V |
| T31 | KIR2DS4 | 3809 | 19 | 55350948 | Missense | A | T | 0.095 | p.T146S |
| T31 | OR9G1 | 390174 | 11 | 56468020 | Missense | T | C | 0.167 | p.C53R |
| T31 | ZNF530 | 348327 | 19 | 58117223 | Missense | T | A | 0.116 | p.H110Q |
| T31 | SERPINB12 | 89777 | 18 | 61233985 | Missense | C | T | 0.227 | p.T320M |
| T31 | SERPINB2 | 5055 | 18 | 61570503 | Missense | C | G | 0.082 | p.N404K |
| T31 | SERPINB2 | 5055 | 18 | 61570529 | Missense | C | G | 0.082 | p.S413C |
| T31 | UGT2B28 | 54490 | 4 | 70156313 | Missense | T | A | 0.089 | p.L365H |
| T31 | TET1 | 80312 | 10 | 70332580 | Missense | A | G | 0.097 | p.D162G |
| T31 | GPR174 | 84636 | X | 78426988 | Missense | T | C | 0.131 | p.S162P |
| T31 | TMEM254 | 80195 | 10 | 81841692 | Missense | G | T | 0.087 | p.C93F |
| T31 | AKAP13 | 11214 | 15 | 86122779 | Missense | T | C | 0.093 | p.W494R |
| T31 | TGIF2LX | 90316 | X | 89177673 | Missense | G | A | 0.082 | p.V197I |
| T31 | TRIM49 | 57093 | 11 | 89531644 | Missense | G | A | 0.242 | p.S338L |
| T31 | PTEN | 5728 | 10 | 89717708 | In_Frame_Ins | C | CCCA | 0.391 | p.Q245delinsPK |
| T31 | KCNK13 | 56659 | 14 | 90650608 | Missense | G | A | 0.409 | p.R163Q |
| T31 | ATXN3 | 4287 | 14 | 92548785 | Missense | C | T | 0.086 | p.V91M |
| T31 | ARSK | 153642 | 5 | 94939193 | Missense | A | G | 0.083 | p.Q525R |
| T31 | DOCK9 | 23348 | 13 | 99540637 | Frame_Shift_Del | AAGTACTTAG | C | 0.022 | p.Y644fs |
| T31 | H2BFWT | 158983 | X | 103267865 | Missense | C | T | 0.143 | p.R123H |
| T31 | PCGF6 | 84108 | 10 | 105110740 | In_Frame_Ins | A | AGGAGGC | 0.037 | p.P28delinsPPP |
| T31 | USP53 | 54532 | 4 | 120214220 | In_Frame_Del | AAATGAGAC | T | 0.039 | p.1026_1036del |
| T31 | OR13H1 | 347468 | X | 130678844 | Missense | A | C | 0.082 | p.Y266S |
| T31 | CSF2 | 1437 | 5 | 131410551 | Missense | C | T | 0.486 | p.R84W |
| T31 | GPR112 | 139378 | X | 135429503 | Missense | C | A | 0.086 | p.T1213N |
| T31 | A4GNT | 51146 | 3 | 137843476 | Missense | G | T | 0.09 | p.A218D |
| T31 | SLU7 | 10569 | 5 | 159839529 | Splice_Site | T | TAAAAA | 0.039 | - |
| T31 | PARK2 | 5071 | 6 | 162622197 | Missense | C | T | 0.091 | p.S167N |
| T31 | XIRP2 | 129446 | 2 | 168107155 | Missense | G | A | 0.092 | p.A2863T |
| T31 | TBP | 6908 | 6 | 170871037 | In_Frame_Del | GCAA | G | 0.03 | p.52_52del |
| T31 | GPRIN1 | 114787 | 5 | 176026119 | In_Frame_Del | ACCCAGGAT | T | 0.124 | p.231_239del |
| T31 | RNASEL | 6041 | 1 | 182551337 | Missense | A | C | 0.115 | p.D541E |
| T31 | PIKFYVE | 200576 | 2 | 209189601 | Frame_Shift_Del | CAATGTTTTT | T | 0.035 | p.Q778fs |
| T31 | TRPM8 | 79054 | 2 | 234869651 | Nonsense | C | T | 0.344 | p.R532X |
| T32 | BAK-RBAKD | 100533952 | 7 | 5097350 | Nonsense | T | GGTGAAG | 0.042 | .L60_E61delinsWRX |
| T32 | NOP2 | 4839 | 12 | 6673319 | Frame_Shift_Del | TA | T | 0.129 | p.L190fs |
| T32 | SPEM1 | 374768 | 17 | 7324895 | Missense | T | A | 0.296 | p.W301R |
| T32 | CD68 | 968 | 17 | 7484197 | Frame_Shift_Del | CTCCTCCAGA | C | 0.022 | p.Q227fs |
| T32 | NANOGNB | 360030 | 12 | 7917942 | Missense | A | G | 0.145 | p.R21G |
| T32 | USP7 | 7874 | 16 | 9009170 | Frame_Shift_Ins | C | GGCAGGA | 0.478 | p.R324fs |
| T32 | USP7 | 7874 | 16 | 9009172 | Frame_Shift_Del | AT | A | 0.44 | p.Y323fs |
| T32 | ZNF426 | 79088 | 19 | 9639447 | Frame_Shift_Del | GGCCTTCTCT | C | 0.09 | p.L411fs |
| T32 | FOPNL | 123811 | 16 | 15977972 | Missense | C | T | 0.111 | p.R40H |
| T32 | SPEN | 23013 | 1 | 16265892 | Frame_Shift_Del | GCCTCCGTGT | C | 0.037 | p.H3656fs |
| T32 | ZDHHC20 | 253832 | 13 | 21975803 | In_Frame_Del | CTTAAGAAT | A | 0.079 | p.84_91del |
| T32 | PDSS1 | 23590 | 10 | 27024482 | Frame_Shift_Del | GGTCCT | G | 0.038 | p.G334fs |
| T32 | SCARA5 | 286133 | 8 | 27845021 | In_Frame_Del | GCTTGGACAG | C | 0.108 | p.23_37del |
| T32 | KIF3B | 9371 | 20 | 30898762 | In_Frame_Del | AGAGGAG | A | 0.036 | p.395_396del |
| T32 | NLRC4 | 58484 | 2 | 32475576 | Nonsense | G | A | 0.109 | p.R453X |
| T32 | LRFN3 | 79414 | 19 | 36435729 | Frame_Shift_Del | CCCGGCAAG | C | 0.027 | p.G566fs |
| T32 | MACF1 | 23499 | 1 | 39790308 | In_Frame_Del | TTCTGTCAGA | T | 0.053 | p.1469_1475del |
| T32 | MGA | 23269 | 15 | 42058556 | Frame_Shift_Del | GTGAATCAA | A | 0.043 | p.K2550fs |
| T32 | WBP2NL | 164684 | 22 | 42422994 | In_Frame_Del | CCTCTCGGAT | A | 0.056 | p.247_254del |
| T32 | ZNF106 | 64397 | 15 | 42717223 | Splice_Site | AAGATTACAG | T | 0.053 | - |
| T32 | ACKR2 | 1238 | 3 | 42906172 | Frame_Shift_Del | CTTCTTCTCA | G | 0.032 | p.G60fs |
| T32 | STARD9 | 57519 | 15 | 42976892 | Frame_Shift_Del | GGCATCAAAA | G | 0.029 | p.R1039fs |
| T32 | ZNF131 | 7690 | 5 | 43174684 | In_Frame_Del | GATGCTC | G | 0.056 | p.407_409del |
| T32 | SLC14A2 | 8170 | 18 | 43249271 | Frame_Shift_Del | CTGGGTACCA | C | 0.082 | p.P680fs |
| T32 | MKNK1 | 8569 | 1 | 47025879 | In_Frame_Del | AGAGCATTTA | T | 0.028 | p.345_350del |
| T32 | NBEAL2 | 23218 | 3 | 47047111 | Splice_Site | GTGCTCACAC | T | 0.024 | - |
| T32 | RACGAP1 | 29127 | 12 | 50400318 | Frame_Shift_Del | TCCTTGTATT | T | 0.041 | p.R46fs |
| T32 | ZNF347 | 84671 | 19 | 53644046 | Frame_Shift_Del | CTCCAGTAT | T | 0.063 | p.V675fs |
| T32 | FAM71E2 | 284418 | 19 | 55870813 | In_Frame_Del | TTCTGGGAT | T | 0.047 | p.465_474del |
| T32 | MED13 | 9969 | 17 | 60042674 | Frame_Shift_Del | TGCTGCTC | T | 0.025 | p.A1510fs |
| T32 | PIK3R1 | 5295 | 5 | 67591133 | In_Frame_Ins | A | ATCC | 0.288 | p.T213delinsIP |
| T32 | RLIM | 51132 | X | 73811721 | In_Frame_Del | ACTTGAACTG | G | 0.046 | p.465_476del |
| T32 | BIRC5 | 332 | 17 | 76212112 | Frame_Shift_Ins | C | CCT | 0.124 | p.T96fs |
| T32 | MYO6 | 4646 | 6 | 76596577 | In_Frame_Del | AAAAAACGA | A | 0.053 | p.842_855del |
| T32 | NUP54 | 53371 | 4 | 77065306 | In_Frame_Del | TTGCTGC | T | 0.049 | p.95_97del |
| T32 | PHIP | 55023 | 6 | 79707261 | Missense | G | A | 0.143 | p.R691C |
| T32 | LRRIQ1 | 84125 | 12 | 85626448 | Frame_Shift_Del | TTTGTCACTA | T | 0.044 | p.C1652fs |
| T32 | CCNH | 902 | 5 | 86705177 | Missense | T | C | 0.4 | p.T29A |
| T32 | AFF1 | 4299 | 4 | 88029331 | Frame_Shift_Del | CATTCCAGCA | A | 0.042 | p.E459fs |
| T32 | ZNF469 | 84627 | 16 | 88494493 | Frame_Shift_Del | CCCCAGAGCA | C | 0.024 | p.P206fs |
| T32 | SMARCAD1 | 56916 | 4 | 95155178 | In_Frame_Del | AAGACCTTTC | C | 0.04 | p.148_154del |
| T32 | ANO4 | 121601 | 12 | 101480569 | Missense | C | G | 0.296 | p.C556W |
| T32 | GBF1 | 8729 | 10 | 104119897 | Frame_Shift_Del | TCACTCTCCT | T | 0.081 | p.G394fs |

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|---|---|---|---|---|---|---|---|---|---|
| T32 | CXXC4 | 80319 | 4 | 105412054 | In_Frame_Del | CTTGGCTGGG | C | 0.053 | p.299_302del |
| T32 | ZBTB20 | 26137 | 3 | 114099221 | Frame_Shift_Ins | C | CCCTTT | 0.031 | p.K14fs |
| T32 | CAMK2D | 817 | 4 | 114376912 | In_Frame_Del | CCACAAAGA | T | 0.037 | p.490_500del |
| T32 | HCAR2 | 338442 | 12 | 123186740 | Frame_Shift_Del | TAAGGA | T | 0.03 | p.S362fs |
| T32 | OR1J1 | 347168 | 9 | 125239256 | Missense | A | G | 0.088 | p.L317P |
| T32 | EXOSC2 | 23404 | 9 | 133578507 | In_Frame_Del | TGCTGTATGA | A | 0.045 | p.221_230del |
| T32 | LUC7L2 | 51631 | 7 | 139106954 | In_Frame_Del | AGACAGGAGT | C | 0.044 | p.350_354del |
| T32 | NOTCH1 | 4851 | 9 | 139390984 | Nonsense | G | A | 0.413 | p.Q2403X |
| T32 | NOTCH1 | 4851 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.401 | p.1578_1578del |
| T32 | FLG2 | 388698 | 1 | 152328653 | In_Frame_Del | CAAAACCAGA | T | 0.047 | p.524_536del |
| T32 | DDR2 | 4921 | 1 | 162748455 | Frame_Shift_Del | TCAGATGAAC | C | 0.032 | p.S790fs |
| T32 | SCN9A | 6335 | 2 | 167145065 | In_Frame_Del | AGTTTATTAGA | G | 0.06 | p.389_399del |
| T32 | TIPRL | 261726 | 1 | 168161459 | Missense | A | G | 0.1 | p.H177R |
| T32 | ATP11B | 23200 | 3 | 182576993 | Frame_Shift_Del | AATTTCATCAT | A | 0.094 | p.Y349fs |
| T32 | SMG7 | 9887 | 1 | 183511615 | Frame_Shift_Del | AGTGCAGGTA | G | 0.024 | p.G565fs |
| T32 | FAT1 | 2195 | 4 | 187557287 | Frame_Shift_Del | CAAATG | C | 0.061 | p.S1357fs |
| T32 | ZNF142 | 7701 | 2 | 219520870 | Frame_Shift_Del | GGGTCTCTCC | T | 0.097 | p.A88fs |
| T33 | UBE2J2 | 118424 | 1 | 1200192 | Missense | C | G | 0.083 | p.W50C |
| T33 | SIRPA | 140885 | 20 | 1917958 | Frame_Shift_Del | AAATGATATC | A | 0.058 | p.D423fs |
| T33 | TJP3 | 27134 | 19 | 3736267 | Missense | C | T | 0.407 | p.A411V |
| T33 | C16orf71 | 146562 | 16 | 4796952 | In_Frame_Del | TGAG | T | 0.111 | p.403_403del |
| T33 | NOP2 | 4839 | 12 | 6673319 | Frame_Shift_Del | TA | T | 0.155 | p.L190fs |
| T33 | SLC2A7 | 155184 | 1 | 9078374 | In_Frame_Del | GGTTCTTGGG | C | 0.043 | p.158_166del |
| T33 | EPOR | 2057 | 19 | 11488864 | Frame_Shift_Del | CAGTGT | C | 0.027 | p.T440fs |
| T33 | EPOR | 2057 | 19 | 11488871 | Frame_Shift_Del | CATGGA | C | 0.028 | p.R437fs |
| T33 | ETV6 | 2120 | 12 | 11905491 | Frame_Shift_Ins | G | GGTCCC | 0.24 | p.S47fs |
| T33 | MAN2B1 | 4125 | 19 | 12777378 | Frame_Shift_Del | ACCGGCAG | A | 0.021 | p.A44fs |
| T33 | NPIPA1 | 9284 | 16 | 15045788 | In_Frame_Del | TCCACCCTCA | C | 0.035 | p.320_324del |
| T33 | AGMO | 392636 | 7 | 15599740 | Frame_Shift_Del | AACTCACCTT | T | 0.08 | p.G79fs |
| T33 | CHERP | 10523 | 19 | 16640580 | In_Frame_Del | TTGCTGC | T | 0.027 | p.334_336del |
| T33 | POTEG | 404785 | 14 | 19563537 | Missense | A | C | 0.083 | p.N351H |
| T33 | NEBL | 10529 | 10 | 21074712 | In_Frame_Del | TCCTGTTCTC | T | 0.044 | p.256_259del |
| T33 | RPGRIP1 | 57096 | 14 | 21794071 | Missense | G | A | 0.49 | p.G817R |
| T33 | ZSCAN31 | 64288 | 6 | 28294124 | Missense | C | T | 0.321 | p.G188E |
| T33 | KCNA4 | 3739 | 11 | 30032999 | In_Frame_Del | AATGTCAATG | A | 0.026 | p.406_409del |
| T33 | C6orf136 | 221545 | 6 | 30617428 | In_Frame_Del | TTCCCACCCA | C | 0.029 | p.56_68del |
| T33 | CCHCR1 | 54535 | 6 | 31122524 | Missense | C | T | 0.305 | p.V148I |
| T33 | C6orf10 | 10665 | 6 | 32260883 | Frame_Shift_Del | CTTTTGTGT | C | 0.028 | p.N520fs |
| T33 | SCAF4 | 57466 | 21 | 33068979 | Frame_Shift_Ins | T | TCGGAC | 0.364 | p.T273fs |
| T33 | RAI14 | 26064 | 5 | 34824304 | Missense | G | A | 0.096 | p.R757Q |
| T33 | RUNX1 | 861 | 21 | 36252939 | Frame_Shift_Ins | C | TCCTCGG | 0.414 | p.S114fs |
| T33 | MELK | 9833 | 9 | 36594745 | Frame_Shift_Del | AGCCAGTAA | T | 0.037 | p.Y57fs |
| T33 | KRTAP9-1 | 728318 | 17 | 39346531 | In_Frame_Del | CTGCTGCCAG | C | 0.051 | p.132_136del |
| T33 | POU6F2 | 11281 | 7 | 39379269 | In_Frame_Del | GCAGCTC | G | 0.022 | p.181_182del |
| T33 | KIF6 | 221458 | 6 | 39602684 | Frame_Shift_Del | TTCCAAATAG | A | 0.043 | p.T141fs |
| T33 | STAT5A | 6776 | 17 | 40459717 | Missense | A | T | 0.322 | p.T598S |
| T33 | EXD1 | 161829 | 15 | 41522701 | Frame_Shift_Del | GTTAGGGCTT | C | 0.027 | - |
| T33 | TNFSF11 | 8600 | 13 | 43148595 | In_Frame_Del | CCTGGGG | C | 0.028 | p.53_54del |
| T33 | PRDM15 | 63977 | 21 | 43281842 | In_Frame_Del | GTCACTGAAC | A | 0.047 | p.237_240del |
| T33 | TSPAN18 | 90139 | 11 | 44941467 | Frame_Shift_Del | AGTCGGGACG | C | 0.023 | p.R178fs |
| T33 | CDC27 | 996 | 17 | 45221273 | Missense | A | C | 0.083 | p.F388L |
| T33 | GPBP1L1 | 60313 | 1 | 46120256 | Frame_Shift_Del | CTTTCT | C | 0.04 | p.K144fs |
| T33 | NGFR | 4804 | 17 | 47583885 | Missense | G | A | 0.201 | p.V145M |
| T33 | SPOP | 8405 | 17 | 47696411 | Missense | G | A | 0.333 | p.R138C |
| T33 | ONECUT2 | 9480 | 18 | 55103476 | In_Frame_Del | GCACCAC | G | 0.02 | p.177_178del |
| T33 | PEG3 | 5178 | 19 | 57327108 | Missense | C | T | 0.1 | p.R901H |
| T33 | AHNAK | 79026 | 11 | 62294720 | Frame_Shift_Ins | T | TGGGCC | 0.026 | p.D2390fs |
| T33 | SYT16 | 83851 | 14 | 62463129 | Missense | G | A | 0.365 | p.R131H |
| T33 | ARID5B | 84159 | 10 | 63845627 | Nonsense | G | T | 0.343 | p.E213X |
| T33 | SRGAP1 | 57522 | 12 | 64521916 | Missense | C | T | 0.258 | p.T939M |
| T33 | ADAMTS9 | 56999 | 3 | 64672467 | Missense | G | A | 0.423 | p.A98V |
| T33 | RBPMS2 | 348093 | 15 | 65067448 | In_Frame_Del | GCCGGAGCC | C | 0.072 | p.20_24del |
| T33 | JAK1 | 3716 | 1 | 65312377 | In_Frame_Ins | T | TACA | 0.204 | p.K648delinsCK |
| T33 | EOGT | 285203 | 3 | 69047197 | Frame_Shift_Del | AGTTATTAAC | A | 0.027 | p.Q260fs |
| T33 | AP3B1 | 8546 | 5 | 77334948 | Frame_Shift_Del | TAGTGTTATT | T | 0.062 | p.L857fs |
| T33 | HMGN5 | 79366 | X | 80370199 | In_Frame_Del | TTCCTCTTTT | A | 0.04 | p.261_266del |
| T33 | LONRF2 | 164832 | 2 | 100917212 | Missense | A | C | 0.34 | p.V320G |
| T33 | POU3F3 | 5455 | 2 | 105472277 | In_Frame_Del | CGCCGCCGCC | C | 0.07 | p.104_110del |
| T33 | AIM1 | 202 | 6 | 106992748 | Missense | C | G | 0.426 | p.A1343G |
| T33 | CHI3L2 | 1117 | 1 | 111778645 | Splice_Site | G | GGA | 0.354 | - |
| T33 | ATP1A1 | 476 | 1 | 116940508 | Frame_Shift_Del | AGG | A | 0.33 | p.R658fs |
| T33 | ATP1A1 | 476 | 1 | 116940514 | Frame_Shift_Del | GCC | G | 0.317 | p.A660fs |
| T33 | CD80 | 941 | 3 | 119255971 | In_Frame_Del | TTCCAGTTGA | C | 0.075 | p.223_234del |
| T33 | GRIK4 | 2900 | 11 | 120673498 | Missense | G | T | 0.394 | p.G60V |
| T33 | IQCB1 | 9657 | 3 | 121507105 | Frame_Shift_Del | TCACTACATTA | A | 0.042 | p.A293fs |
| T33 | SNCAIP | 9627 | 5 | 121759362 | Frame_Shift_Del | AGGAGTGAGT | A | 0.066 | p.E311fs |
| T33 | SMPD4 | 55627 | 2 | 130922002 | Frame_Shift_Del | AAAAACCTG | C | 0.024 | p.V231fs |
| T33 | PCDHAC2 | 56134 | 5 | 140346394 | Missense | C | T | 0.082 | p.R15W |
| T33 | ARHGAP26 | 23092 | 5 | 142500599 | Frame_Shift_Del | ACCCACTCTGC | G | 0.029 | p.G529fs |
| T33 | TRPV5 | 56302 | 7 | 142622608 | Frame_Shift_Del | ATCACCTGTA | T | 0.067 | p.Q369fs |
| T33 | EZH2 | 2146 | 7 | 148511202 | Missense | C | T | 0.424 | p.C511Y |
| T33 | ADAMTS2 | 9509 | 5 | 178770863 | Missense | G | T | 0.331 | p.R147S |
| T33 | NCKAP1 | 10787 | 2 | 183799497 | In_Frame_Del | AAATCTTCAA | T | 0.04 | p.934_947del |
| T33 | CASP3 | 836 | 4 | 185553423 | In_Frame_Del | AATTCCACAA | A | 0.083 | p.92_102del |
| T33 | LPP | 4026 | 3 | 188327154 | Frame_Shift_Del | CTCCACTTCT | C | 0.039 | p.T212fs |
| T33 | PID1 | 55022 | 2 | 229890503 | Missense | C | T | 0.333 | p.V167M |
| T33 | ESPNL | 339768 | 2 | 239013337 | In_Frame_Del | TGCCAGGAGG | T | 0.04 | p.176_185del |
| T35 | MYH1 | 4619 | 17 | 10397924 | Missense | G | A | 0.43 | p.R1845C |
| T35 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.422 | p.M511I |
| T35 | SATB1 | 6304 | 3 | 18391076 | Frame_Shift_Ins | T | TG | 0.366 | p.P626fs |
| T35 | KRT14 | 3861 | 17 | 39740633 | Missense | A | T | 0.369 | p.V214E |
| T35 | DHX58 | 79132 | 17 | 40263740 | Splice_Site | C | T | 0.443 | - |
| T35 | MTRNR2L2 | 100462981 | 5 | 79945871 | Missense | G | A | 0.105 | p.S12L |
| T35 | PCLO | 27445 | 7 | 82583042 | In_Frame_Ins | A | AGAG | 0.15 | p.P2409delinsPS |
| T35 | DCAF4L2 | 138009 | 8 | 88885459 | Missense | C | A | 0.421 | p.E247D |
| T35 | GPC6 | 10082 | 13 | 94680148 | Missense | G | A | 0.192 | p.D293N |
| T35 | TRPC6 | 7225 | 11 | 101375527 | Missense | C | T | 0.5 | p.R58Q |
| T35 | PHF6 | 84295 | X | 133511775 | Frame_Shift_Ins | A | ATGAAC | 0.347 | p.H43fs |
| T35 | NOTCH1 | 4851 | 9 | 139391014 | Nonsense | G | A | 0.399 | p.Q2393X |
| T35 | GRM1 | 2911 | 6 | 146480549 | Missense | G | A | 0.42 | p.A256T |
| T37 | SDK1 | 221935 | 7 | 4247894 | Frame_Shift_Ins | A | AT | 0.326 | p.Q280fs |
| T37 | CHD4 | 1108 | 12 | 6702762 | Missense | G | C | 0.788 | p.F778L |
| T37 | CLSTN1 | 22883 | 1 | 9790706 | In_Frame_Del | TTTCCTC | T | 0.021 | p.924_925del |
| T37 | CACNA1A | 773 | 19 | 13318713 | Missense | G | T | 0.103 | p.P2312Q |
| T37 | INSM1 | 3642 | 20 | 20349177 | Missense | G | T | 0.449 | p.G89V |
| T37 | ITPR2 | 3709 | 12 | 26553126 | Missense | C | A | 0.439 | p.V2489L |
| T37 | SUPT7L | 9913 | 2 | 27878330 | Missense | A | C | 0.415 | p.L160R |
| T37 | TBC1D10B | 26000 | 16 | 30381225 | Missense | G | C | 0.342 | p.L94V |
| T37 | WT1 | 7490 | 11 | 32417923 | Frame_Shift_Ins | T | CGGGGGT | 0.343 | p.T360fs |
| T37 | IL7R | 3575 | 5 | 35874603 | In_Frame_Ins | C | CCCGAGG | 0.326 | p.V253delinsVPEA |
| T37 | RUNX1 | 861 | 21 | 36206705 | Splice_Site | A | G | 0.344 | - |
| T37 | SIPA1L3 | 23094 | 19 | 38572367 | In_Frame_Del | GGCCACC | G | 0.038 | p.55_56del |
| T37 | U2AF1 | 7307 | 21 | 44524456 | Missense | G | T | 0.44 | p.S34Y |
| T37 | SPIDR | 23514 | 8 | 48648054 | In_Frame_Del | GGGTGGT | G | 0.026 | p.871_873del |

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|---|---|---|---|---|---|---|---|---|---|
| T37 | C11orf80 | 79703 | 11 | 66512290 | In_Frame_Del | GGGCGGC | G | 0.024 | p.26_28del |
| T37 | CTCF | 10664 | 16 | 67654598 | Splice_Site | A | G | 0.369 | - |
| T37 | EED | 8726 | 11 | 85975226 | Missense | G | A | 0.406 | p.R216Q |
| T37 | EED | 8726 | 11 | 85988147 | Missense | G | T | 0.384 | p.W364C |
| T37 | TRIM8 | 81603 | 10 | 104416930 | Frame_Shift_Del | ACTTT | A | 0.342 | p.H492fs |
| T37 | TRIM8 | 81603 | 10 | 104416938 | Frame_Shift_Ins | T | TTAAG | 0.358 | p.W495fs |
| T37 | BACE1 | 23621 | 11 | 117186404 | Frame_Shift_Ins | G | GC | 0.371 | p.G36fs |
| T37 | FBRSL1 | 57666 | 12 | 133159690 | Missense | G | A | 0.533 | p.E822K |
| T37 | PHF6 | 84295 | X | 133549136 | Nonsense | C | T | 0.842 | p.R274X |
| T37 | AKR1B1 | 231 | 7 | 134134518 | Missense | G | A | 0.363 | p.S128L |
| T37 | EXD3 | 54932 | 9 | 140245793 | Missense | G | A | 0.416 | p.S454L |
| T37 | IHH | 3549 | 2 | 219920516 | Missense | G | A | 0.443 | p.R217C |
| T39 | SPI1 | 6688 | 11 | 47381534 | Nonsense | T | AGTCCTTA | 0.221 | p.E68_N69delinsVX |
| T39 | SPI1 | 6688 | 11 | 47381535 | Missense | C | G | 0.24 | p.E68Q |
| T39 | METTL2A | 339175 | 17 | 60522305 | Splice_Site | TTTGAAAGTG | G | 0.05 | - |
| T39 | FAM155B | 27112 | X | 68725178 | In_Frame_Del | TCTGCTGCTG | T | 0.055 | p.18_21del |
| T39 | ARID1B | 57492 | 6 | 157100430 | In_Frame_Del | AGGC | A | 0.114 | p.456_457del |
| T39 | DNAH14 | 127602 | 1 | 225564979 | Frame_Shift_Del | ATACACATTA | A | 0.071 | p.Y4084fs |
| T4 | LONP1 | 9361 | 19 | 5692082 | Missense | G | T | 0.433 | p.F751L |
| T4 | A2ML1 | 144568 | 12 | 8975309 | Missense | C | T | 0.394 | p.P21L |
| T4 | MUC16 | 94025 | 19 | 9074278 | Missense | G | T | 0.464 | p.Q4390K |
| T4 | DNM2 | 1785 | 19 | 10940850 | Missense | G | A | 0.431 | p.R776Q |
| T4 | CTNND2 | 1501 | 5 | 11384890 | Missense | G | A | 0.371 | p.T264M |
| T4 | PSPC1 | 55269 | 13 | 20346428 | In_Frame_Ins | G | GGTTCCT | 0.021 | p.R210delinsRNR |
| T4 | ZDHHC20 | 253832 | 13 | 21976935 | Splice_Site | C | T | 0.149 | - |
| T4 | FOXA2 | 3170 | 20 | 22562751 | Missense | C | T | 0.452 | p.A377T |
| T4 | LINGO2 | 158038 | 9 | 27949327 | Missense | C | T | 0.447 | p.R448Q |
| T4 | SUZ12 | 23512 | 17 | 30325778 | Missense | A | G | 0.47 | p.H659R |
| T4 | ASXL1 | 171023 | 20 | 31022441 | Frame_Shift_Ins | A | AG | 0.36 | p.G642fs |
| T4 | ASXL1 | 171023 | 20 | 31023289 | Missense | A | C | 0.476 | p.Q925P |
| T4 | SSTR1 | 6751 | 14 | 38679634 | Missense | C | T | 0.337 | p.A347V |
| T4 | GANC | 2595 | 15 | 42618537 | In_Frame_Del | GGCCAAAGAT | C | 0.031 | p.446_460del |
| T4 | ZNF235 | 9310 | 19 | 44792636 | Frame_Shift_Ins | G | GT | 0.516 | p.R318fs |
| T4 | ITGB3 | 3690 | 17 | 45369768 | Missense | G | T | 0.465 | p.Q508H |
| T4 | NUP160 | 23279 | 11 | 47862006 | Missense | C | T | 0.48 | p.R150H |
| T4 | GNAT1 | 2779 | 3 | 50231275 | Missense | T | A | 0.44 | p.I180N |
| T4 | TMPRSS12 | 283471 | 12 | 51237795 | Missense | G | A | 0.478 | p.A120T |
| T4 | KRT5 | 3852 | 12 | 52911516 | Missense | T | G | 0.422 | p.H317P |
| T4 | CPSF7 | 79869 | 11 | 61183144 | Missense | T | C | 0.091 | p.S360G |
| T4 | TMEM5 | 10329 | 12 | 64173769 | Missense | C | T | 0.437 | p.S10L |
| T4 | CDH11 | 1009 | 16 | 64984727 | Missense | C | T | 0.422 | p.A613T |
| T4 | FGF4 | 2249 | 11 | 69589599 | Missense | C | T | 0.211 | p.R85Q |
| T4 | COL9A1 | 1297 | 6 | 70951689 | Missense | A | T | 0.338 | p.L416H |
| T4 | COL13A1 | 1305 | 10 | 71634918 | Missense | T | G | 0.436 | p.V145G |
| T4 | RIMS1 | 22999 | 6 | 72952113 | Missense | T | G | 0.365 | p.V159G |
| T4 | YLPM1 | 56252 | 14 | 75245267 | In_Frame_Del | AAAG | A | 0.217 | p.331_332del |
| T4 | NFATC1 | 4772 | 18 | 77246461 | Missense | A | G | 0.533 | p.H297R |
| T4 | CENPE | 1062 | 4 | 104117412 | Splice_Site | AAACAAC | A | 0.041 | - |
| T4 | MID2 | 11043 | X | 107084583 | Missense | G | A | 0.76 | p.A230T |
| T4 | NRAS | 4893 | 1 | 115256516 | In_Frame_Del | ACTG | A | 0.388 | p.64_65del |
| T4 | SCTR | 6344 | 2 | 120199150 | Missense | C | G | 0.351 | p.C389S |
| T4 | ENG | 2022 | 9 | 130591971 | Missense | C | A | 0.292 | p.A119S |
| T4 | PHF6 | 84295 | X | 133547538 | Frame_Shift_Ins | T | TCCCCACA | 0.667 | p.F146fs |
| T4 | BMPR2 | 659 | 2 | 203384865 | Missense | G | A | 0.415 | p.R303H |
| T4 | PAX3 | 5077 | 2 | 223158861 | Missense | C | T | 0.106 | p.R204H |
| T4 | CCDC185 | 164127 | 1 | 223567122 | Missense | G | A | 0.386 | p.R102H |
| T43 | CLUH | 23277 | 17 | 2604679 | Missense | G | A | 0.429 | p.R256W |
| T43 | CARD11 | 84433 | 7 | 2976831 | Missense | G | A | 0.4 | p.S394L |
| T43 | PRDM16 | 63976 | 1 | 3328407 | Missense | G | A | 0.454 | p.S549N |
| T43 | DOHH | 83475 | 19 | 3491744 | Missense | C | T | 0.419 | p.E219K |
| T43 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.424 | p.M511I |
| T43 | RNF186 | 54546 | 1 | 20141135 | Missense | G | A | 0.47 | p.R154C |
| T43 | OR6S1 | 341799 | 14 | 21109480 | Missense | C | T | 0.409 | p.R124H |
| T43 | CRYBB3 | 1417 | 22 | 25603126 | Missense | C | T | 0.463 | p.R195C |
| T43 | KRTAP6-3 | 337968 | 21 | 31964792 | Missense | G | T | 0.435 | p.G10C |
| T43 | SLC20A2 | 6575 | 8 | 42323373 | Missense | T | C | 0.449 | p.I118V |
| T43 | MED25 | 81857 | 19 | 50339023 | Missense | G | A | 0.353 | p.V596I |
| T43 | FAM120C | 54954 | X | 54209518 | In_Frame_Del | GTGCTGC | G | 0.039 | p.36_38del |
| T43 | CNOT3 | 4849 | 19 | 54649666 | Frame_Shift_Ins | T | TC | 0.338 | p.S242fs |
| T43 | OR5M8 | 219484 | 11 | 56258722 | Missense | A | C | 0.434 | p.L42R |
| T43 | MAJIN | 283129 | 11 | 64717861 | Missense | C | A | 0.419 | p.Q63H |
| T43 | CTCF | 10664 | 16 | 67660456 | Splice_Site | A | G | 0.34 | - |
| T43 | CPM | 1368 | 12 | 69265721 | Missense | G | T | 0.5 | p.L92M |
| T43 | ERH | 2079 | 14 | 69847280 | Missense | C | A | 0.471 | p.R97L |
| T43 | AATK | 9625 | 17 | 79095148 | Missense | G | A | 0.575 | p.T760M |
| T43 | PCLO | 27445 | 7 | 82544055 | Missense | C | T | 0.439 | p.R4416H |
| T43 | PGR | 5241 | 11 | 100998357 | Missense | G | A | 0.455 | p.A482V |
| T43 | NKX2-3 | 159296 | 10 | 101295274 | In_Frame_Del | GGGCGGC | G | 0.068 | p.298_299del |
| T43 | BORCS7 | 119032 | 10 | 104620256 | Missense | G | C | 0.407 | p.S69T |
| T43 | PLD4 | 122618 | 14 | 105393475 | Splice_Site | C | A | 0.377 | - |
| T43 | ABCA1 | 19 | 9 | 107547805 | Missense | G | A | 0.464 | p.R2173W |
| T43 | SEC63 | 11231 | 6 | 108234611 | Missense | C | T | 0.379 | p.R158Q |
| T43 | PNLIPRP3 | 119548 | 10 | 118220697 | Missense | G | A | 0.424 | p.A235T |
| T43 | GRIK4 | 2900 | 11 | 120831686 | Missense | G | A | 0.391 | p.R648H |
| T43 | FLNC | 2318 | 7 | 128482659 | Missense | C | T | 0.528 | p.R766W |
| T43 | KCNJ1 | 3758 | 11 | 128709865 | Missense | C | T | 0.462 | p.E111K |
| T43 | JADE1 | 79960 | 4 | 129783355 | Missense | C | A | 0.415 | p.T481K |
| T43 | PHF6 | 84295 | X | 133527523 | Splice_Site | TGCTG | T | 0.83 | - |
| T43 | PHF6 | 84295 | X | 133527529 | Splice_Site | A | ACGGG | 0.812 | - |
| T43 | MYB | 4602 | 6 | 135507056 | In_Frame_Ins | C | CTTGGTG | 0.341 | p.D13delinsDGLVR |
| T43 | NHSL1 | 57224 | 6 | 138745544 | Missense | G | A | 0.43 | p.R1503C |
| T43 | NOTCH1 | 4851 | 9 | 139399422 | Missense | A | G | 0.529 | p.L1574P |
| T43 | SEMA4A | 64218 | 1 | 156124370 | Missense | A | G | 0.576 | p.M1V |
| T5 | PRPF8 | 10594 | 17 | 1581867 | Missense | C | T | 0.186 | p.R600Q |
| T5 | CACNA1C | 775 | 12 | 2775868 | Missense | C | A | 0.106 | p.L1504M |
| T5 | OXT | 5020 | 20 | 3052826 | Missense | G | T | 0.203 | p.C75F |
| T5 | AKAP3 | 10566 | 12 | 4736272 | Missense | C | T | 0.221 | p.R599Q |
| T5 | TMEM200C | 645369 | 18 | 5891177 | Missense | G | A | 0.234 | p.P296S |
| T5 | KLHL21 | 9903 | 1 | 6662231 | Frame_Shift_Del | TGCGCG | T | 0.059 | p.A214fs |
| T5 | GATA3 | 2625 | 10 | 8106048 | Missense | T | A | 0.266 | p.Y291N |
| T5 | ZNF560 | 147741 | 19 | 9577543 | Nonsense | G | A | 0.233 | p.R694X |
| T5 | PRAMEF2 | 65122 | 1 | 12921404 | Missense | C | T | 0.159 | p.R399C |
| T5 | PRAMEF10 | 343071 | 1 | 12954549 | Missense | C | T | 0.127 | p.R245H |
| T5 | MEOX2 | 4223 | 7 | 15725595 | Missense | C | T | 0.245 | p.A145T |
| T5 | JAK3 | 3718 | 19 | 17945969 | Missense | C | T | 0.349 | p.R657Q |
| T5 | ISYNA1 | 51477 | 19 | 18548485 | Missense | T | C | 0.243 | p.N69S |
| T5 | GPR158 | 57512 | 10 | 25887025 | Missense | G | A | 0.223 | p.V824M |
| T5 | KSR1 | 8844 | 17 | 25910106 | Missense | C | T | 0.167 | p.R182C |
| T5 | TAF1L | 138474 | 9 | 32631872 | Missense | G | A | 0.252 | p.R1236W |
| T5 | NCOA6 | 23054 | 20 | 33345644 | Nonsense | G | A | 0.208 | p.R303X |
| T5 | KRT28 | 162605 | 17 | 38950240 | Missense | G | A | 0.209 | p.A346V |
| T5 | NFKBIB | 4793 | 19 | 39395963 | Frame_Shift_Del | TGGGGGCACA | G | 0.025 | p.R50fs |
| T5 | SIX3 | 6496 | 2 | 45169896 | Missense | G | A | 0.265 | p.R218Q |
| T5 | KRTAP10-3 | 386682 | 21 | 45978454 | Missense | G | A | 0.179 | p.P49S |

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|---|---|---|---|---|---|---|---|---|---|
| T5 | CA11 | 770 | 19 | 49148711 | Frame_Shift_Ins | G | GACCT | 0.208 | p.P31fs |
| T5 | POLI | 11201 | 18 | 51818412 | Splice_Site | A | AC | 0.259 | - |
| T5 | NEDD4L | 23327 | 18 | 55912703 | Missense | G | C | 0.153 | p.R56T |
| T5 | JAK1 | 3716 | 1 | 65304237 | Missense | G | A | 0.158 | p.P960S |
| T5 | LEMD3 | 23592 | 12 | 65564472 | Missense | C | T | 0.29 | p.P366S |
| T5 | ZFHX4 | 79776 | 8 | 77763271 | Missense | G | A | 0.254 | p.D1372N |
| T5 | RASGRF1 | 5923 | 15 | 79277384 | Missense | G | A | 0.232 | p.R359W |
| T5 | CHRDL1 | 91851 | X | 109924875 | Missense | C | G | 0.245 | p.E251Q |
| T5 | DOCK1 | 1793 | 10 | 128925976 | In_Frame_Del | CGGACCGTGA | T | 0.033 | p.911_915del |
| T5 | CFAP46 | 54777 | 10 | 134736148 | Missense | G | A | 0.283 | p.R441W |
| T5 | NOTCH1 | 4851 | 9 | 139399422 | Missense | A | G | 0.303 | p.L1574P |
| T5 | CP | 1356 | 3 | 148904498 | Missense | C | A | 0.206 | p.G629V |
| T5 | ABCD1 | 215 | X | 152991100 | Missense | C | T | 0.215 | p.P127S |
| T5 | AVPR2 | 554 | X | 153172147 | Missense | G | A | 0.167 | p.A361T |
| T5 | FBXW7 | 55294 | 4 | 153244302 | Splice_Site | C | T | 0.253 | - |
| T5 | FBXW7 | 55294 | 4 | 153249510 | Missense | C | A | 0.277 | p.G423V |
| T5 | USP21 | 27005 | 1 | 161130475 | Frame_Shift_Ins | A | ACC | 0.131 | p.P15fs |
| T5 | USP21 | 27005 | 1 | 161130480 | Frame_Shift_Ins | T | TC | 0.128 | p.V17fs |
| T5 | USP21 | 27005 | 1 | 161130482 | Frame_Shift_Del | AATAT | A | 0.126 | p.N18fs |
| T5 | USP21 | 27005 | 1 | 161130489 | Frame_Shift_Ins | A | ACCCCTC | 0.12 | p.Q20fs |
| T5 | NOS1AP | 9722 | 1 | 162336853 | Missense | G | A | 0.228 | p.D78N |
| T5 | LRP2 | 4036 | 2 | 170097611 | Missense | C | T | 0.237 | p.R1311H |
| T6 | MRPS34 | 65993 | 16 | 1823102 | Missense | G | A | 0.548 | p.R7C |
| T6 | MEFV | 4210 | 16 | 3293364 | Missense | C | T | 0.43 | p.R708H |
| T6 | CHD4 | 1108 | 12 | 6703680 | Missense | A | G | 0.216 | p.M753T |
| T6 | USP17L2 | 377630 | 8 | 11995276 | Missense | C | T | 0.113 | p.D332N |
| T6 | PRAMEF10 | 343071 | 1 | 12955537 | Missense | G | A | 0.571 | p.R48C |
| T6 | JAK3 | 3718 | 19 | 17943438 | Missense | A | G | 0.461 | p.L857P |
| T6 | DMRTA1 | 63951 | 9 | 22451628 | Frame_Shift_Del | ACTTCTGCTT | T | 0.041 | p.L412fs |
| T6 | ZNF99 | 7652 | 19 | 22942425 | Nonsense | G | A | 0.461 | p.Q96X |
| T6 | MYH7 | 4625 | 14 | 23887614 | Missense | G | A | 0.162 | p.A1325V |
| T6 | STMN4 | 81551 | 8 | 27094410 | Missense | C | T | 0.319 | p.E175K |
| T6 | PTHLH | 5744 | 12 | 28116482 | Frame_Shift_Del | TTTCCTGAGT | G | 0.144 | p.L104fs |
| T6 | PTHLH | 5744 | 12 | 28116494 | In_Frame_Ins | A | AAGG | 0.146 | p.L104delinsPL |
| T6 | TBC1D10B | 26000 | 16 | 30381256 | In_Frame_Del | CCGGGGCTG | A | 0.047 | p.79_83del |
| T6 | SFTA3 | 253970 | 14 | 36946210 | Missense | G | A | 0.384 | p.T76M |
| T6 | CASC3 | 22794 | 17 | 38320342 | Missense | A | G | 0.167 | p.D465G |
| T6 | TMEM63B | 55362 | 6 | 44120425 | Missense | C | G | 0.438 | p.I644M |
| T6 | PCDH15 | 65217 | 10 | 55587280 | Nonsense | G | A | 0.155 | p.R1343X |
| T6 | PRKAA2 | 5563 | 1 | 57161792 | Nonsense | C | T | 0.246 | p.Q250X |
| T6 | JAK1 | 3716 | 1 | 65312383 | In_Frame_Ins | A | ACCT | 0.47 | p.S646delinsRS |
| T6 | BAI3 | 577 | 6 | 69348922 | Missense | G | A | 0.471 | p.V119I |
| T6 | ROBO2 | 6092 | 3 | 77530323 | Missense | A | G | 0.556 | p.N207S |
| T6 | PPFIA2 | 8499 | 12 | 81661810 | Nonsense | G | A | 0.484 | p.R659X |
| T6 | HSBP1 | 3281 | 16 | 83842919 | Frame_Shift_Ins | T | TATTTCC | 0.324 | p.M41fs |
| T6 | KCMF1 | 56888 | 2 | 85270773 | Frame_Shift_Ins | A | AGCCCT | 0.371 | p.R137fs |
| T6 | ZNF292 | 23036 | 6 | 87964747 | Frame_Shift_Ins | T | TG | 0.541 | p.V467fs |
| T6 | LRRK1 | 79705 | 15 | 101609009 | Missense | G | A | 0.5 | p.E2002K |
| T6 | ALG13 | 79868 | X | 110988007 | Frame_Shift_Ins | C | CTCTCT | 0.07 | p.P936fs |
| T6 | ZC3H6 | 376940 | 2 | 113080237 | In_Frame_Del | AGAACTCATA | T | 0.075 | p.367_373del |
| T6 | SASH3 | 54440 | X | 128927710 | Missense | T | C | 0.5 | p.S349P |
| T6 | PHF6 | 84295 | X | 133547940 | Nonsense | C | T | 0.357 | p.R225X |
| T6 | VPS26B | 112936 | 11 | 134115368 | Missense | G | A | 0.415 | p.V299I |
| T6 | PCDHAC1 | 56135 | 5 | 140306880 | Missense | G | A | 0.463 | p.E135K |
| T6 | EZH2 | 2146 | 7 | 148511215 | Missense | G | A | 0.457 | p.P507S |
| T6 | SLC6A7 | 6534 | 5 | 149578888 | Missense | G | A | 0.448 | p.V228M |
| T6 | DYNC1I2 | 1781 | 2 | 172546734 | Frame_Shift_Del | GAAAAGAAG | G | 0.096 | p.E24fs |
| T6 | TRIM67 | 440730 | 1 | 231342518 | Missense | G | A | 0.523 | p.V601I |
| T7 | FOXC1 | 2296 | 6 | 1612017 | In_Frame_Del | ACGGCGG | A | 0.04 | p.446_448del |
| T7 | KRTAP5-4 | 387267 | 11 | 1643265 | In_Frame_Del | CCGG | C | 0.111 | p.19_20del |
| T7 | MINK1 | 50488 | 17 | 4795522 | Missense | C | T | 0.219 | p.R674C |
| T7 | CHD4 | 1108 | 12 | 6700646 | Missense | A | T | 0.5 | p.I1109N |
| T7 | DNM2 | 1785 | 19 | 10870454 | Frame_Shift_Del | CCT | C | 0.501 | p.P68fs |
| T7 | ETV6 | 2120 | 12 | 11992216 | Frame_Shift_Ins | T | TCG | 0.487 | p.F102fs |
| T7 | WT1 | 7490 | 11 | 32417914 | Frame_Shift_Ins | G | GAGTCG | 0.619 | p.R363fs |
| T7 | UBA2 | 10054 | 19 | 34921563 | Missense | A | C | 0.42 | p.Q74P |
| T7 | GGNBP2 | 79893 | 17 | 34943637 | Missense | G | A | 0.189 | p.D618N |
| T7 | FGFR1 | 2260 | 8 | 38272124 | In_Frame_Ins | C | ATCATTA | 0.024 | p.M578delinsIFNDT |
| T7 | TREML2 | 79865 | 6 | 41168713 | In_Frame_Del | ACAGCAG | A | 0.031 | p.10_11del |
| T7 | CNOT3 | 4849 | 19 | 54649666 | Frame_Shift_Ins | T | TC | 0.329 | p.S242fs |
| T7 | ROR1 | 4919 | 1 | 64624825 | Missense | G | A | 0.548 | p.V446I |
| T7 | OTOP2 | 92736 | 17 | 72923894 | Splice_Site | G | A | 0.088 | - |
| T7 | MOGS | 7841 | 2 | 74690357 | Missense | G | A | 0.158 | p.P246S |
| T7 | YLPM1 | 56252 | 14 | 75264822 | Missense | T | A | 0.198 | p.V941D |
| T7 | ROBO2 | 6092 | 3 | 77623816 | Missense | G | A | 0.465 | p.R713Q |
| T7 | CGA | 1081 | 6 | 87796244 | Missense | T | C | 0.091 | p.R58G |
| T7 | TEX37 | 200523 | 2 | 88828623 | In_Frame_Del | TAACCCC | T | 0.022 | p.59_60del |
| T7 | EML5 | 161436 | 14 | 89202882 | Missense | C | T | 0.537 | p.R292Q |
| T7 | RGAG1 | 57529 | X | 109694294 | Missense | C | T | 0.232 | p.T150M |
| T7 | PKHD1L1 | 93035 | 8 | 110412530 | Missense | G | A | 0.43 | p.R413H |
| T7 | SOWAHD | 347454 | X | 118893357 | Missense | G | A | 0.315 | p.E243K |
| T7 | CHST15 | 51363 | 10 | 125805376 | Missense | C | T | 0.457 | p.S118N |
| T7 | DOCK1 | 1793 | 10 | 129224207 | Missense | G | A | 0.439 | p.E1595K |
| T7 | PHF6 | 84295 | X | 133549136 | Nonsense | C | T | 0.728 | p.R274X |
| T7 | DGKI | 9162 | 7 | 137150690 | Missense | G | A | 0.444 | p.P867L |
| T7 | PERP | 64065 | 6 | 138428381 | Missense | G | A | 0.18 | p.R33C |
| T7 | FBXO38 | 81545 | 5 | 147784364 | Frame_Shift_Ins | T | TGGAC | 0.931 | p.F237fs |
| T7 | ZNF282 | 8427 | 7 | 148920947 | In_Frame_Del | AGCCCCAGC | A | 0.044 | p.409_412del |
| T7 | GPR171 | 29909 | 3 | 150916825 | Missense | T | A | 0.611 | p.T117S |
| T7 | SP140 | 11262 | 2 | 231175916 | Frame_Shift_Del | CT | C | 0.121 | p.F664fs |
| T7 | SP140L | 93349 | 2 | 231266128 | Frame_Shift_Del | CT | C | 0.477 | p.F491fs |
| T81 | SRY | 6736 | Y | 2655389 | Nonsense | G | A | 0.703 | p.R86X |
| T81 | TBL1X | 6907 | X | 9677720 | Frame_Shift_Del | CAATAA | C | 0.038 | p.N403fs |
| T81 | CELF2 | 10659 | 10 | 11370966 | Missense | C | T | 0.34 | p.R475C |
| T81 | JAK3 | 3718 | 19 | 17948006 | Missense | G | A | 0.39 | p.A573V |
| T81 | ELMO1 | 9844 | 7 | 36910077 | Missense | G | A | 0.094 | p.P129L |
| T81 | FGFR1 | 2260 | 8 | 38272104 | Frame_Shift_Del | AATAATGCC | T | 0.029 | p.P580fs |
| T81 | FGFR1 | 2260 | 8 | 38272124 | In_Frame_Ins | C | ATCATTA | 0.03 | p.M578delinsIFNDT |
| T81 | MKL1 | 57591 | 22 | 40814637 | Missense | G | A | 0.395 | p.A602V |
| T81 | COL7A1 | 1294 | 3 | 48602634 | Missense | T | C | 0.341 | p.E2843G |
| T81 | SETD6 | 79918 | 16 | 58552682 | Missense | G | A | 0.105 | p.G391R |
| T81 | JAK1 | 3716 | 1 | 65313328 | Missense | G | C | 0.288 | p.H596D |
| T81 | CYP3A43 | 64816 | 7 | 99436330 | Missense | T | C | 0.129 | p.W66R |
| T81 | DTX3L | 151636 | 3 | 122287500 | In_Frame_Del | GAGCAGTTCC | G | 0.037 | p.189_194del |
| T81 | ERGIC1 | 57222 | 5 | 172359507 | Missense | C | T | 0.1 | p.R204W |
| T81 | ADAMTS2 | 9509 | 5 | 178578171 | Missense | A | T | 0.083 | p.Y554N |
| T81 | FSIP2 | 401024 | 2 | 186673849 | Nonsense | A | T | 0.282 | p.K6695X |
| T81 | KCNK1 | 3775 | 1 | 233750257 | Missense | G | A | 0.396 | p.V114M |
| T82 | DEFB127 | 140850 | 20 | 139609 | Frame_Shift_Del | ATAATAGAA | C | 0.036 | p.Q82fs |
| T82 | LINC01600 | 154386 | 6 | 2623840 | Missense | G | A | 0.425 | p.P73S |
| T82 | SMCHD1 | 23347 | 18 | 2762110 | Missense | T | C | 0.581 | p.V1481A |
| T82 | TM4SF5 | 9032 | 17 | 4675397 | Splice_Site | G | A | 0.093 | - |
| T82 | OR51A7 | 119687 | 11 | 4928621 | Missense | G | A | 0.133 | p.E8K |
| T82 | SPAG11B | 10407 | 8 | 7308355 | Frame_Shift_Del | GA | G | 0.173 | p.F41fs |

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|---|---|---|---|---|---|---|---|---|---|
| T82 | MTCL1 | 23255 | 18 | 8783835 | Missense | T | C | 0.085 | p.M242T |
| T82 | CTNND2 | 1501 | 5 | 11098685 | Frame_Shift_Del | GCCAAGTTCT | A | 0.033 | p.G528fs |
| T82 | THSD7A | 221981 | 7 | 11676296 | In_Frame_Del | CTCACCTGAA | G | 0.021 | p.147_161del |
| T82 | TRMT9B | 57604 | 8 | 12879198 | Missense | A | T | 0.081 | p.H211L |
| T82 | NOTCH3 | 4854 | 19 | 15271781 | Nonsense | C | A | 0.43 | p.E2220X |
| T82 | NOTCH3 | 4854 | 19 | 15281551 | Missense | C | T | 0.337 | p.A1608T |
| T82 | AKAP8L | 26993 | 19 | 15491033 | In_Frame_Del | CCCT | C | 0.211 | p.613_614del |
| T82 | AKAP8L | 26993 | 19 | 15514491 | In_Frame_Del | GGCCATA | G | 0.029 | p.51_52del |
| T82 | TRIM16 | 10626 | 17 | 15531942 | Missense | C | A | 0.1 | p.G561V |
| T82 | ITGA8 | 8516 | 10 | 15573050 | Missense | A | G | 0.108 | p.V994A |
| T82 | CCDC171 | 203238 | 9 | 15724827 | Frame_Shift_Del | CTTTAATAAG | T | 0.041 | p.K516fs |
| T82 | RAD51AP2 | 729475 | 2 | 17697183 | Frame_Shift_Del | TTTTTTCTTCT | T | 0.04 | p.W818fs |
| T82 | SLC25A1 | 6576 | 22 | 19163739 | In_Frame_Del | AATCTGGGTG | G | 0.025 | p.281_287del |
| T82 | CABLES1 | 91768 | 18 | 20716014 | In_Frame_Del | GGGCGCCGGC | G | 0.085 | p.97_99del |
| T82 | APP | 351 | 21 | 27394181 | In_Frame_Del | TGGTGGTGG | T | 0.041 | p.220_224del |
| T82 | ASXL1 | 171023 | 20 | 31022440 | Frame_Shift_Del | GA | G | 0.353 | p.G642fs |
| T82 | FAN1 | 22909 | 15 | 31229434 | Frame_Shift_Del | AAGAGCCAA | G | 0.045 | p.G1010fs |
| T82 | EIF4ENIF1 | 56478 | 22 | 31859663 | Splice_Site | A | AGGTAT | 0.031 | - |
| T82 | ITCH | 83737 | 20 | 33028027 | In_Frame_Del | GACAAAT | G | 0.049 | p.140_141del |
| T82 | WDR46 | 9277 | 6 | 33248188 | Frame_Shift_Del | GGAGCCTCA | C | 0.039 | p.L452fs |
| T82 | ITPR3 | 3710 | 6 | 33648146 | In_Frame_Ins | T | TTTTTAA | 0.04 | p.V1422delinsVFK |
| T82 | ITPR3 | 3710 | 6 | 33648152 | In_Frame_Del | CGGAGGT | C | 0.038 | p.1424_1426del |
| T82 | TAF15 | 8148 | 17 | 34151122 | In_Frame_Del | CAGGGAGGA | A | 0.031 | p.173_185del |
| T82 | ACTC1 | 70 | 15 | 35084671 | Missense | C | A | 0.397 | p.R185L |
| T82 | CCDC169 | 728591 | 13 | 36828237 | Missense | T | C | 0.121 | p.K20R |
| T82 | NIPBL | 25836 | 5 | 36984815 | In_Frame_Del | GCTACAGGAG | A | 0.04 | p.512_525del |
| T82 | KRT38 | 8687 | 17 | 39596435 | In_Frame_Del | CATTGTCAAT | C | 0.024 | p.176_184del |
| T82 | FSIP1 | 161835 | 15 | 39910052 | Missense | C | G | 0.093 | p.G528A |
| T82 | BCOR | 54880 | X | 39916463 | Nonsense | G | A | 0.569 | p.R1462X |
| T82 | L3MBTL1 | 26013 | 20 | 42168814 | Frame_Shift_Del | GTCAGCCCTG | C | 0.022 | p.Q643fs |
| T82 | UBR2 | 23304 | 6 | 42646299 | Missense | G | A | 0.092 | p.G1501S |
| T82 | TTBK1 | 84630 | 6 | 43252029 | Missense | T | C | 0.105 | p.L1184S |
| T82 | PNPLA5 | 150379 | 22 | 44285165 | Splice_Site | CCTCTAACA | T | 0.063 | - |
| T82 | DGKZ | 8525 | 11 | 46369267 | Missense | G | A | 0.167 | p.A20T |
| T82 | USP11 | 8237 | X | 47100815 | Missense | G | A | 0.371 | p.G372D |
| T82 | MRO | 83876 | 18 | 48346258 | Frame_Shift_Del | CACGCCATG | A | 0.033 | - |
| T82 | ACSF2 | 80221 | 17 | 48543234 | Splice_Site | GGGAGCAAG | G | 0.027 | - |
| T82 | CSRNP2 | 81566 | 12 | 51461660 | In_Frame_Del | CTCCACATTT | C | 0.028 | p.165_168del |
| T82 | TSPYL2 | 64061 | X | 53111758 | In_Frame_Del | CCCGCCGCCG | C | 0.051 | p.27_29del |
| T82 | ZNF816 | 125893 | 19 | 53454387 | Missense | G | C | 0.095 | p.S214C |
| T82 | TRO | 7216 | X | 54956073 | In_Frame_Del | GTGCCAGCT | T | 0.032 | p.504_513del |
| T82 | TMEM150B | 284417 | 19 | 55831807 | Missense | G | C | 0.082 | p.P50A |
| T82 | OR5M10 | 390167 | 11 | 56344479 | Missense | G | A | 0.508 | p.T240M |
| T82 | DOK4 | 55715 | 16 | 57507354 | Frame_Shift_Del | CTGTTGAGGA | A | 0.047 | p.D301fs |
| T82 | TLN2 | 83660 | 15 | 63029122 | In_Frame_Del | TGGCTGCATC | A | 0.021 | p.1135_1148del |
| T82 | ABCA10 | 10349 | 17 | 67210856 | Missense | C | T | 0.267 | p.R332Q |
| T82 | THAP11 | 57215 | 16 | 67876778 | In_Frame_Del | AGCAGCAAC | A | 0.038 | p.108_123del |
| T82 | LACTB2 | 51110 | 8 | 71581258 | Missense | G | A | 0.443 | p.T33I |
| T82 | ADAMTS14 | 140766 | 10 | 72518009 | Missense | A | G | 0.085 | p.E1049G |
| T82 | BAZ1B | 9031 | 7 | 72892249 | In_Frame_Del | TCTATCTTCA | G | 0.027 | p.505_514del |
| T82 | P2RY2 | 5029 | 11 | 72945623 | Missense | G | A | 0.397 | p.R140H |
| T82 | C15orf39 | 56905 | 15 | 75499861 | Missense | G | A | 0.085 | p.G491D |
| T82 | HNF4G | 3174 | 8 | 76452258 | Missense | G | A | 0.207 | p.D11N |
| T82 | E2F7 | 144455 | 12 | 77419747 | In_Frame_Del | AAACCATTTA | T | 0.023 | p.714_719del |
| T82 | ZFHX4 | 79776 | 8 | 77765398 | Missense | A | G | 0.106 | p.I2081V |
| T82 | GAA | 2548 | 17 | 78091405 | Missense | G | A | 0.107 | p.V780I |
| T82 | SLC38A10 | 124565 | 17 | 79220224 | Missense | G | C | 0.098 | p.A831G |
| T82 | TMC3 | 342125 | 15 | 81624768 | Missense | C | T | 0.083 | p.D1099N |
| T82 | USP10 | 9100 | 16 | 84778685 | Missense | A | G | 0.227 | p.M200V |
| T82 | PTEN | 5728 | 10 | 89624298 | Missense | C | A | 0.379 | p.D24E |
| T82 | PTEN | 5728 | 10 | 89717712 | Missense | C | G | 0.086 | p.P246R |
| T82 | SPATA31E1 | 286234 | 9 | 90503007 | Missense | A | G | 0.088 | p.D1202G |
| T82 | NUTM2F | 54754 | 9 | 97080926 | In_Frame_Del | TCTTGGA | T | 0.036 | p.696_697del |
| T82 | FAM185A | 222234 | 7 | 102390107 | Splice_Site | CAAGTG | C | 0.057 | - |
| T82 | C14orf180 | 400258 | 14 | 105054607 | Splice_Site | G | A | 0.451 | - |
| T82 | NPAT | 4863 | 11 | 108043988 | Missense | C | T | 0.105 | p.V575I |
| T82 | LAMA4 | 3910 | 6 | 112471705 | Frame_Shift_Del | TTACCTCTCT | A | 0.027 | p.A722fs |
| T82 | CSMD3 | 114788 | 8 | 113301638 | Missense | C | A | 0.36 | p.C2866F |
| T82 | NRAS | 4893 | 1 | 115258748 | Missense | C | T | 0.456 | p.G12S |
| T82 | CEP164 | 22897 | 11 | 117282493 | Frame_Shift_Del | TTCCCAGTGA | T | 0.053 | p.S1383fs |
| T82 | MYLK | 4638 | 3 | 123419733 | Missense | A | G | 0.115 | p.L792P |
| T82 | CHST15 | 51363 | 10 | 125805220 | Frame_Shift_Del | TGAACTCAA | A | 0.037 | p.I159fs |
| T82 | FSCN3 | 29999 | 7 | 127235677 | Missense | G | A | 0.435 | p.R154H |
| T82 | FBN2 | 2201 | 5 | 127671209 | Missense | C | T | 0.272 | p.G1262E |
| T82 | MFSD8 | 256471 | 4 | 128859986 | Missense | G | A | 0.105 | p.R236C |
| T82 | PHF6 | 84295 | X | 133549134 | In_Frame_Del | AACG | A | 0.384 | p.273_274del |
| T82 | ANHX | 647589 | 12 | 133808116 | Missense | G | A | 0.379 | p.R122C |
| T82 | TG | 7038 | 8 | 133882059 | Missense | C | T | 0.5 | p.R88W |
| T82 | AHI1 | 54806 | 6 | 135778731 | Missense | C | T | 0.081 | p.R351Q |
| T82 | LHX3 | 8022 | 9 | 139091657 | Frame_Shift_Del | CGGCGCACC | C | 0.023 | p.T105fs |
| T82 | PLOD2 | 5352 | 3 | 145791085 | Missense | T | C | 0.632 | p.I557V |
| T82 | PRSS48 | 345062 | 4 | 152201018 | Frame_Shift_Ins | G | GCAGGT | 0.07 | p.W41fs |
| T82 | TPM3 | 7170 | 1 | 154145612 | In_Frame_Del | CCATCTTTTCT | T | 0.035 | p.31_45del |
| T82 | DUSP27 | 92235 | 1 | 167097686 | Frame_Shift_Del | CAG | C | 0.404 | p.R1107fs |
| T82 | LRP2 | 4036 | 2 | 170028520 | Frame_Shift_Del | GTTTTCCTCA | C | 0.055 | p.D3747fs |
| T82 | AXDND1 | 126859 | 1 | 179504034 | In_Frame_Del | GAAGAAC | G | 0.039 | p.990_992del |
| T82 | SWT1 | 54823 | 1 | 185175837 | Missense | A | C | 0.091 | p.L638F |
| T82 | FSIP2 | 401024 | 2 | 186654867 | Missense | G | C | 0.083 | p.D1091H |
| T82 | FSIP2 | 401024 | 2 | 186658438 | Missense | C | T | 0.104 | p.T2281M |
| T82 | FSIP2 | 401024 | 2 | 186658565 | Missense | G | T | 0.086 | p.E2323D |
| T82 | OBSCN | 84033 | 1 | 228525066 | In_Frame_Ins | C | CGATGCC | 0.061 | .D5594delinsDGDAR |
| T82 | DNER | 92737 | 2 | 230579068 | In_Frame_Del | GAGC | G | 0.167 | p.23_24del |
| T82 | GIGYF2 | 26058 | 2 | 233708909 | In_Frame_Del | AAGCAGC | A | 0.023 | p.1009_1011del |
| T82 | MROH2A | 339766 | 2 | 234732317 | Missense | A | G | 0.099 | p.M1382V |
| T82 | ACTN2 | 88 | 1 | 236917317 | Missense | G | A | 0.558 | p.R637H |
| T83 | WASHC1 | 100287171 | 9 | 17423 | Missense | A | C | 0.156 | p.V201G |
| T83 | SLC6A3 | 6531 | 5 | 1422076 | Missense | G | A | 0.444 | p.P236L |
| T83 | CACTIN | 58509 | 19 | 3612286 | Missense | A | G | 0.486 | p.Y638H |
| T83 | JAK2 | 3717 | 9 | 5089788 | Missense | G | A | 0.105 | p.E896K |
| T83 | ASB13 | 79754 | 10 | 5683742 | Missense | A | G | 0.487 | p.Y234H |
| T83 | CDKN2A | 1029 | 9 | 21971120 | Nonsense | G | A | 0.979 | p.R80X |
| T83 | HOXA11 | 3207 | 7 | 27224657 | Missense | T | C | 0.152 | p.Q36R |
| T83 | MAS1L | 116511 | 6 | 29455589 | Missense | G | A | 0.472 | p.L31F |
| T83 | PKP2 | 5318 | 12 | 33049529 | Missense | C | T | 0.526 | p.R46H |
| T83 | TIMP3 | 7078 | 22 | 33253242 | Nonsense | C | T | 0.171 | p.R71X |
| T83 | RUNX1 | 861 | 21 | 36171607 | Nonsense | G | A | 0.489 | p.R293X |
| T83 | RPGR | 6103 | X | 38145958 | Missense | T | C | 0.182 | p.E765G |
| T83 | KRT19 | 3880 | 17 | 39684429 | Missense | C | T | 0.337 | p.R24H |
| T83 | BCOR | 54880 | X | 39933959 | Frame_Shift_Ins | A | AAT | 0.619 | p.S214fs |
| T83 | ZFP36L2 | 678 | 2 | 43452230 | Missense | G | T | 0.229 | p.T238K |
| T83 | MYL7 | 58498 | 7 | 44179919 | Splice_Site | C | T | 0.509 | - |
| T83 | MADD | 8567 | 11 | 47330923 | Missense | G | A | 0.314 | p.M1238I |
| T83 | XKR4 | 114786 | 8 | 56436394 | Missense | G | A | 0.543 | p.G521R |
| T83 | CNGB1 | 1258 | 16 | 57918257 | Frame_Shift_Ins | G | TCATTAA | 0.024 | p.P1183fs |

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|---|---|---|---|---|---|---|---|---|---|
| T83 | VPS37C | 55048 | 11 | 60901634 | Missense | G | A | 0.442 | p.R47W |
| T83 | AHNAK | 79026 | 11 | 62294720 | Frame_Shift_Ins | T | TGGGCG | 0.024 | p.D2390fs |
| T83 | AHNAK | 79026 | 11 | 62294732 | Frame_Shift_Del | ATTTTGGG | A | 0.064 | p.P2384fs |
| T83 | CDH11 | 1009 | 16 | 65025743 | Missense | C | T | 0.395 | p.G247R |
| T83 | DLG5 | 9231 | 10 | 79579695 | Missense | G | A | 0.149 | p.R1162W |
| T83 | PLCE1 | 51196 | 10 | 95892006 | Missense | G | T | 0.5 | p.A120S |
| T83 | COL17A1 | 1308 | 10 | 105836080 | Missense | C | T | 0.418 | p.V104I |
| T83 | LAMA4 | 3910 | 6 | 112512973 | Missense | G | T | 0.909 | p.P195T |
| T83 | GRK1 | 6011 | 13 | 114325920 | Missense | C | T | 0.465 | p.R312W |
| T83 | TRIM33 | 51592 | 1 | 115053697 | Missense | T | C | 0.5 | p.M1V |
| T83 | NRAS | 4893 | 1 | 115258748 | Missense | C | T | 0.407 | p.G12S |
| T83 | POLE | 5426 | 12 | 133245295 | Missense | C | T | 0.439 | p.C651Y |
| T83 | PHF6 | 84295 | X | 133549044 | Frame_Shift_Del | AGTT | A | 0.59 | p.L244fs |
| T83 | SLC2A6 | 11182 | 9 | 136342270 | Missense | C | T | 0.49 | p.V117M |
| T83 | NOTCH1 | 4851 | 9 | 139390864 | Frame_Shift_Ins | C | CCT | 0.982 | p.V2443fs |
| T83 | NOTCH1 | 4851 | 9 | 139397774 | Missense | A | T | 0.134 | p.V1676D |
| T83 | NOTCH1 | 4851 | 9 | 139399344 | Missense | A | G | 0.337 | p.L1600P |
| T83 | FLNA | 2316 | X | 153577922 | Missense | C | T | 0.364 | p.V2514I |
| T83 | ADAM19 | 8728 | 5 | 156916129 | Missense | G | A | 0.5 | p.T769M |
| T83 | RAPGEF2 | 9693 | 4 | 160263047 | Missense | G | T | 0.463 | p.A795S |
| T83 | DACT2 | 168002 | 6 | 168708575 | In_Frame_Del | GCGGGCCCG | A | 0.022 | p.447_451del |
| T83 | MUC4 | 4585 | 3 | 195507062 | Missense | C | T | 0.121 | p.D3797N |
| T84 | PDE6B | 5158 | 4 | 619705 | Missense | A | G | 0.309 | p.Y97C |
| T84 | KANK1 | 23189 | 9 | 738396 | Missense | G | T | 0.083 | p.D991Y |
| T84 | DLGAP2 | 9228 | 8 | 1645451 | Missense | T | A | 0.35 | p.S885T |
| T84 | ATP8B3 | 148229 | 19 | 1785173 | Missense | T | C | 0.422 | p.T1136A |
| T84 | OSBPL5 | 114879 | 11 | 3124554 | Splice_Site | C | T | 0.454 | - |
| T84 | RAX2 | 84839 | 19 | 3770838 | Frame_Shift_Ins | C | CG | 0.388 | p.P112fs |
| T84 | MMP26 | 56547 | 11 | 5012655 | Missense | T | G | 0.541 | p.F175C |
| T84 | ADAMTS16 | 170690 | 5 | 5182239 | Missense | C | A | 0.378 | p.A195D |
| T84 | CHD3 | 1107 | 17 | 7788321 | Frame_Shift_Ins | G | GC | 0.193 | p.S66fs |
| T84 | GATA3 | 2625 | 10 | 8100424 | Frame_Shift_Ins | A | AC | 0.411 | p.Y133fs |
| T84 | GATA3 | 2625 | 10 | 8106036 | Missense | G | A | 0.433 | p.A287T |
| T84 | CA6 | 765 | 1 | 9027780 | Missense | T | C | 0.454 | p.Y84H |
| T84 | HOOK2 | 29911 | 19 | 12876513 | Missense | T | C | 0.385 | p.E542G |
| T84 | ARNTL | 406 | 11 | 13378326 | Splice_Site | T | C | 0.455 | - |
| T84 | PSIP1 | 11168 | 9 | 15490113 | Nonsense | TA | T | 0.581 | p.L53X |
| T84 | ANKRD28 | 23243 | 3 | 15756165 | Splice_Site | T | TG | 0.323 | - |
| T84 | PLCL2 | 23228 | 3 | 17052022 | Missense | A | G | 0.349 | p.Q269R |
| T84 | JAK3 | 3718 | 19 | 17945907 | Missense | C | A | 0.874 | p.V678L |
| T84 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.891 | p.M511I |
| T84 | DGCR8 | 54487 | 22 | 20080358 | Missense | T | G | 0.358 | p.S545A |
| T84 | NPC1 | 4864 | 18 | 21124413 | Frame_Shift_Ins | G | GTTTTTTA | 0.027 | p.F675fs |
| T84 | TNFRSF10D | 8793 | 8 | 23005949 | Splice_Site | A | G | 0.332 | - |
| T84 | KSR1 | 8844 | 17 | 25904558 | Missense | T | C | 0.427 | p.M1T |
| T84 | ELP4 | 26610 | 11 | 31671714 | Missense | A | G | 0.427 | p.E364G |
| T84 | TNXB | 7148 | 6 | 32064688 | Frame_Shift_Ins | G | GC | 0.394 | p.G314fs |
| T84 | ACTL10 | 170487 | 20 | 32255550 | Missense | C | T | 0.311 | p.R83C |
| T84 | ASIC2 | 40 | 17 | 32483077 | Missense | G | A | 0.211 | p.R159C |
| T84 | BRCA2 | 675 | 13 | 32907420 | Frame_Shift_Ins | G | GA | 0.363 | p.G602fs |
| T84 | GLB1 | 2720 | 3 | 33038564 | Frame_Shift_Ins | G | GT | 0.397 | p.N538fs |
| T84 | FHOD3 | 80206 | 18 | 34340703 | Frame_Shift_Ins | A | AC | 0.46 | p.T1328fs |
| T84 | AGXT2 | 64902 | 5 | 35025887 | Missense | C | G | 0.309 | p.G315A |
| T84 | MED1 | 5469 | 17 | 37564325 | Frame_Shift_Ins | A | AT | 0.472 | p.N1383fs |
| T84 | LIFR | 3977 | 5 | 38530706 | Missense | A | G | 0.424 | p.V15A |
| T84 | KRT38 | 8687 | 17 | 39594451 | Missense | C | A | 0.42 | p.D379Y |
| T84 | SPATA31A3 | 727830 | 9 | 40706016 | Missense | C | T | 0.411 | p.H1225Y |
| T84 | EP300 | 2033 | 22 | 41572250 | Splice_Site | G | T | 0.451 | - |
| T84 | FRS3 | 10817 | 6 | 41740598 | Missense | A | G | 0.267 | p.I118T |
| T84 | PHOX2B | 8929 | 4 | 41749429 | In_Frame_Del | GTAGTGA | G | 0.022 | p.120_122del |
| T84 | SPTBN5 | 51332 | 15 | 42146396 | Missense | G | T | 0.429 | p.A3209D |
| T84 | TMPRSS3 | 64699 | 21 | 43795962 | Frame_Shift_Ins | G | GC | 0.377 | p.P277fs |
| T84 | FBLN1 | 2192 | 22 | 45959099 | Missense | A | G | 0.399 | p.S669G |
| T84 | PRKD2 | 25865 | 19 | 47181752 | Missense | C | A | 0.406 | p.G590C |
| T84 | CDHR4 | 389118 | 3 | 49836690 | Missense | T | C | 0.33 | p.Y77C |
| T84 | SIGLEC9 | 27180 | 19 | 51630335 | Missense | A | G | 0.468 | p.Q266R |
| T84 | ZNF528 | 84436 | 19 | 52919481 | Missense | A | G | 0.43 | p.H459R |
| T84 | ITGB7 | 3695 | 12 | 53589830 | Frame_Shift_Del | CT | C | 0.417 | p.T323fs |
| T84 | BMP5 | 653 | 6 | 55620369 | Frame_Shift_Ins | A | AT | 0.474 | p.Y443fs |
| T84 | BRSK1 | 84446 | 19 | 55815035 | Frame_Shift_Ins | A | AC | 0.382 | p.D376fs |
| T84 | GLYAT | 10249 | 11 | 58477609 | Missense | T | C | 0.365 | p.D174G |
| T84 | ARID4A | 5926 | 14 | 58825910 | Frame_Shift_Ins | G | GA | 0.32 | p.K638fs |
| T84 | PCNX3 | 399909 | 11 | 65383874 | Missense | C | T | 0.368 | p.S31F |
| T84 | RTTN | 25914 | 18 | 67697248 | Frame_Shift_Ins | C | CT | 0.506 | p.K1915fs |
| T84 | KIF19 | 124602 | 17 | 72348406 | Missense | A | G | 0.406 | p.Y636C |
| T84 | ZFHX3 | 463 | 16 | 72821632 | In_Frame_Ins | C | CACT | 0.013 | p.G2601delinsSG |
| T84 | GRIN2C | 2905 | 17 | 72851135 | Missense | C | T | 0.435 | p.A33T |
| T84 | RAB11FIP5 | 26056 | 2 | 73302654 | Frame_Shift_Ins | T | TG | 0.329 | p.K653fs |
| T84 | UNC13D | 201294 | 17 | 73836130 | Missense | T | G | 0.285 | p.Q307P |
| T84 | SEMA4F | 10505 | 2 | 74907092 | Missense | G | T | 0.404 | p.R535M |
| T84 | PROX2 | 283571 | 14 | 75329571 | Frame_Shift_Ins | T | TG | 0.403 | p.K323fs |
| T84 | PLAU | 5328 | 10 | 75673437 | Frame_Shift_Ins | C | CG | 0.371 | p.R184fs |
| T84 | AGGF1 | 55109 | 5 | 76358966 | Frame_Shift_Ins | C | CA | 0.286 | p.N678fs |
| T84 | MYCBP2 | 23077 | 13 | 77644812 | Missense | A | G | 0.337 | p.V3953A |
| T84 | POMT2 | 29954 | 14 | 77746241 | Missense | C | A | 0.402 | p.A606S |
| T84 | DLG5 | 9231 | 10 | 79613231 | Missense | G | A | 0.388 | p.R249W |
| T84 | CRISPLD2 | 83716 | 16 | 84911067 | Missense | A | G | 0.301 | p.T394A |
| T84 | PIEZO1 | 9780 | 16 | 88800372 | In_Frame_Ins | G | GTCC | 0.437 | p.D757delinsED |
| T84 | CDH15 | 1013 | 16 | 89256785 | Frame_Shift_Ins | G | GC | 0.378 | p.E371fs |
| T84 | MDN1 | 23195 | 6 | 90428910 | Missense | T | A | 0.46 | p.N2001I |
| T84 | CHD2 | 1106 | 15 | 93521483 | Frame_Shift_Ins | C | CG | 0.391 | p.S866fs |
| T84 | GIGYF1 | 64599 | 7 | 100284009 | Missense | G | A | 0.438 | p.R248C |
| T84 | PLOD3 | 8985 | 7 | 100853406 | Missense | G | A | 0.109 | p.R551W |
| T84 | FBXO43 | 286151 | 8 | 101153915 | Frame_Shift_Ins | A | AT | 0.398 | p.N189fs |
| T84 | PWP1 | 11137 | 12 | 108082506 | Missense | G | T | 0.112 | p.E82D |
| T84 | TMEM168 | 64418 | 7 | 112424215 | Frame_Shift_Del | AT | A | 0.459 | p.N222fs |
| T84 | HECTD4 | 283450 | 12 | 112720937 | Missense | T | C | 0.262 | p.N358S |
| T84 | TRIM33 | 51592 | 1 | 115006892 | Missense | C | A | 0.426 | p.Q215H |
| T84 | SLC6A14 | 11254 | X | 115589975 | Missense | C | T | 0.871 | p.R595C |
| T84 | PDZD3 | 79849 | 11 | 119056821 | Missense | A | C | 0.414 | p.K22T |
| T84 | OR6M1 | 390261 | 11 | 123676367 | Missense | G | A | 0.34 | p.R231C |
| T84 | HEG1 | 57493 | 3 | 124732127 | Missense | A | G | 0.256 | p.F766L |
| T84 | COL6A5 | 256076 | 3 | 130150710 | Missense | A | G | 0.138 | p.T1884A |
| T84 | VDAC1 | 7416 | 5 | 133316638 | Frame_Shift_Ins | A | AT | 0.467 | p.N111fs |
| T84 | CXXC5 | 51523 | 5 | 139060270 | Frame_Shift_Ins | A | AC | 0.364 | p.P54fs |
| T84 | CCDC28A | 25901 | 6 | 139097329 | Frame_Shift_Ins | C | CA | 0.29 | p.A114fs |
| T84 | NOTCH1 | 4851 | 9 | 139390863 | Frame_Shift_Ins | A | ACC | 0.434 | p.V2443fs |
| T84 | UCP1 | 7350 | 4 | 141484277 | Frame_Shift_Ins | G | GT | 0.462 | p.N205fs |
| T84 | HHIP | 64399 | 4 | 145568016 | Frame_Shift_Ins | T | TG | 0.453 | p.S63fs |
| T84 | LYPD6B | 130576 | 2 | 150064872 | Missense | G | A | 0.366 | p.A92T |
| T84 | FMNL2 | 114793 | 2 | 153417442 | Frame_Shift_Ins | C | CCGTATC | 0.043 | p.D163fs |
| T84 | FMNL2 | 114793 | 2 | 153417450 | In_Frame_Del | AGCCCTGGAG | A | 0.04 | p.166_169del |
| T84 | LPA | 4018 | 6 | 161026093 | Missense | G | T | 0.089 | p.A977E |
| T84 | RARS | 5917 | 5 | 167927670 | Frame_Shift_Ins | T | TA | 0.443 | p.G299fs |

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| T84 | RAPGEF4 | 11069 | 2 | 173832040 | Missense | A | G | 0.341 | p.D71G |
| T84 | ABL2 | 27 | 1 | 179077356 | Missense | A | G | 0.09 | p.S995P |
| T84 | OSBPL6 | 114880 | 2 | 179247169 | Missense | T | C | 0.468 | p.I488T |
| T84 | ZNF804A | 91752 | 2 | 185802810 | Missense | A | G | 0.1 | p.E896G |
| T84 | TNK2 | 10188 | 3 | 195595228 | Frame_Shift_Ins | C | CGG | 0.224 | p.P632fs |
| T84 | ETNK2 | 55224 | 1 | 204110441 | Splice_Site | A | G | 0.341 | - |
| T84 | PTPN14 | 5784 | 1 | 214585024 | Splice_Site | T | C | 0.427 | - |
| T84 | FAM177B | 400823 | 1 | 222920399 | Nonsense | C | T | 0.284 | p.R73X |
| T84 | ARMC9 | 80210 | 2 | 232072925 | Missense | T | C | 0.412 | p.V46A |
| T84 | ALPPL2 | 251 | 2 | 233273429 | In_Frame_Ins | G | GTTTTTT | 0.029 | p.G291delinsGFL |
| T84 | OR2T2 | 401992 | 1 | 248616704 | Frame_Shift_Del | CTGCTGCG | C | 0.026 | p.C203fs |
| T85 | PLEKHG4B | 153478 | 5 | 174103 | Missense | G | A | 0.413 | p.R1075Q |
| T85 | ZC3H7A | 29066 | 16 | 11845202 | Frame_Shift_Ins | A | AT | 0.482 | p.Y963fs |
| T85 | JAK3 | 3718 | 19 | 17942143 | Missense | C | T | 0.747 | p.E958K |
| T85 | JAK3 | 3718 | 19 | 17943648 | Missense | G | T | 0.697 | p.P814H |
| T85 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.326 | p.M511I |
| T85 | RPGRIP1 | 57096 | 14 | 21792807 | Missense | G | A | 0.429 | p.R598Q |
| T85 | RASD2 | 23551 | 22 | 35947567 | Missense | G | C | 0.43 | p.V97L |
| T85 | HNF1B | 6928 | 17 | 36061117 | Frame_Shift_Del | GGGCTGCCA | G | 0.062 | p.L466fs |
| T85 | CLDN14 | 23562 | 21 | 37833633 | Missense | C | A | 0.408 | p.G121C |
| T85 | PABPC4 | 8761 | 1 | 40029354 | Missense | G | A | 0.382 | p.R505W |
| T85 | TUBG1 | 7283 | 17 | 40767021 | Missense | C | T | 0.428 | p.R440W |
| T85 | CCND3 | 896 | 6 | 41903745 | Frame_Shift_Ins | C | CG | 0.465 | p.R199fs |
| T85 | U2AF1 | 7307 | 21 | 44524453 | Missense | C | A | 0.491 | p.R35L |
| T85 | OR13A1 | 79290 | 10 | 45799461 | Missense | G | A | 0.4 | p.A137V |
| T85 | ZNF41 | 7592 | X | 47315415 | Missense | C | T | 0.877 | p.G67E |
| T85 | SPI1 | 6688 | 11 | 47381554 | Frame_Shift_Del | GCT | G | 0.138 | p.S61fs |
| T85 | KCND1 | 3750 | X | 48826047 | Missense | C | T | 0.262 | p.R211H |
| T85 | LAMB2 | 3913 | 3 | 49161040 | Missense | C | A | 0.469 | p.E1274D |
| T85 | BCL2L12 | 83596 | 19 | 50173533 | Missense | C | T | 0.388 | p.R247C |
| T85 | ESM1 | 11082 | 5 | 54275189 | Missense | C | T | 0.212 | p.V126I |
| T85 | HCRTR2 | 3062 | 6 | 55142224 | Missense | A | G | 0.452 | p.Q270R |
| T85 | KIR2DL3 | 3804 | 19 | 55258837 | Missense | G | A | 0.382 | p.G239S |
| T85 | PXK | 54899 | 3 | 58368237 | Splice_Site | A | T | 0.116 | - |
| T85 | JAK1 | 3716 | 1 | 65310518 | Missense | G | T | 0.164 | p.R724S |
| T85 | PRMT7 | 54496 | 16 | 68379665 | Frame_Shift_Ins | C | CA | 0.433 | p.H289fs |
| T85 | ODF3L1 | 161753 | 15 | 76018513 | Splice_Site | G | A | 0.468 | - |
| T85 | ZNF804B | 219578 | 7 | 88964560 | Missense | G | A | 0.382 | p.R755Q |
| T85 | RNGTT | 8732 | 6 | 89638748 | Missense | C | T | 0.434 | p.R48H |
| T85 | SEMA4B | 10509 | 15 | 90768923 | Missense | G | C | 0.368 | p.V518L |
| T85 | HACE1 | 57531 | 6 | 105243508 | Missense | T | G | 0.205 | p.K290T |
| T85 | CFAP43 | 80217 | 10 | 105903204 | Missense | T | C | 0.364 | p.K1380E |
| T85 | ENPP2 | 5168 | 8 | 120569893 | Missense | C | T | 0.455 | p.M820I |
| T85 | TECTA | 7007 | 11 | 120999043 | Missense | C | T | 0.443 | p.S786L |
| T85 | ERCC3 | 2071 | 2 | 128050344 | Nonsense | C | A | 0.344 | p.E105X |
| T85 | PHF6 | 84295 | X | 133551264 | In_Frame_Ins | T | TTGGGGC | 0.867 | p.T300delinsTWG |
| T85 | ALDH8A1 | 64577 | 6 | 135265040 | Missense | T | C | 0.411 | p.E68G |
| T85 | R3HDM1 | 23518 | 2 | 136380220 | Splice_Site | T | C | 0.373 | - |
| T85 | NOTCH1 | 4851 | 9 | 139402689 | Missense | C | T | 0.369 | p.R1107Q |
| T85 | NOTCH1 | 4851 | 9 | 139412291 | Missense | C | T | 0.158 | p.D452N |
| T85 | LCN12 | 286256 | 9 | 139846837 | Nonsense | C | T | 0.386 | p.Q20X |
| T85 | PNPLA7 | 375775 | 9 | 140438197 | Missense | T | C | 0.467 | p.K90R |
| T85 | IVL | 3713 | 1 | 152883771 | Missense | C | T | 0.305 | p.P500S |
| T85 | ABCD1 | 215 | X | 152991428 | Missense | G | A | 0.886 | p.R236H |
| T85 | SLC22A1 | 6580 | 6 | 160579571 | Missense | C | T | 0.093 | p.T541M |
| T85 | G6PC2 | 57818 | 2 | 169764571 | Missense | C | A | 0.365 | p.S350R |
| T85 | SLC45A3 | 85414 | 1 | 205632662 | Missense | C | T | 0.536 | p.R86Q |
| T85 | CNOT9 | 9125 | 2 | 219458280 | Missense | C | T | 0.532 | p.S254F |
| T86 | SNPH | 9751 | 20 | 1281256 | In_Frame_Del | CCCGGAGCAG | C | 0.024 | p.70_76del |
| T86 | INTS1 | 26173 | 7 | 1538192 | Splice_Site | GGGTGA | G | 0.038 | - |
| T86 | PKD1 | 5310 | 16 | 2143917 | In_Frame_Del | GACAGCC | G | 0.022 | p.3569_3571del |
| T86 | PRSS41 | 360226 | 16 | 2848499 | In_Frame_Del | GGCGCTGCTG | G | 0.045 | p.5_9del |
| T86 | P2RX1 | 5023 | 17 | 3807683 | Missense | C | T | 0.331 | p.G123E |
| T86 | OR51B4 | 79339 | 11 | 5322327 | Missense | C | T | 0.082 | p.V284M |
| T86 | CATSPERD | 257062 | 19 | 5757840 | Frame_Shift_Del | CCCAGGTGAT | T | 0.03 | p.V427fs |
| T86 | TMEM200C | 645369 | 18 | 5890729 | Missense | G | A | 0.333 | p.A445V |
| T86 | L3MBTL4 | 91133 | 18 | 6241403 | Missense | C | T | 0.111 | p.C169Y |
| T86 | APBB1 | 322 | 11 | 6422866 | Missense | C | T | 0.384 | p.V261M |
| T86 | VAV1 | 7409 | 19 | 6822237 | Missense | C | T | 0.343 | p.T152M |
| T86 | ZBTB4 | 57659 | 17 | 7366354 | In_Frame_Del | CTCCTCCTCT | C | 0.029 | p.644_649del |
| T86 | PEX14 | 5195 | 1 | 10659376 | Frame_Shift_Del | CAGCCCCCTC | C | 0.027 | p.T84fs |
| T86 | CLEC16A | 23274 | 16 | 11272395 | Missense | G | A | 0.134 | p.V1004I |
| T86 | GUCY2C | 2984 | 12 | 14822692 | Nonsense | TC | T | 0.108 | p.W415X |
| T86 | ANO8 | 57719 | 19 | 17438153 | Frame_Shift_Ins | T | GGTGGC | 0.059 | p.H851fs |
| T86 | NCAPG | 64151 | 4 | 17836092 | In_Frame_Del | GCTACAGCTA | G | 0.111 | p.686_691del |
| T86 | SLC6A5 | 9152 | 11 | 20648323 | In_Frame_Del | CCTGGAG | C | 0.041 | p.444_446del |
| T86 | LDHB | 3945 | 12 | 21796868 | Splice_Site | C | T | 0.094 | - |
| T86 | CHD8 | 57680 | 14 | 21868187 | Frame_Shift_Del | CT | C | 0.116 | p.E1590fs |
| T86 | ZNF98 | 148198 | 19 | 22575759 | Frame_Shift_Del | TC | T | 0.5 | p.D93fs |
| T86 | NUPL2 | 11097 | 7 | 23239809 | Missense | C | G | 0.452 | p.S239R |
| T86 | NGDN | 25983 | 14 | 23945243 | In_Frame_Del | GGAAGATGAA | C | 0.025 | p.143_155del |
| T86 | NYNRIN | 57523 | 14 | 24868493 | Frame_Shift_Del | TCATGGTG | T | 0.022 | p.F14fs |
| T86 | SLC5A11 | 115584 | 16 | 24921736 | In_Frame_Del | CCAG | C | 0.11 | p.517_518del |
| T86 | CARMIL1 | 55604 | 6 | 25605058 | Missense | G | A | 0.125 | p.V1191I |
| T86 | CPD | 1362 | 17 | 28773016 | Missense | C | T | 0.347 | p.P704S |
| T86 | PPP1CB | 5500 | 2 | 29006809 | Missense | G | A | 0.089 | p.R186Q |
| T86 | ITGAL | 3683 | 16 | 30529934 | Frame_Shift_Del | CCTCTTCCATG | C | 0.021 | p.A961fs |
| T86 | ADGRB2 | 576 | 1 | 32201995 | Splice_Site | G | A | 0.374 | - |
| T86 | TMEM234 | 56063 | 1 | 32682515 | Missense | C | T | 0.367 | p.G121E |
| T86 | FMN1 | 342184 | 15 | 33194232 | In_Frame_Del | ATGTAAAAAT | A | 0.045 | p.903_906del |
| T86 | SYNGAP1 | 8831 | 6 | 33403301 | Frame_Shift_Ins | T | TTGACC | 0.368 | p.S225fs |
| T86 | ZNF792 | 126375 | 19 | 35449617 | Missense | A | T | 0.101 | p.L381H |
| T86 | NIPBL | 25836 | 5 | 37007578 | Splice_Site | T | C | 0.458 | - |
| T86 | TMPRSS6 | 164656 | 22 | 37492735 | Frame_Shift_Del | GCTGGTGAT | G | 0.061 | p.I117fs |
| T86 | ZNF585B | 92285 | 19 | 37697940 | Splice_Site | A | G | 0.408 | - |
| T86 | ERBB2 | 2064 | 17 | 37868667 | Missense | G | A | 0.467 | p.G372R |
| T86 | TOP2A | 7153 | 17 | 38557204 | Frame_Shift_Del | CAGCACCATT | T | 0.026 | p.I850fs |
| T86 | RALA | 5898 | 7 | 39726334 | Missense | G | T | 0.429 | p.G23V |
| T86 | DAAM2 | 23500 | 6 | 39843230 | In_Frame_Del | GAACATCGTC | G | 0.023 | p.430_432del |
| T86 | MAP3K10 | 4294 | 19 | 40718729 | In_Frame_Del | GTGGCAGCAG | G | 0.051 | p.524_528del |
| T86 | EP300 | 2033 | 22 | 41553382 | Missense | G | T | 0.182 | p.M1157I |
| T86 | EP300 | 2033 | 22 | 41553383 | Nonsense | C | T | 0.182 | p.Q1158X |
| T86 | MYBL2 | 4605 | 20 | 42310418 | Frame_Shift_Del | AGCAGCTGAG | T | 0.03 | p.D39fs |
| T86 | ZNF106 | 64397 | 15 | 42742230 | Missense | A | G | 0.367 | p.F724S |
| T86 | ZFP36L2 | 678 | 2 | 43452464 | Frame_Shift_Ins | C | CG | 0.337 | p.R160fs |
| T86 | PAIP1 | 10605 | 5 | 43555994 | In_Frame_Ins | T | TTAA | 0.183 | p.M125delinsLM |
| T86 | WDR76 | 79968 | 15 | 44136203 | In_Frame_Del | CCAAATTTGG | C | 0.044 | p.264_279del |
| T86 | U2AF1 | 7307 | 21 | 44524453 | Missense | C | A | 0.414 | p.R35L |
| T86 | MRPL10 | 124995 | 17 | 45906025 | Frame_Shift_Del | GGAGGGCATA | T | 0.025 | p.G18fs |
| T86 | TESK2 | 10420 | 1 | 45923441 | Missense | C | T | 0.104 | p.R6Q |
| T86 | CCR9 | 10803 | 3 | 45943304 | Nonsense | C | T | 0.434 | p.Q330X |
| T86 | MBD1 | 4152 | 18 | 47799956 | Frame_Shift_Del | AACAGGGCCC | G | 0.019 | p.V446fs |
| T86 | RBP3 | 5949 | 10 | 48385938 | Missense | C | T | 0.5 | p.D1052N |
| T86 | FBN1 | 2200 | 15 | 48756211 | Frame_Shift_Del | AGAGAAAGT | A | 0.045 | p.D1648fs |

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| T86 | PLXNB2 | 23654 | 22 | 50724662 | Missense | G | A | 0.388 | p.T606M |
| T86 | ZFP64 | 55734 | 20 | 50768758 | Frame_Shift_Del | GGGTAGTTCTT | T | 0.026 | p.Q599fs |
| T86 | MYH14 | 79784 | 19 | 50812948 | In_Frame_Del | GGGCGTGGCA | A | 0.024 | p.1964_1970del |
| T86 | SLC18A3 | 6572 | 10 | 50819258 | Missense | G | A | 0.394 | p.G158S |
| T86 | SALL1 | 6299 | 16 | 51173359 | Missense | G | A | 0.323 | p.S828F |
| T86 | ACVRL1 | 94 | 12 | 52308232 | Missense | G | A | 0.097 | p.R212H |
| T86 | NDC1 | 55706 | 1 | 54284629 | Frame_Shift_Del | TACCAAGAAA | A | 0.05 | p.I189fs |
| T86 | WDHD1 | 11169 | 14 | 55457956 | Missense | G | A | 0.109 | p.P316L |
| T86 | BMP5 | 653 | 6 | 55739287 | Missense | C | T | 0.365 | p.R126H |
| T86 | RAE1 | 8480 | 20 | 55949641 | Frame_Shift_Del | GCAGGTAAAT | T | 0.019 | p.V276fs |
| T86 | KIAA0586 | 9786 | 14 | 59014535 | Missense | C | T | 0.109 | p.P1435L |
| T86 | GID8 | 54994 | 20 | 61574940 | In_Frame_Ins | C | CGGA | 0.481 | p.R137delinsRR |
| T86 | MEN1 | 4221 | 11 | 64574672 | In_Frame_Del | TAGAGCAGCC | T | 0.033 | p.270_273del |
| T86 | DCAF5 | 8816 | 14 | 69521800 | Missense | C | T | 0.297 | p.E534K |
| T86 | AAK1 | 22848 | 2 | 69741759 | In_Frame_Del | TTGTTGC | T | 0.038 | p.538_540del |
| T86 | FOXO4 | 4303 | X | 70316671 | Missense | G | A | 0.335 | p.R98Q |
| T86 | NEXMIF | 340533 | X | 73960761 | Frame_Shift_Del | GTTACCTTTG | G | 0.032 | p.N1195fs |
| T86 | OOEP | 441161 | 6 | 74079037 | Frame_Shift_Del | CCACTGTCAGC | A | 0.044 | p.T76fs |
| T86 | ZDHHC15 | 158866 | X | 74670562 | Frame_Shift_Del | ATATATGACTT | T | 0.036 | p.R134fs |
| T86 | VRTN | 55237 | 14 | 74823805 | Missense | C | T | 0.372 | p.R107C |
| T86 | TNRC6C | 57690 | 17 | 76089740 | In_Frame_Del | TGACCCTGAGA | T | 0.037 | p.1398_1402del |
| T86 | MYO7A | 4647 | 11 | 76895770 | Frame_Shift_Del | CGGGGACACC | G | 0.021 | p.G1172fs |
| T86 | TRPM6 | 140803 | 9 | 77423012 | Frame_Shift_Del | ATATGCTCTAC | G | 0.043 | p.I516fs |
| T86 | FASN | 2194 | 17 | 80049224 | Missense | C | T | 0.372 | p.D456N |
| T86 | WDFY3 | 23001 | 4 | 85654536 | Missense | G | A | 0.423 | p.A2407V |
| T86 | GSE1 | 23199 | 16 | 85689982 | In_Frame_Del | GGAGCGC | G | 0.024 | p.238_239del |
| T86 | RALYL | 138046 | 8 | 85833139 | Frame_Shift_Del | ATAACGCATGA | T | 0.043 | p.I279fs |
| T86 | SPARCL1 | 8404 | 4 | 88416210 | Frame_Shift_Del | GTTGTCAGGT | T | 0.03 | p.T34fs |
| T86 | GBP2 | 2634 | 1 | 89586914 | Frame_Shift_Del | GTGAGACTTCA | C | 0.045 | p.G68fs |
| T86 | CHMP1A | 5119 | 16 | 89712454 | Frame_Shift_Del | CACACCGGCG | T | 0.025 | p.P193fs |
| T86 | VPS9D1 | 9605 | 16 | 89775692 | In_Frame_Del | GTAGGGGTAG | G | 0.031 | p.502_513del |
| T86 | AKAP9 | 10142 | 7 | 91652241 | Frame_Shift_Del | GAAACTGAACA | G | 0.038 | p.E1356fs |
| T86 | GRID2 | 2895 | 4 | 94145790 | Missense | C | T | 0.222 | p.T235M |
| T86 | AFF3 | 3899 | 2 | 100343539 | Missense | G | A | 0.433 | p.S389L |
| T86 | AGL | 178 | 1 | 100377969 | Frame_Shift_Del | GGCCTGAGTA | C | 0.039 | p.S1265fs |
| T86 | CERS3 | 204219 | 15 | 100943011 | In_Frame_Del | TCTTCCTCTTC | T | 0.035 | p.349_353del |
| T86 | DRAM1 | 55332 | 12 | 102295083 | Frame_Shift_Del | TATACAAG | T | 0.025 | p.Y72fs |
| T86 | IL1R1 | 3554 | 2 | 102791182 | Missense | C | T | 0.333 | p.P376L |
| T86 | MFSD9 | 84804 | 2 | 103335139 | In_Frame_Del | GGAGAAGGACA | C | 0.02 | p.383_388del |
| T86 | TBC1D8B | 54885 | X | 106069297 | Missense | G | A | 0.207 | p.A289T |
| T86 | TBC1D8B | 54885 | X | 106069298 | Missense | C | A | 0.22 | p.A289D |
| T86 | COL4A6 | 1288 | X | 107457364 | In_Frame_Del | AAATCCAACAC | T | 0.027 | p.125_140del |
| T86 | COL4A5 | 1287 | X | 107908740 | Missense | C | T | 0.167 | p.T1126I |
| T86 | ACOXL | 55289 | 2 | 111691076 | Missense | G | A | 0.426 | p.A306T |
| T86 | ACOXL | 55289 | 2 | 111691077 | Missense | C | A | 0.42 | p.A306D |
| T86 | LSMEM1 | 286006 | 7 | 112129898 | Frame_Shift_Del | CTAACAGCTGA | G | 0.053 | p.R97fs |
| T86 | ANKK1 | 255239 | 11 | 113270912 | In_Frame_Del | AGAGGGCAAC | A | 0.037 | p.741_751del |
| T86 | CSMD3 | 114788 | 8 | 113275891 | Missense | C | A | 0.16 | p.S3111I |
| T86 | FOXP2 | 93986 | 7 | 114271579 | Splice_Site | CCAG | C | 0.107 | - |
| T86 | FAM160B1 | 57700 | 10 | 116608392 | Splice_Site | GTTTTCATTTA | C | 0.055 | - |
| T86 | KNTC1 | 9735 | 12 | 123055661 | In_Frame_Del | CCTTGGTATGA | T | 0.05 | p.670_673del |
| T86 | FGFR2 | 2263 | 10 | 123239508 | Missense | C | T | 0.465 | p.E665K |
| T86 | ATAD2 | 29028 | 8 | 124358375 | In_Frame_Del | ATATACAGTAA | G | 0.057 | p.815_828del |
| T86 | SND1 | 27044 | 7 | 127725834 | Splice_Site | GTGTTGGGGA | T | 0.028 | - |
| T86 | SMO | 6608 | 7 | 128843395 | In_Frame_Del | CCTGACCGCT | C | 0.025 | p.168_177del |
| T86 | UGGT1 | 56886 | 2 | 128944257 | Missense | G | A | 0.436 | p.D1454N |
| T86 | ATP2C1 | 27032 | 3 | 130660532 | Missense | C | T | 0.084 | p.R169C |
| T86 | DNAJC13 | 23317 | 3 | 132196961 | Frame_Shift_Del | GAATGTTAGAC | T | 0.035 | p.Y896fs |
| T86 | PHF6 | 84295 | X | 133551285 | Frame_Shift_Ins | A | ACC | 0.518 | p.V307fs |
| T86 | NME5 | 8382 | 5 | 137474363 | Missense | C | T | 0.103 | p.R36K |
| T86 | COL5A1 | 1289 | 9 | 137653751 | Frame_Shift_Del | CCTTTCACTTC | T | 0.034 | p.G646fs |
| T86 | PCDHB16 | 57717 | 5 | 140563579 | Missense | C | T | 0.087 | p.T482I |
| T86 | HDAC3 | 8841 | 5 | 141001059 | In_Frame_Del | ATGGTCTCCAT | G | 0.061 | p.412_421del |
| T86 | AFF2 | 2334 | X | 148044334 | Missense | G | A | 0.324 | p.R568H |
| T86 | NDUFS2 | 4720 | 1 | 161182216 | In_Frame_Del | ATGCCAAAGTG | G | 0.022 | p.355_369del |
| T86 | DIEXF | 27042 | 1 | 210015667 | Nonsense | C | T | 0.093 | p.R515X |
| T86 | SPAG16 | 79582 | 2 | 214794681 | Frame_Shift_Del | GACAAATTGG | T | 0.031 | p.S405fs |
| T86 | RYR2 | 6262 | 1 | 237670048 | Frame_Shift_Del | AACTCTGGGTT | A | 0.042 | p.L885fs |
| T87 | SORCS2 | 57537 | 4 | 7691221 | In_Frame_Del | CCACCTG | C | 0.023 | p.500_501del |
| T87 | PHOX2B | 8929 | 4 | 41749429 | In_Frame_Del | GTAGTGA | G | 0.025 | p.120_122del |
| T87 | MTREX | 23517 | 5 | 54696225 | Frame_Shift_Del | TTTGTGAAAAA | T | 0.035 | p.T820fs |
| T87 | UBE2L6 | 9246 | 11 | 57327892 | Missense | A | T | 0.25 | p.L14H |
| T87 | GOLGA6C | 653641 | 15 | 75561149 | Missense | C | G | 0.114 | p.Q505E |
| T88 | PTPRD | 5789 | 9 | 8341922 | Missense | A | G | 0.778 | p.I1166T |
| T88 | ETV6 | 2120 | 12 | 12037478 | Missense | T | C | 0.171 | p.I370T |
| T88 | SUZ12 | 23512 | 17 | 30267481 | Frame_Shift_Del | GA | G | 0.463 | p.R121fs |
| T88 | FRY | 10129 | 13 | 32729647 | Missense | G | A | 0.164 | p.R500Q |
| T88 | DLK2 | 65989 | 6 | 43419679 | Missense | C | T | 0.266 | p.G102S |
| T88 | PHF21B | 112885 | 22 | 45283886 | Missense | G | A | 0.184 | p.T331M |
| T88 | RAPGEF3 | 10411 | 12 | 48141625 | Missense | C | T | 0.462 | p.G406D |
| T88 | DNAH12 | 201625 | 3 | 57348533 | Nonsense | G | A | 0.316 | p.R2683X |
| T88 | LRRC7 | 57554 | 1 | 70505051 | Missense | G | A | 0.211 | p.G1144S |
| T88 | NUP85 | 79902 | 17 | 73204715 | Missense | G | A | 0.377 | p.E43K |
| T88 | UHRF1BP1L | 23074 | 12 | 100482738 | Frame_Shift_Ins | G | GGTCGCCG | 0.046 | p.H326fs |
| T88 | MID2 | 11043 | X | 107160832 | Missense | C | A | 0.568 | p.S433Y |
| T88 | LEF1 | 51176 | 4 | 108999437 | Frame_Shift_Ins | T | CGGGATCC | 0.147 | p.N288fs |
| T88 | NRAS | 4893 | 1 | 115258747 | Missense | C | T | 0.123 | p.G12D |
| T88 | TMEM132B | 114795 | 12 | 126138849 | Missense | G | A | 0.481 | p.D456N |
| T88 | NOTCH1 | 4851 | 9 | 139390873 | Nonsense | G | A | 0.237 | p.Q2440X |
| T88 | TENM3 | 55714 | 4 | 183721295 | Missense | C | T | 0.376 | p.R2631W |
| T89 | OR52N4 | 390072 | 11 | 5776051 | Frame_Shift_Del | CTTCCCATTCTC | C | 0.033 | p.W28fs |
| T89 | OR6A2 | 8590 | 11 | 6816047 | Missense | C | T | 0.391 | p.R298H |
| T89 | CLEC10A | 10462 | 17 | 6979115 | Missense | C | T | 0.277 | p.E180K |
| T89 | USP17L8 | 392188 | 8 | 7830642 | Missense | G | C | 0.153 | p.S45C |
| T89 | USP17L3 | 645836 | 8 | 7834514 | Missense | C | T | 0.115 | p.D332N |
| T89 | TMEM201 | 199953 | 1 | 9670833 | Frame_Shift_Del | CTGCAGGACGT | C | 0.071 | p.P579fs |
| T89 | DOCK6 | 57572 | 19 | 11327612 | Missense | C | T | 0.489 | p.C1291Y |
| T89 | JAK3 | 3718 | 19 | 17945969 | Missense | C | T | 0.28 | p.R657Q |
| T89 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.453 | p.M511I |
| T89 | GOLGA6L6 | 727832 | 15 | 20740019 | In_Frame_Del | CCTGCCTCCAC | C | 0.056 | p.570_577del |
| T89 | MED15 | 51586 | 22 | 20920852 | Nonsense | T | CTTTAATT | 0.051 | A263_L264delinsALX |
| T89 | ADGRA3 | 166647 | 4 | 22390107 | Missense | G | A | 0.288 | p.P1063S |
| T89 | ZBTB40 | 9923 | 1 | 22835691 | Missense | T | A | 0.383 | p.S600T |
| T89 | TNRC6A | 27327 | 16 | 24788434 | In_Frame_Del | AGCCGCAGCA | C | 0.048 | p.115_120del |
| T89 | MYO18B | 84700 | 22 | 26231287 | Missense | G | T | 0.364 | p.A1029S |
| T89 | TRNP1 | 388610 | 1 | 27320524 | Missense | C | A | 0.458 | p.L83I |
| T89 | HECTD1 | 25831 | 14 | 31675021 | Missense | A | T | 0.286 | p.V41E |
| T89 | ELP4 | 26610 | 11 | 31805046 | Missense | G | A | 0.102 | p.G417R |
| T89 | CAPRIN1 | 4076 | 11 | 34107720 | Frame_Shift_Del | TAC | T | 0.172 | p.V359fs |
| T89 | TBX20 | 57057 | 7 | 35271152 | Missense | C | A | 0.324 | p.G285V |
| T89 | HRCT1 | 646962 | 9 | 35906347 | In_Frame_Del | CCTGCTG | C | 0.048 | p.22_23del |
| T89 | SRSF7 | 6432 | 2 | 38976765 | Frame_Shift_Ins | G | GT | 0.343 | p.R98fs |
| T89 | KCNK17 | 89822 | 6 | 39268140 | Frame_Shift_Del | CCCAAAGTGTT | T | 0.043 | p.G268fs |
| T89 | FCGBP | 8857 | 19 | 40392676 | Missense | C | T | 0.193 | p.A2610T |

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| T89 | GPATCH8 | 23131 | 17 | 42541881 | Missense | T | G | 0.333 | p.H51P |
| T89 | PHLDB3 | 653583 | 19 | 44008216 | Missense | A | T | 0.361 | p.C19S |
| T89 | SKOR2 | 652991 | 18 | 44773549 | In_Frame_Del | GGGT | G | 0.154 | p.668_669del |
| T89 | DGKZ | 8525 | 11 | 46369267 | Missense | G | A | 0.167 | p.A20T |
| T89 | ARHGAP35 | 2909 | 19 | 47423994 | Missense | C | T | 0.289 | p.R688W |
| T89 | PCNT | 5116 | 21 | 47850484 | Missense | G | C | 0.125 | p.Q2659H |
| T89 | SCN8A | 6334 | 12 | 52139683 | Splice_Site | A | T | 0.088 | - |
| T89 | KRT1 | 3848 | 12 | 53073800 | In_Frame_Del | ACCAAAGCCA | T | 0.043 | p.106_111del |
| T89 | KDM5C | 8242 | X | 53226155 | Frame_Shift_Del | GAGGGCAGTG | T | 0.143 | p.L824fs |
| T89 | HOXC12 | 3228 | 12 | 54349260 | Missense | G | A | 0.438 | p.G183S |
| T89 | FGD1 | 2245 | X | 54495206 | Frame_Shift_Del | CTGATCCAGC | A | 0.053 | p.S390fs |
| T89 | DST | 667 | 6 | 56513427 | In_Frame_Del | GGTAGTTCAC | T | 0.052 | p.275_287del |
| T89 | ATXN7 | 6314 | 3 | 63973982 | In_Frame_Del | GGTAAGCCAG | A | 0.026 | p.303_309del |
| T89 | JAK1 | 3716 | 1 | 65310517 | Missense | C | T | 0.363 | p.R724H |
| T89 | MLXIPL | 51085 | 7 | 73020296 | Missense | G | C | 0.275 | p.T255S |
| T89 | CAMK2G | 818 | 10 | 75611990 | Frame_Shift_Del | CCTACCTGGC | A | 0.03 | p.Y107fs |
| T89 | AQP11 | 282679 | 11 | 77301215 | Missense | T | A | 0.373 | p.C60S |
| T89 | PTDSS1 | 9791 | 8 | 97316289 | Frame_Shift_Del | GAA | G | 0.286 | p.K259fs |
| T89 | PTDSS1 | 9791 | 8 | 97316294 | Frame_Shift_Del | TCAAGAGA | T | 0.286 | p.I260fs |
| T89 | TEDC1 | 283643 | 14 | 105958522 | Frame_Shift_Del | GTCGGGAGCT | A | 0.058 | p.D102fs |
| T89 | NRCAM | 4897 | 7 | 107822325 | Missense | C | T | 0.354 | p.E863K |
| T89 | FNDC7 | 163479 | 1 | 109268467 | Frame_Shift_Ins | G | GCCGTA | 0.026 | p.V318fs |
| T89 | GTF2H3 | 2967 | 12 | 124137275 | Frame_Shift_Del | TAAGATAAAA | G | 0.03 | p.R119fs |
| T89 | ZNF140 | 7699 | 12 | 133682473 | Missense | C | T | 0.321 | p.L204F |
| T89 | NOTCH1 | 4851 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.39 | p.L2335fs |
| T89 | PTK2 | 5747 | 8 | 141762358 | Missense | C | T | 0.322 | p.V464M |
| T89 | ZNF862 | 643641 | 7 | 149559004 | Missense | G | T | 0.438 | p.A919S |
| T89 | CSRNP3 | 80034 | 2 | 166532849 | Missense | G | A | 0.396 | p.E146K |
| T89 | FAM149A | 25854 | 4 | 187074839 | Missense | G | A | 0.308 | p.V43I |
| T89 | ATP2B4 | 493 | 1 | 203680012 | Nonsense | C | T | 0.345 | p.R603X |
| T90 | CCDC27 | 148870 | 1 | 3683111 | Nonsense | C | T | 0.096 | p.R489X |
| T90 | PTPRS | 5802 | 19 | 5222796 | Missense | C | T | 0.915 | p.D981N |
| T90 | DNAH9 | 1770 | 17 | 11650999 | Missense | G | A | 0.489 | p.V2176I |
| T90 | PSIP1 | 11168 | 9 | 15474099 | Nonsense | C | A | 0.925 | p.E256X |
| T90 | FBLIM1 | 54751 | 1 | 16111113 | Missense | G | T | 0.43 | p.C263F |
| T90 | JAK3 | 3718 | 19 | 17948006 | Missense | G | A | 0.769 | p.A573V |
| T90 | TXNRD2 | 10587 | 22 | 19903307 | Frame_Shift_Ins | A | AG | 0.468 | p.V170fs |
| T90 | CHD8 | 57680 | 14 | 21868773 | Splice_Site | T | TA | 0.563 | - |
| T90 | CATSPER4 | 378807 | 1 | 26527888 | Nonsense | G | T | 0.41 | p.E415X |
| T90 | FOXG1 | 2290 | 14 | 29237269 | Missense | G | A | 0.471 | p.D262N |
| T90 | CCDC178 | 374864 | 18 | 30950100 | Missense | C | T | 0.357 | p.V88I |
| T90 | FRY | 10129 | 13 | 32785053 | Missense | G | T | 0.432 | p.M1491I |
| T90 | FRY | 10129 | 13 | 32841333 | Missense | C | G | 0.533 | p.S2658C |
| T90 | TMEM132E | 124842 | 17 | 32957063 | Missense | C | T | 0.417 | p.R369W |
| T90 | RUNX1 | 861 | 21 | 36164546 | Frame_Shift_Ins | G | GCCCCC | 0.448 | p.N416fs |
| T90 | POU3F1 | 5453 | 1 | 38512308 | In_Frame_Del | GGCC | G | 0.114 | p.35_36del |
| T90 | ZFP36L2 | 678 | 2 | 43452301 | In_Frame_Ins | G | GTCT | 0.478 | p.F214delinsLD |
| T90 | DGKZ | 8525 | 11 | 46369238 | Missense | C | A | 0.154 | p.A10D |
| T90 | STXBP4 | 252983 | 17 | 53150304 | Missense | G | A | 0.459 | p.R352Q |
| T90 | CNOT3 | 4849 | 19 | 54647246 | Missense | G | T | 0.475 | p.K54N |
| T90 | C17orf47 | 284083 | 17 | 56620826 | In_Frame_Del | CTCTGGGCTG | C | 0.024 | p.238_241del |
| T90 | HOOK1 | 51361 | 1 | 60328470 | Missense | G | A | 0.443 | p.R516H |
| T90 | MARK2 | 2011 | 11 | 63672397 | Missense | C | T | 0.464 | p.R552W |
| T90 | SHANK2 | 22941 | 11 | 70331731 | Missense | A | G | 0.48 | p.I968T |
| T90 | TRPA1 | 8989 | 8 | 72946507 | Missense | G | T | 0.571 | p.S887R |
| T90 | GLG1 | 2734 | 16 | 74491781 | Missense | G | A | 0.494 | p.R1075C |
| T90 | TMEM63C | 57156 | 14 | 77708757 | Missense | G | A | 0.453 | p.V378I |
| T90 | ADGRV1 | 84059 | 5 | 90024566 | Missense | C | A | 0.452 | p.N3414K |
| T90 | RPL5 | 6125 | 1 | 93301893 | Frame_Shift_Ins | T | CCGAGG | 0.368 | p.N157fs |
| T90 | RPL5 | 6125 | 1 | 93301894 | Missense | A | C | 0.389 | p.K158Q |
| T90 | CFAP43 | 80217 | 10 | 105945749 | Nonsense | G | A | 0.391 | p.R665X |
| T90 | CLDN18 | 51208 | 3 | 137748653 | Missense | C | T | 0.458 | p.A173V |
| T90 | NOTCH1 | 4851 | 9 | 139399324 | In_Frame_Ins | T | TTGG | 0.405 | p.K1607delinsPK |
| T90 | ARRDC1 | 92714 | 9 | 140508839 | Missense | C | T | 0.42 | p.A236V |
| T90 | SETDB1 | 9869 | 1 | 150933036 | Splice_Site | C | G | 0.542 | - |
| T90 | HCFC1 | 3054 | X | 153215694 | Missense | C | T | 0.907 | p.E2002K |
| T90 | FBXW7 | 55294 | 4 | 153249384 | Missense | C | A | 0.479 | p.R465H |
| T90 | KIFAP3 | 22920 | 1 | 169961322 | Missense | A | G | 0.425 | p.F376L |
| T90 | HOXD9 | 3235 | 2 | 176988064 | Missense | C | T | 0.409 | p.R190W |
| T90 | NBEAL1 | 65065 | 2 | 203972724 | Nonsense | C | T | 0.176 | p.R559X |
| T90 | EPHA4 | 2043 | 2 | 222290771 | Missense | G | C | 0.552 | p.H980D |
| T90 | IQCA1 | 79781 | 2 | 237272521 | Missense | C | G | 0.371 | p.E550Q |
| T90 | ZNF124 | 7678 | 1 | 247323020 | Missense | C | T | 0.545 | p.M42I |
| T91 | DEFA1B | 728358 | 8 | 6873605 | Missense | C | A | 0.222 | p.M64I |
| T91 | DNM2 | 1785 | 19 | 10904484 | Nonsense | C | T | 0.463 | p.R361X |
| T91 | TEAD1 | 7003 | 11 | 12903484 | Missense | C | T | 0.355 | p.A185V |
| T91 | JAK3 | 3718 | 19 | 17948009 | Missense | G | A | 0.5 | p.A572V |
| T91 | WT1 | 7490 | 11 | 32449596 | Nonsense | G | A | 0.353 | p.Q260X |
| T91 | FAM98C | 147965 | 19 | 38899501 | In_Frame_Del | CAAGAAG | C | 0.047 | p.344_345del |
| T91 | ZNF575 | 284346 | 19 | 44039475 | Missense | C | T | 0.414 | p.P125L |
| T91 | EFCAB6 | 64800 | 22 | 44178186 | Missense | C | T | 0.389 | p.A5T |
| T91 | ITGB2 | 3689 | 21 | 46306656 | Missense | T | A | 0.437 | p.N748Y |
| T91 | KMT2D | 8085 | 12 | 49423202 | Frame_Shift_Del | TTG | T | 0.352 | p.H4685fs |
| T91 | ERBB3 | 2065 | 12 | 56495682 | Missense | A | G | 0.427 | p.E1291G |
| T91 | CNOT1 | 23019 | 16 | 58633167 | Nonsense | G | CCGAGAA | 0.521 | p.Y25_R26delinsX |
| T91 | JAK1 | 3716 | 1 | 65310518 | Missense | G | A | 0.245 | p.R724C |
| T91 | JAK1 | 3716 | 1 | 65311203 | Missense | C | G | 0.128 | p.S703T |
| T91 | C15orf59 | 388135 | 15 | 74032593 | Missense | G | A | 0.398 | p.R183W |
| T91 | JMY | 133746 | 5 | 78610443 | In_Frame_Del | CCCCACCTCC | A | 0.081 | p.810_822del |
| T91 | PHIP | 55023 | 6 | 79735234 | Splice_Site | A | T | 0.369 | - |
| T91 | MMRN2 | 79812 | 10 | 88702930 | Missense | C | G | 0.434 | p.Q537H |
| T91 | VPS50 | 55610 | 7 | 92881984 | Nonsense | C | T | 0.402 | p.R41X |
| T91 | MMP17 | 4326 | 12 | 132313146 | Missense | G | T | 0.447 | p.G36V |
| T91 | EZH2 | 2146 | 7 | 148523560 | Missense | C | T | 0.41 | p.R298H |
| T91 | TBP | 6908 | 6 | 170871037 | In_Frame_Del | GCAA | G | 0.033 | p.52_52del |
| T92 | MYH1 | 4619 | 17 | 10415749 | Missense | G | T | 0.553 | p.Q375K |
| T92 | MTOR | 2475 | 1 | 11169377 | Missense | T | A | 0.432 | p.I2500F |
| T92 | FREM1 | 158326 | 9 | 14857642 | Missense | C | T | 0.438 | p.R246H |
| T92 | OR4N4 | 283694 | 15 | 22382704 | Missense | G | C | 0.143 | p.A78P |
| T92 | CATSPER4 | 378807 | 1 | 26517292 | Missense | G | C | 0.424 | p.E58D |
| T92 | AGO3 | 192669 | 1 | 36474500 | Frame_Shift_Del | ACAGTTAGAA | T | 0.036 | p.F61fs |
| T92 | STAT3 | 6774 | 17 | 40474420 | Missense | C | A | 0.33 | p.D661Y |
| T92 | TGM7 | 116179 | 15 | 43584975 | Missense | T | C | 0.479 | p.Q124R |
| T92 | RSPH6A | 81492 | 19 | 46299149 | In_Frame_Ins | T | CTCCTCC | 0.069 | .E711delinsGEEEEE |
| T92 | DEFB133 | 403339 | 6 | 49913927 | Missense | C | T | 0.467 | p.V25M |
| T92 | EPX | 8288 | 17 | 56271388 | Missense | G | A | 0.403 | p.D177N |
| T92 | COL9A3 | 1299 | 20 | 61460146 | Missense | G | A | 0.333 | p.V311M |
| T92 | FHOD1 | 29109 | 16 | 67267998 | Frame_Shift_Ins | T | TG | 0.447 | p.A536fs |
| T92 | PHLPP2 | 23035 | 16 | 71706165 | Missense | C | T | 0.186 | p.R511Q |
| T92 | KCNQ5 | 56479 | 6 | 73331983 | In_Frame_Del | AGCG | A | 0.111 | p.23_23del |
| T92 | TRPM3 | 80036 | 9 | 73458001 | In_Frame_Del | GCATGATCCT | G | 0.037 | p.82_87del |
| T92 | ASPSCR1 | 79058 | 17 | 79966910 | Frame_Shift_Del | CCCGTGGACC | C | 0.053 | p.P312fs |
| T92 | PTEN | 5728 | 10 | 89717681 | Frame_Shift_Del | GACAA | G | 0.327 | p.D236fs |
| T92 | DCBLD2 | 131566 | 3 | 98519527 | Missense | G | T | 0.106 | p.A585E |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| T92 | VPS13B | 157680 | 8 | 100515040 | Frame_Shift_Del | GTTTCTTATTG | A | 0.035 | p.E1348fs |
| T92 | SPAG1 | 6674 | 8 | 101190138 | Missense | G | C | 0.402 | p.R132P |
| T92 | H2BFM | 286436 | X | 103294760 | Nonsense | C | T | 0.086 | p.Q73X |
| T92 | LEF1 | 51176 | 4 | 108999373 | Splice_Site | T | TAC | 0.434 | - |
| T92 | COL6A5 | 256076 | 3 | 130110550 | Missense | A | G | 0.122 | p.D982G |
| T92 | PHF6 | 84295 | X | 133549137 | Missense | G | A | 0.925 | p.R274Q |
| T92 | HRNR | 388697 | 1 | 152188109 | Missense | T | A | 0.083 | p.Q1999L |
| T92 | DENND4B | 9909 | 1 | 153907294 | In_Frame_Del | TGCTGCTGCT | C | 0.021 | p.901_905del |
| T92 | LPA | 4018 | 6 | 161026103 | Missense | G | A | 0.494 | p.R974W |

Supplementary Table 4.Significantly mutated genes in the discovery cohort.

| Gene | Indels | SNVs | Total Mutations | Sample Affected | Sample Percent(%) | P-value CT | FDR CT |
|---|---|---|---|---|---|---|---|
| *NOTCH1* | 14 | 13 | 27 | 20 | 48.78 | 0 | 0 |
| *PHF6* | 10 | 6 | 16 | 15 | 36.59 | 0 | 0 |
| *JAK3* | 0 | 18 | 18 | 14 | 34.15 | 0 | 0 |
| *JAK1* | 2 | 11 | 13 | 11 | 26.83 | 0 | 0 |
| *NRAS* | 1 | 6 | 7 | 7 | 17.07 | 1.38E-19 | 4.41E-16 |
| *ETV6* | 6 | 2 | 8 | 7 | 17.07 | 7.79E-16 | 1.87E-12 |
| *FBXW7* | 1 | 6 | 7 | 6 | 14.63 | 1.60E-13 | 3.07E-10 |
| *RUNX1* | 4 | 2 | 6 | 6 | 14.63 | 2.49E-10 | 3.68E-07 |
| *CDC27* | 0 | 9 | 9 | 5 | 12.2 | 0 | 0 |
| *SUZ12* | 3 | 4 | 7 | 5 | 12.2 | 2.58E-12 | 4.50E-09 |
| *WT1* | 5 | 1 | 6 | 5 | 12.2 | 5.34E-11 | 8.53E-08 |
| *IL7R* | 7 | 2 | 9 | 4 | 9.76 | 2.39E-19 | 6.54E-16 |
| *MTRNR2L2* | 0 | 4 | 4 | 4 | 9.76 | 3.23E-14 | 6.88E-11 |
| *ASXL1* | 4 | 1 | 5 | 4 | 9.76 | 7.08E-07 | 7.98E-04 |
| *CHD4* | 0 | 4 | 4 | 4 | 9.76 | 1.34E-05 | 0.012 |
| *DNM2* | 1 | 3 | 4 | 4 | 9.76 | 2.42E-05 | 0.019 |
| *COL6A5* | 1 | 3 | 4 | 4 | 9.76 | 4.77E-05 | 0.034 |
| *PTEN* | 2 | 2 | 4 | 3 | 7.32 | 7.24E-09 | 9.92E-06 |
| *U2AF1* | 0 | 3 | 3 | 3 | 7.32 | 1.04E-07 | 1.33E-04 |
| *CTCF* | 0 | 3 | 3 | 3 | 7.32 | 1.19E-05 | 0.011 |
| *EZH2* | 0 | 3 | 3 | 3 | 7.32 | 1.62E-05 | 0.014 |
| *ZFP36L2* | 2 | 1 | 3 | 3 | 7.32 | 2.51E-05 | 0.019 |
| *NOTCH3* | 0 | 4 | 4 | 3 | 7.32 | 0.000109238 | 0.063 |
| *CNOT3* | 2 | 1 | 3 | 3 | 7.32 | 0.000134642 | 0.072 |
| *TMEM200C* | 1 | 2 | 3 | 3 | 7.32 | 0.000131772 | 0.072 |
| *SPI1* | 2 | 1 | 3 | 2 | 4.88 | 3.31E-06 | 0.003 |
| *EED* | 0 | 3 | 3 | 2 | 4.88 | 1.76E-05 | 0.015 |
| *GATA3* | 1 | 2 | 3 | 2 | 4.88 | 3.38E-05 | 0.025 |
| *POTEG* | 0 | 2 | 2 | 2 | 4.88 | 7.72E-05 | 0.049 |
| *CATSPER4* | 0 | 2 | 2 | 2 | 4.88 | 0.000128897 | 0.072 |
| *KRT38* | 1 | 1 | 2 | 2 | 4.88 | 0.000141566 | 0.073 |
| *FGFR1* | 3 | 0 | 3 | 2 | 4.88 | 0.000152861 | 0.077 |

Supplementary Table 5.Exome sequencing data was verified by Sanger sequencing.

| Patient_id | Hugo Symbol | Entrez Gene Id | Chromosome | Position | Variant Classification | Reference Allele | Tumor Allele | Variant allele frequency | Protein Change | Validation |
|---|---|---|---|---|---|---|---|---|---|---|
| T4 | ASXL1 | 171023 | 20 | 31022441 | Frame_Shift_Ins | A | AG | 0.36 | p.G642fs | yes |
| T27 | ASXL1 | 171023 | 20 | 31022286 | Nonsense | T | TTCGTTTTATTGTGA | 0.41 | p.Y591_Q592delinsFVLLX | yes |
| T13 | CHD4 | 1108 | 12 | 6697096 | Missense | C | T | 0.31 | p.R1162Q | yes |
| T7 | CHD4 | 1108 | 12 | 6700646 | Missense | A | T | 0.50 | p.I1109N | yes |
| T37 | CHD4 | 1108 | 12 | 6702762 | Missense | G | C | 0.79 | p.F778L | yes |
| T43 | CNOT3 | 4849 | 19 | 54649666 | Frame_Shift_Ins | T | TC | 0.34 | p.S242fs | yes |
| T90 | CNOT3 | 4849 | 19 | 54647246 | Missense | G | T | 0.48 | p.K54N | no |
| T26 | COL6A5 | 256076 | 3 | 130174322 | Frame_Shift_Ins | A | AT | 0.35 | p.D2201fs | no |
| T29 | COL6A5 | 256076 | 3 | 130095517 | Missense | G | T | 0.43 | p.V169L | no |
| T29 | CTCF | 10664 | 16 | 67645919 | Missense | C | T | 0.34 | p.R283C | yes |
| T37 | CTCF | 10664 | 16 | 67654598 | Splice_Site | A | G | 0.37 | - | yes |
| T13 | DNM2 | 1785 | 19 | 10904475 | Missense | G | A | 0.37 | p.G358R | yes |
| T4 | DNM2 | 1785 | 19 | 10940850 | Missense | G | A | 0.43 | p.R776Q | yes |
| T91 | DNM2 | 1785 | 19 | 10904484 | Nonsense | C | T | 0.46 | p.R361X | yes |
| T7 | DNM2 | 1785 | 19 | 10870454 | Frame_Shift_Del | CCT | C | 0.50 | p.P68fs | yes |
| T37 | EED | 8726 | 11 | 85988147 | Missense | G | T | 0.38 | p.W364C | yes |
| T37 | EED | 8726 | 11 | 85975226 | Missense | G | A | 0.41 | p.R216Q | yes |
| T2 | ETV6 | 2120 | 12 | 12022491 | Frame_Shift_Ins | G | GC | 0.35 | p.R199fs | yes |
| T7 | ETV6 | 2120 | 12 | 11992216 | Frame_Shift_Ins | T | TCG | 0.49 | p.F102fs | yes |
| T1 | ETV6 | 2120 | 12 | 12038875 | Missense | A | G | 0.53 | p.T390A | yes |
| T6 | EZH2 | 2146 | 7 | 148511215 | Missense | G | A | 0.46 | p.P507S | yes |
| T2_136 | FBXW7 | 55294 | 4 | 153249380 | frameshift deletion | ACAACG | A | 0.29 | p.R347fs | yes |
| T28 | FBXW7 | 55294 | 4 | 153244155 | Frame_Shift_Ins | T | TC | 0.38 | p.S550fs | yes |
| T19 | FBXW7 | 55294 | 4 | 153247289 | Missense | G | A | 0.42 | p.R505C | yes |
| T16 | FBXW7 | 55294 | 4 | 153247289 | Missense | G | A | 0.46 | p.R505C | yes |
| T90 | FBXW7 | 55294 | 4 | 153249384 | Missense | C | A | 0.48 | p.R347L | yes |
| T24 | FBXW7 | 55294 | 4 | 153249468 | Missense | C | A | 0.51 | p.G319V | yes |
| T84 | GATA3 | 2625 | 10 | 8100424 | Frame_Shift_Ins | A | AC | 0.41 | p.Y133fs | yes |
| T84 | GATA3 | 2625 | 10 | 8106036 | Missense | G | A | 0.43 | p.A287T | yes |
| T37 | IL7R | 3575 | 5 | 35874603 | In_Frame_Ins | C | CCCCGAGGCT | 0.33 | p.V253delinsVPEA | yes |
| T10 | IL7R | 3575 | 5 | 35874578 | Frame_Shift_Del | TCA | T | 0.37 | p.I245fs | yes |
| T10 | IL7R | 3575 | 5 | 35874576 | Frame_Shift_Ins | C | CA | 0.37 | p.T244fs | yes |
| T27 | IL7R | 3575 | 5 | 35867418 | Missense | G | A | 0.42 | p.V78M | yes |
| T13 | JAK1 | 3716 | 1 | 65312382 | Missense | G | T | 0.33 | p.S646Y | yes |
| T89 | JAK1 | 3716 | 1 | 65310517 | Missense | C | T | 0.36 | p.R724H | yes |
| T24 | JAK1 | 3716 | 1 | 65312362 | Missense | G | A | 0.37 | p.L653F | yes |
| T6 | JAK1 | 3716 | 1 | 65312383 | In_Frame_Ins | A | ACCT | 0.47 | p.S646delinsRS | yes |
| T3 | JAK1 | 3716 | 1 | 65316516 | Missense | C | T | 0.51 | p.D576N | yes |
| T85 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.33 | p.M511I | yes |
| T24 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.38 | p.M511I | yes |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| T31 | JAK3 | 3718 | 19 | 17949108 | Missense | C | A | 0.39 | p.M511I | yes |
| T43 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.42 | p.M511I | yes |
| T89 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.45 | p.M511I | yes |
| T6 | JAK3 | 3718 | 19 | 17943438 | Missense | A | G | 0.46 | p.L857P | yes |
| T85 | JAK3 | 3718 | 19 | 17943648 | Missense | G | T | 0.70 | p.P814H | yes |
| T85 | JAK3 | 3718 | 19 | 17942143 | Missense | C | T | 0.75 | p.E958K | yes |
| T84 | JAK3 | 3718 | 19 | 17945907 | Missense | C | A | 0.87 | p.V678L | yes |
| T84 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.89 | p.M511I | yes |
| T3 | JAK3 | 3718 | 19 | 17945918 | Missense | A | G | 0.92 | p.V674A | no |
| T21 | JAK3 | 3718 | 19 | 17949108 | Missense | C | T | 0.94 | p.M511I | yes |
| T2_48 | NOTCH1 | 4851 | 9 | 139390789 | frameshift insertion | G | GCGCCC | 0.18 | p.L2468fs | yes |
| T2_143 | NOTCH1 | 4851 | 9 | 139399390 | nonframeshift insertion | G | GGATCGA | 0.20 | p.L1585delinsSIL | yes |
| T2_138 | NOTCH1 | 4851 | 9 | 139391020 | frameshift insertion | G | GCCGCCTACGGATCC | 0.20 | p.Q2391fs | yes |
| T2_143 | NOTCH1 | 4851 | 9 | 139399397 | nonframeshift insertion | C | CGGATAT | 0.21 | p.P1582delinsPYP | yes |
| T2_97 | NOTCH1 | 4851 | 9 | 139390601 | frameshift insertion | G | GGGGGCCC | 0.26 | p.S2530fs | yes |
| T5 | NOTCH1 | 4851 | 9 | 139399422 | Missense | A | G | 0.30 | p.L1574P | yes |
| T2_144 | NOTCH1 | 4851 | 9 | 139390777 | stopgain | G | TCCTCCTACCTTTCC | 0.32 | p.L2472delinsGERX | yes |
| T3 | NOTCH1 | 4851 | 9 | 139391169 | Frame_Shift_Del | GGGGGCCTGTGTG | G | 0.32 | p.L2335fs | yes |
| T26 | NOTCH1 | 4851 | 9 | 139399392 | In_Frame_Ins | T | TTCCCCA | 0.33 | p.Q1584delinsLGK | yes |
| T83 | NOTCH1 | 4851 | 9 | 139399344 | Missense | A | G | 0.34 | p.L1600P | yes |
| T20 | NOTCH1 | 4851 | 9 | 139399396 | In_Frame_Ins | C | CCGG | 0.35 | p.E1583delinsPE | yes |
| T85 | NOTCH1 | 4851 | 9 | 139402689 | Missense | C | T | 0.37 | p.R1107Q | yes |
| T13 | NOTCH1 | 4851 | 9 | 139390789 | Frame_Shift_Ins | G | GCGCCC | 0.38 | p.L2468fs | yes |
| T27 | NOTCH1 | 4851 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.38 | p.L2335fs | yes |
| T89 | NOTCH1 | 4851 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.39 | p.L2335fs | yes |
| T2_135 | NOTCH1 | 4851 | 9 | 139390601 | frameshift insertion | G | GGGGGCCC | 0.39 | p.S2530fs | yes |
| T32 | NOTCH1 | 4851 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.40 | p.1578_1578del | yes |
| T2_77 | NOTCH1 | 4851 | 9 | 139399325 | nonframeshift insertion | G | GATACTTCTT | 0.40 | p.F1606delinsLRSI | yes |
| T2_69 | NOTCH1 | 4851 | 9 | 139390912 | frameshift insertion | C | CGG | 0.40 | p.G2427fs | yes |
| T90 | NOTCH1 | 4851 | 9 | 139399324 | In_Frame_Ins | T | TTGG | 0.41 | p.K1607delinsPK | yes |
| T32 | NOTCH1 | 4851 | 9 | 139390984 | Nonsense | G | A | 0.41 | p.Q2403X | yes |
| T2_103 | NOTCH1 | 4851 | 9 | 139390913 | frameshift insertion | G | GAATTATCAAAT | 0.43 | p.S2426fs | yes |
| T24 | NOTCH1 | 4851 | 9 | 139412284 | Missense | T | C | 0.43 | p.N454S | yes |
| T84 | NOTCH1 | 4851 | 9 | 139390863 | Frame_Shift_Ins | A | ACC | 0.43 | p.V2443fs | yes |
| T2_108 | NOTCH1 | 4851 | 9 | 139396761 | nonframeshift deletion | GCTT | G | 0.47 | p.1782_1782del | yes |
| T2_72 | NOTCH1 | 4851 | 9 | 139390648 | frameshift deletion | CAG | C | 0.47 | p.P2514fs | yes |
| T29 | NOTCH1 | 4851 | 9 | 139397639 | Missense | A | C | 0.48 | p.V1721G | yes |
| T3 | NOTCH1 | 4851 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.48 | p.1578_1578del | yes |
| T43 | NOTCH1 | 4851 | 9 | 139399422 | Missense | A | G | 0.53 | p.L1574P | yes |
| T1 | NOTCH1 | 4851 | 9 | 139440195 | Missense | G | A | 0.53 | p.P15L | yes |
| T2_60 | NOTCH1 | 4851 | 9 | 139399398 | nonframeshift deletion | GGCGGCATCA | G | 0.54 | p.1579_1582del | yes |
| T2_77 | NOTCH1 | 4851 | 9 | 139390648 | frameshift deletion | CAG | C | 0.58 | p.P2514fs | yes |
| T83 | NOTCH1 | 4851 | 9 | 139390864 | Frame_Shift_Ins | C | CCT | 0.98 | p.V2443fs | yes |
| T10 | NOTCH3 | 4854 | 19 | 15281517 | Missense | C | A | 0.39 | p.R1619L | yes |
| T82 | NOTCH3 | 4854 | 19 | 15271781 | Nonsense | C | A | 0.43 | p.E2220X | no |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| T2_62 | NRAS | 4893 | 1 | 115256515 | nonframeshift insertion | C | CTGTACTCTTCTTGC | 0.36 | p.A66delinsSQEEYSA | yes |
| T2 | NRAS | 4893 | 1 | 115258748 | Missense | C | A | 0.39 | p.G12C | yes |
| T4 | NRAS | 4893 | 1 | 115256516 | In_Frame_Del | ACTG | A | 0.39 | p.64_65del | yes |
| T16 | NRAS | 4893 | 1 | 115258747 | Missense | C | T | 0.41 | p.G12D | yes |
| T83 | NRAS | 4893 | 1 | 115258748 | Missense | C | T | 0.41 | p.G12S | yes |
| T82 | NRAS | 4893 | 1 | 115258748 | Missense | C | T | 0.46 | p.G12S | yes |
| T2_73 | PHF6 | 84295 | X | 133549082 | frameshift insertion | T | TTACCCAATCG | 0.30 | p.S256fs | yes |
| T2_103 | PHF6 | 84295 | X | 133547642 | frameshift insertion | G | GA | 0.31 | p.R180fs | yes |
| T6 | PHF6 | 84295 | X | 133547940 | Nonsense | C | T | 0.36 | p.R225X | yes |
| T82 | PHF6 | 84295 | X | 133549134 | In_Frame_Del | AACG | A | 0.38 | p.273_274del | yes |
| T86 | PHF6 | 84295 | X | 133551285 | Frame_Shift_Ins | A | ACC | 0.52 | p.V307fs | yes |
| T2_132 | PHF6 | 84295 | X | 133547985 | stopgain | T | TAGGGGGCGCC | 0.53 | p.Y240_K241delinsX | yes |
| T2_137 | PHF6 | 84295 | X | 133547971 | frameshift deletion | AG | A | 0.57 | p.K235fs | yes |
| T83 | PHF6 | 84295 | X | 133549044 | Frame_Shift_Del | AGTT | A | 0.59 | p.L244fs | yes |
| T2_70 | PHF6 | 84295 | X | 133547949 | frameshift deletion | CTGCATATATTTAA | C | 0.60 | p.L228fs | yes |
| T4 | PHF6 | 84295 | X | 133547538 | Frame_Shift_Ins | T | TAATCCCCACAGGC | 0.67 | p.F146fs | yes |
| T7 | PHF6 | 84295 | X | 133549136 | Nonsense | C | T | 0.73 | p.R274X | yes |
| T2_108 | PHF6 | 84295 | X | 133547534 | frameshift deletion | AAGTT | A | 0.75 | p.S145fs | yes |
| T2_136 | PHF6 | 84295 | X | 133551262 | nonframeshift deletion | CTTACCATTACCAC | A | 0.75 | p.300_305del | yes |
| T2_69 | PHF6 | 84295 | X | 133547982 | nonframeshift deletion | CATTATA | C | 0.80 | p.239_241del | yes |
| T43 | PHF6 | 84295 | X | 133527529 | Splice_Site | A | ACGGG | 0.81 | - | yes |
| T2_129 | PHF6 | 84295 | X | 133547926 | frameshift deletion | AAG | A | 0.82 | p.E220fs | yes |
| T2_141 | PHF6 | 84295 | X | 133551264 | stopgain | T | TTAGG | 0.82 | p.T300_Y301delinsTX | yes |
| T1 | PHF6 | 84295 | X | 133551195 | Splice_Site | A | AGGCGCCC | 0.82 | - | yes |
| T43 | PHF6 | 84295 | X | 133527523 | Splice_Site | TGCTG | T | 0.83 | - | yes |
| T37 | PHF6 | 84295 | X | 133549136 | Nonsense | C | T | 0.84 | p.R274X | yes |
| T85 | PHF6 | 84295 | X | 133551264 | In_Frame_Ins | T | TTGGGGC | 0.87 | p.T300delinsTWG | yes |
| T27 | PHF6 | 84295 | X | 133549087 | Frame_Shift_Ins | A | AG | 0.90 | p.R257fs | yes |
| T21 | PHF6 | 84295 | X | 133551319 | Nonsense | C | T | 0.94 | p.R319X | yes |
| T3 | PHF6 | 84295 | X | 133547940 | Nonsense | C | T | 0.95 | p.R225X | yes |
| T2_65 | PHF6 | 84295 | X | 133527950 | frameshift insertion | G | GA | 0.97 | p.R129fs | yes |
| T2_70 | PTEN | 5728 | 10 | 89717713 | frameshift insertion | G | GTACCCGCC | 0.15 | p.P246fs | no |
| T2_69 | PTEN | 5728 | 10 | 89717710 | frameshift insertion | G | GCC | 0.37 | p.Q245fs | yes |
| T82 | PTEN | 5728 | 10 | 89624298 | Missense | C | A | 0.38 | p.D24E | yes |
| T31 | PTEN | 5728 | 10 | 89717708 | In_Frame_Ins | C | CCCA | 0.39 | p.Q245delinsPK | yes |
| T37 | RUNX1 | 861 | 21 | 36206705 | Splice_Site | A | G | 0.34 | - | yes |
| T26 | RUNX1 | 861 | 21 | 36252937 | Frame_Shift_Ins | G | GCAGCA | 0.45 | p.A115fs | yes |
| T90 | RUNX1 | 861 | 21 | 36164546 | Frame_Shift_Ins | G | GCCCCC | 0.45 | p.N416fs | yes |
| T83 | RUNX1 | 861 | 21 | 36171607 | Nonsense | G | A | 0.49 | p.R293X | yes |
| T24 | SUZ12 | 23512 | 17 | 30325743 | In_Frame_Del | AATT | A | 0.30 | p.648_648del | no |
| T24 | SUZ12 | 23512 | 17 | 30303634 | Splice_Site | G | T | 0.38 | - | yes |
| T3 | SUZ12 | 23512 | 17 | 30315460 | Frame_Shift_Del | CAG | C | 0.46 | p.S382fs | yes |
| T4 | SUZ12 | 23512 | 17 | 30325778 | Missense | A | G | 0.47 | p.H659R | no |
| T3 | SUZ12 | 23512 | 17 | 30323848 | Missense | G | A | 0.48 | p.G609E | yes |
| T13 | SUZ12 | 23512 | 17 | 30323843 | Missense | T | A | 0.68 | p.N607K | yes |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| T86 | U2AF1 | 7307 | 21 | 44524453 | Missense | C | A | 0.41 | p.R35L | no |
| T37 | U2AF1 | 7307 | 21 | 44524456 | Missense | G | T | 0.44 | p.S34Y | yes |
| T85 | U2AF1 | 7307 | 21 | 44524453 | Missense | C | A | 0.49 | p.R35L | no |
| T37 | WT1 | 7490 | 11 | 32417923 | Frame_Shift_Ins | T | TCGGGGGTC | 0.34 | p.T360fs | no |
| T91 | WT1 | 7490 | 11 | 32449596 | Nonsense | G | A | 0.35 | p.Q260X | yes |
| T3 | WT1 | 7490 | 11 | 32417915 | Frame_Shift_Ins | T | TACAAGAGTCCTTCA | 0.42 | p.V362fs | yes |
| T16 | WT1 | 7490 | 11 | 32414233 | Frame_Shift_Ins | T | TTGCC | 0.46 | p.R423fs | yes |
| T7 | WT1 | 7490 | 11 | 32417914 | Frame_Shift_Ins | G | ACAAGAGTCGGGGG | 0.62 | p.R363fs | yes |
| T86 | ZFP36L2 | 678 | 2 | 43452464 | Frame_Shift_Ins | C | CG | 0.34 | p.R160fs | no |
| T90 | ZFP36L2 | 678 | 2 | 43452301 | In_Frame_Ins | G | GTCT | 0.48 | p.F214delinsLD | yes |

Supplementary Table 6. Primers for Sanger sequencing.

| Hugo Symbol | Position | Forward primer | Reverse primer |
|---|---|---|---|
| ASXL1 | 31022286 | CCACCTCCCTCATCGGTGGC | ACTCACACAGTCCCACCAGAAA |
| ASXL1 | 31022441 | CTGGACATGGCAGTTCCGGC | AGAGGTTTGCTTGAGACAGCCTTCA |
| ASXL1 | 31023289 | TAGGGCTTGGTGGCTCATGCC | TGGCGGACCGCACATACTCG |
| CHD4 | 6697096 | AGGCAGGGGTGCAAAAGGAAGT | CCTTTAGAGAGGCCAAGCCCC |
| CHD4 | 6700646 | AAGGAGGGTGGGCATCGTGT | CAGCAGCGCAGGTGTGTCAG |
| CHD4 | 6702762 | GCCTCACCAGGGACCAGATCA | GGAGATGCACAAGAAGTTACAGTCC |
| CNOT3 | 54647246 | GAAGGCGGCTCAGGACCTCTG | TTGTCTCCTCGAGTCCTGCCCT |
| CNOT3 | 54649666 | GGCACATCGAGAAGCACCGC | TCCCACCTCTCTGGGACTCAGG |
| COL6A5 | 130095517 | TGGCCCAGTACAGCGACGAG | AGTGTTAAAAGATGAGGATCCTGGC |
| COL6A5 | 130174322 | AGGCTCTAGACAGTTGTGAGAA | ACCTGGGGATCAGGCACCTCT |
| CTCF | 67645919 | CCCGCTGGAGTCAGCTTGAATGA | TGAGGAAGAACAGCAGGAGGGTCT |
| CTCF | 67654598 | AACAATGGGGACACACAGTGG | GAACTTCAGTGCCCCAAAGCTA |
| CTCF | 67660456 | AAAATTAGCCGGGCATGGTG | CACCGAGAAAGCACCAACAA |
| DNM2 | 10870454 | TGGGGTTGGTGCCTTTGCTGA | CAGGAGGGTGCCTGACCAGA |
| DNM2 | 10904475 | GAGCCTGACTCGTAGCCAGCA | GTGGGACTGGCGCTCAGGTT |
| DNM2 | 10904484 | GGTGCTGAGCTTTGACCCCTGA | AGCCCAGGACCCAAGTTCCAC |
| DNM2 | 10940850 | AGCAGCTGGGCACGTAGTGAG | CACCCTGCCCACCACAAGTT |
| EED | 85975226 | TCCATTTTTAGGCTTTACTGTGC | TGTGTGCTGGAAACCTGGCAA |
| EED | 85988147 | GATGAATGACATCAAAGGGCAAAGT | TGCCCTGCAGTTTCCAACTT |
| ETV6 | 11992216 | GCGGCTCAAACAAGGGCTGG | GCTTTGGGTATCCGATAGGCAGGT |
| ETV6 | 12022491 | TTTACCGCCTGTAGAGCCGCA | GTCCCCATGATGCTGGAGCG |
| ETV6 | 12038875 | TGCCTGGAAGGCAGCCGATT | GGCCGGGTGAGGGGTGTTAAA |
| EZH2 | 148511215 | GCCCCAGCTAAATCATCTAAGGCA | AGATGCCCAGTACAGCCCTTGC |
| EZH2 | 148523560 | CAGAGCAATCCTCAAGCAACA | AGGCGCACTTCCTCCTGAAT |
| FBXW7 | 153244155 | CCCCAAGCCAACATCCTGCAC | ACTGGATCAGCAATTTGACAGTGA |
| FBXW7 | 153247289 | GTCCCCAGGTCAGGGAACCA | ACAGAAAGGGCCCAAATTCACCA |

| | | | |
|---|---|---|---|
| FBXW7 | 153249384 | TGGGACATACAGGTGGAGTATGGT | GCTGTCGTTCACACAGCCAGAA |
| FBXW7 | 153249468 | AGAGGCCAGGCCAGAGCTATCA | ACTCTACACAGAAAGGGCCCAA |
| GATA3 | 8100424 | GGAGGAGAAAAGGCTCCAGGGAA | CGCCTCTGCTTCATGGATCCCTAC |
| GATA3 | 8106036 | TGTCGGGGGAACGGTCATGC | AGCCAGCTGACACGATTGGAGG |
| IL7R | 35867418 | ACACAGTGTTTTCAGGTAGCCCA | TGGGGCTTAAGCTCTGACTGTCC |
| IL7R | 35874578 | GGGCCTGGTCACCCAAGTCA | ACATGCCTCCACTCACCCACC |
| JAK1 | 65310517 | CGAACGGGGGCTCGTTCAAG | AAGGCAAGAAGCCTGGGCAAC |
| JAK1 | 65312382 | TGATGTTCAGGGCCTGGGGTG | ATCCCCAAGCTGCTCCATCGT |
| JAK1 | 65316516 | ACCTTGGAGCACCACACACCT | TGGCTGTAGCTGGGGGTAGGA |
| JAK3 | 17942143 | ATCTGCAAGGTGCGAGGGGG | AGGGGGTGAACTAGAGGGGCA |
| JAK3 | 17943438 | CATGCCCCCACCCCAGACTA | TCGTGGTCCAGAGAGGTCACAG |
| JAK3 | 17943648 | ACCCGGGCCATAGCTGACAC | GGGCCATAGCTGACACCACG |
| JAK3 | 17945918 | CCCAACCCAATAGACCCACCCC | CAGACTCCAGGGCCAAAGGTGA |
| JAK3 | 17948006 | ATGAACACGGCTCCCATCCAGG | CCCCCACCCCAGACTATGAGC |
| JAK3 | 17949108 | TCCCAGCCCAAGCGAGACAT | GGCTCGCGGACCACGTAGTAG |
| NOTCH1 | 139390789 | TGGAATGCGGGGACGAGCTG | TGGGACTGCATGCTGGTGGG |
| NOTCH1 | 139390863 | CTGAGCACACAGGCCCCCTC | GCTTTTCCCTCTCCATGCTG |
| NOTCH1 | 139390984 | GTAGCTGGTGGCTGGGGGTG | GGGCCGGAGCTTCCTGAGTG |
| NOTCH1 | 139391169 | CTGGGCATCGGGCACCTGAA | GGTCTCACTCACCCGCGGAC |
| NOTCH1 | 139397639 | GGCGTCATGGGCCTCAGTGT | TGCCAACCCCTGCGAGCAT |
| NOTCH1 | 139399396 | CTTTGACTGCCAGCGTGCGG | AACTCGGACGGCAACGCTCA |
| NOTCH1 | 139402689 | GGTGTGTGGCAACACTCGTGC | CACTCAGGAAGCTCCGGCCC |
| NOTCH1 | 139412284 | GGAAAGCGGAAGCAACCCACA | CTGAGCACACAGGCCCCCTC |
| NOTCH1 | 139440195 | ACTCTGAGCCTCACTAGTGC | TCCTCGCCCTGCAAGAACGG |
| NOTCH3 | 15271781 | GGTCTGGGCCTGAGCAAGGG | CGTAGTCAGGGACAGGGAGCG |
| NOTCH3 | 15281517 | ATGCAGGTGGGCCATGGAGAC | TGGGCCATGGAGACCTGTGG |
| NOTCH3 | 15281634 | CTAAGAGCAGGAAGCAGAGGGCG | TCAGCCTGGGCCTGCTGAAC |
| NRAS | 115256516 | AACAACCTAAAACCAACTCTTCCCA | TCAGGTCAGCGGGCTACCAC |
| NRAS | 115258747 | ATGGGAAGGAGTTGCGGCCT | CTGCCCCCTTACCCTCCACA |
| PHF6 | 133527529 | ACTTGTACCTAGGAAGATCTGGA | ACACCATTTAAGAACAGAGACTGAG |

| | | | |
|---|---|---|---|
| PHF6 | 133547538 | AGAACCATGCTTACCATGCACT | ATCCAGGGATATGTAGTCAGAGGA |
| PHF6 | 133547940 | TTTGGGCTTTAGATCACAGGGG | ACGGCTTGCAAATGCCTTGA |
| PHF6 | 133549087 | GGCTCCACACTGGCAGTCCT | GTCTCCACACAGAAGCAGCCC |
| PHF6 | 133549136 | GGCTCCACACTGGCAGTCCT | ACGGCTTGCAAATGCCTTGA |
| PHF6 | 133551195 | TGTCAGACCTGGGATGGTCA | ACCACAGACCATTTCTCCTCA |
| PHF6 | 133551264 | TGTCAGACCTGGGATGGTCA | TGATGAAATGCTTTGAAATGGGA |
| PHF6 | 133551319 | ATCCAGGGATATGTAGTCAGAGGA | ACACCATTTAAGAACAGAGACTGAG |
| PTEN | 89624298 | CATTACCCGGCTGCGGTCCA | CCTCAGTTTGTGGTCTGCCAGC |
| PTEN | 89717708 | TGCCAGAGTAAGCAAAACACCTGC | TCGCATCCGTCTACTCCCACG |
| RUNX1 | 36164546 | ACCATCCCCACCGTGGTCCTA | CACATGGGGGCCAGTTGTGG |
| RUNX1 | 36171607 | AATCAGTGCATGGGCATGGGA | TGGTGGCCCTAGGGGATGTT |
| RUNX1 | 36206776 | GGGGGCCCATTCTGCTGAGAG | CAACCATCCCCACCGTGGTC |
| RUNX1 | 36252937 | AGACAGACCGAGTTTCTAGGGA | GTGCATGGGCATGGGACTCAGA |
| SUZ12 | 30303634 | CCCCAAGATTTACGTAGGGCCCAG | GTGAAACAGCAAAAGACCATAAAGA |
| SUZ12 | 30315460 | AGGCTGCCTCCATTCGAAACA | TGCTGCATTTCACGGAGCTT |
| SUZ12 | 30323843 | AGAAATGTTGCCACTTTGCTGT | AGAGCTTCCAGCCAGAAGAAAACGA |
| SUZ12 | 30325743 | TGCTGTTCTAATGGTACCTGTTT | GCACAAGACCTAACTCTGCAAACCA |
| U2AF1 | 44524456 | AGGAGGAGGCGGGTTAGAGT | AGTCGATCACCTGCCTCACTAT |
| WT1 | 32414233 | AAACCACACCTCACCCAGGGC | ACAGCGGGCACACTTACCAG |
| WT1 | 32417910 | AGAGGCTCTGGGACAGCCAT | ACCCTAGCCCAAGGGAACACAG |
| WT1 | 32449596 | CGCAGCGACTGCTAGGGGAA | AGGCGTCTCGTGCCTCCAAG |
| ZFP36L2 | 43452301 | GTCCGACCTCCTACGGCACC | TTCGGATGGCGAGTCAGGCT |
| ZFP36L2 | 43452464 | CCCCTCCCTTTGGCAGACAGA | AAGCCCAGGTGCAACGCATC |

Supplementary Table 7. Significantly mutated genes in all T-LBL cases (n=96).

| Patient_id | Hugo Symbol | Hugo | Chromosome | Position | Variant Classification | Reference Allele | Tumor Allele | Variant allele frequency | Protein Change |
|---|---|---|---|---|---|---|---|---|---|
| T1 | *ETV6* | NM_001987 | 12 | 12038875 | Missense | A | G | 0.53 | p.T390A |
| T1 | *NOTCH1* | NM_017617 | 9 | 139390823 | Frame_Shift_Ins | A | AGT | 0.36 | p.I2456fs |
| T1 | *NOTCH1* | NM_017617 | 9 | 139440195 | Missense | G | A | 0.53 | p.P15L |
| T1 | *PHF6* | NM_001015877 | X | 133551195 | Splice_Site | A | AGGCGCCC | 0.82 | - |
| T1 | *TMEM200C* | NM_001080209 | 18 | 5891373 | In_Frame_Del | GCGGCGGCGGC | G | 0.21 | p.226_230del |
| T10 | *ASXL1* | NM_015338 | 20 | 31022441 | Frame_Shift_Ins | A | AG | 0.35 | p.G642fs |
| T10 | *CDC27* | NM_001114091 | 17 | 45234360 | Nonsense | A | C | 0.09 | p.L254X |
| T10 | *CDC27* | NM_001114091 | 17 | 45234298 | Missense | G | C | 0.16 | p.L275V |
| T10 | *CDC27* | NM_001114091 | 17 | 45234343 | Missense | T | G | 0.18 | p.N260H |
| T10 | *IL7R* | NM_002185 | 5 | 35874578 | Frame_Shift_Del | TCA | T | 0.37 | p.I245fs |
| T10 | *IL7R* | NM_002185 | 5 | 35874576 | Frame_Shift_Ins | C | CA | 0.37 | p.T244fs |
| T10 | *IL7R* | NM_002185 | 5 | 35874553 | Frame_Shift_Del | GAGATGGATCCT | G | 0.37 | p.E237fs |
| T10 | *IL7R* | NM_002185 | 5 | 35874568 | In_Frame_Del | TTACTAA | T | 0.38 | p.242_244del |
| T10 | *IL7R* | NM_002185 | 5 | 35867418 | Missense | G | A | 0.50 | p.V78M |
| T10 | *NOTCH1* | NM_017617 | 9 | 139399344 | Missense | A | T | 0.09 | p.L1600Q |
| T10 | *NOTCH3* | NM_000435 | 19 | 15281517 | Missense | C | A | 0.39 | p.R1619L |
| T10 | *RUNX1* | NM_001001890 | 21 | 36206776 | Frame_Shift_Ins | T | TG | 0.43 | p.T219fs |
| T11 | *CDC27* | NM_001114091 | 17 | 45234343 | Missense | T | G | 0.11 | p.N260H |
| T11 | *POTEC* | NM_001005356 | 18 | 14522310 | Missense | C | T | 0.09 | p.R451K |
| T13 | *CDC27* | NM_001114091 | 17 | 45234298 | Missense | G | C | 0.14 | p.L275V |
| T13 | *CDC27* | NM_001114091 | 17 | 45234343 | Missense | T | G | 0.14 | p.N260H |
| T13 | *CHD4* | NM_001273 | 12 | 6697096 | Missense | C | T | 0.31 | p.R1162Q |
| T13 | *DNM2* | NM_001005360 | 19 | 10904475 | Missense | G | A | 0.37 | p.G358R |
| T13 | *JAK1* | NM_002227 | 1 | 65312382 | Missense | G | T | 0.33 | p.S646Y |
| T13 | *MTRNR2L2* | NM_001190470 | 5 | 79945871 | Missense | G | A | 0.27 | p.S12L |
| T13 | *NOTCH1* | NM_017617 | 9 | 139390789 | Frame_Shift_Ins | G | GCGCCC | 0.38 | p.L2468fs |
| T13 | *POTEG* | NM_001005356 | 14 | 19563537 | Missense | A | C | 0.10 | p.N351H |
| T13 | *SUZ12* | NM_015355 | 17 | 30323843 | Missense | T | A | 0.68 | p.N607K |
| T14 | *IL7R* | NM_002185 | 5 | 35874567 | In_Frame_Del | CTTA | C | 0.24 | p.242_242del |
| T14 | *IL7R* | NM_002185 | 5 | 35874575 | In_Frame_Ins | C | CTTGTAGGGG | 0.24 | p.T244delinsTCRG |
| T15 | *ETV6* | NM_001987 | 12 | 12022356 | Splice_Site | A | AG | 0.21 | - |
| T15 | *NRAS* | NM_002524 | 1 | 115258744 | Missense | C | T | 0.17 | p.G13D |
| T16 | FBXW7 | NM_033632 | 4 | 153247289 | Missense | G | A | 0.462 | p.R505C |
| T16 | *NRAS* | NM_002524 | 1 | 115258747 | Missense | C | T | 0.41 | p.G12D |
| T16 | *WT1* | NM_000378 | 11 | 32417910 | Frame_Shift_Ins | G | GAAGGA | 0.46 | p.S364fs |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| T16 | *WT1* | NM_000378 | 11 | 32414233 | Frame_Shift_Ins | T | TTGCC | 0.46 | p.R423fs |
| T19 | FBXW7 | NM_033632 | 4 | 153247289 | Missense | G | A | 0.415 | p.R505C |
| T2 | *ETV6* | NM_001987 | 12 | 12022491 | Frame_Shift_Ins | G | GC | 0.35 | p.R199fs |
| T2 | *NRAS* | NM_002524 | 1 | 115258748 | Missense | C | A | 0.39 | p.G12C |
| T2_103 | *CTCF* | NM_006565 | 16 | 67645059 | frameshift insertion | A | AATCCACCTCC | 0.50 | p.I108fs |
| T2_103 | *NOTCH1* | NM_017617 | 9 | 139390913 | frameshift insertion | G | GAATTATCAAA | 0.43 | p.S2426fs |
| T2_103 | *PHF6* | NM_001015877 | X | 133547642 | frameshift insertion | G | GA | 0.31 | p.R180fs |
| T2_108 | *NOTCH1* | NM_017617 | 9 | 139396761 | nonframeshift deletion | GCTT | G | 0.47 | p.1782_1782del |
| T2_108 | *PHF6* | NM_001015877 | X | 133547534 | frameshift deletion | AAGTT | A | 0.75 | p.S145fs |
| T2_108 | *RUNX1* | NM_001001890 | 21 | 36252937 | stopgain | G | CCCCTTCGATT | 0.18 | p.A115_E116delinsGVX |
| T2_111 | *ETV6* | NM_001987 | 12 | 12037398 | nonframeshift insertion | T | TAGG | 0.42 | p.D343delinsDR |
| T2_113 | *CNOT3* | NM_014516 | 19 | 54649666 | frameshift insertion | T | TC | 0.55 | p.S242fs |
| T2_120 | *ETV6* | NM_001987 | 12 | 12038900 | frameshift insertion | T | TGA | 0.51 | p.L398fs |
| T2_121 | *ASXL1* | NM_015338 | 20 | 31023523 | stopgain | C | TAGTTTTTGAC | 0.47 | p.S1003delinsSSFX |
| T2_121 | *RUNX1* | NM_001001890 | 21 | 36252939 | stopgain | C | CTTCAGGAG | 0.46 | p.S114_A115delinsSSX |
| T2_122 | *ETV6* | NM_001987 | 12 | 12022755 | frameshift insertion | C | CAA | 0.14 | p.F287fs |
| T2_122 | *EZH2* | NM_004456 | 7 | 148513805 | frameshift deletion | ATCCACATCCTC | A | 0.48 | p.A443fs |
| T2_122 | *JAK3* | NM_000215 | 19 | 17943366 | nonframeshift insertion | T | TCACTCC | 0.25 | p.D881delinsGSD |
| T2_126 | *ETV6* | NM_001987 | 12 | 11992215 | frameshift insertion | T | TGGGAC | 0.15 | p.F102fs |
| T2_126 | *IL7R* | NM_002185 | 5 | 35874571 | nonframeshift insertion | C | CCGTGTT | 0.22 | p.L243delinsPCL |
| T2_126 | *WT1* | NM_000378 | 11 | 32414249 | nonframeshift insertion | A | ACGC | 0.24 | p.R417delinsRR |
| T2_128 | *COL6A5* | NM_001278298 | 3 | 130134511 | nonframeshift deletion | GAAAAGGAGA | G | 0.20 | p.1595_1598del |
| T2_128 | *JAK1* | NM_002227 | 1 | 65335028 | frameshift deletion | TC | T | 0.24 | p.K204fs |
| T2_128 | *NOTCH1* | NM_017617 | 9 | 139401708 | Splice_Site | CAACACCAGCCC | G | 0.92 | - |
| T2_129 | *EZH2* | NM_004456 | 7 | 148512054 | frameshift insertion | C | CGGCCCCCA | 0.33 | p.V498fs |
| T2_129 | *IL7R* | NM_002185 | 5 | 35874570 | frameshift insertion | A | ATGTC | 0.55 | p.L242fs |
| T2_129 | *PHF6* | NM_001015877 | X | 133547926 | frameshift deletion | AAG | A | 0.82 | p.E220fs |
| T2_129 | *RUNX1* | NM_001001890 | 21 | 36252862 | frameshift insertion | C | CTTGACAA | 0.42 | p.S140fs |
| T2_132 | *PHF6* | NM_001015877 | X | 133547985 | stopgain | T | TAGGGGGCGCC | 0.53 | p.Y240_K241delinsX |
| T2_134 | *SUZ12* | NM_015355 | 17 | 30310089 | frameshift insertion | A | AGGGCC | 0.24 | p.K330fs |
| T2_135 | *NOTCH1* | NM_017617 | 9 | 139390601 | frameshift insertion | G | GGGGGCCC | 0.39 | p.S2530fs |
| T2_136 | *FBXW7* | NM_033632 | 4 | 153249380 | frameshift deletion | ACAACG | A | 0.29 | p.R465fs |
| T2_136 | *PHF6* | NM_001015877 | X | 133551262 | nonframeshift deletion | TTACCATTACCA | A | 0.75 | p.300_305del |
| T2_137 | *CNOT3* | NM_014516 | 19 | 54649666 | frameshift insertion | T | TC | 0.53 | p.S242fs |
| T2_137 | *FBXW7* | NM_033632 | 4 | 153245474 | frameshift insertion | A | AG | 0.32 | p.C573fs |
| T2_137 | *FGFR1* | NM_001174066 | 8 | 38274873 | nonframeshift deletion | GATCATCTTC | G | 0.24 | p.446_449del |
| T2_137 | *PHF6* | NM_001015877 | X | 133547971 | frameshift deletion | AG | A | 0.57 | p.K235fs |
| T2_137 | *RUNX1* | NM_001001890 | 21 | 36171599 | frameshift insertion | T | TTAATAGGC | 0.29 | p.S295fs |
| T2_138 | *NOTCH1* | NM_017617 | 9 | 139391020 | frameshift insertion | G | CGCCTACGGAT | 0.20 | p.Q2391fs |
| T2_138 | *RUNX1* | NM_001001890 | 21 | 36252939 | nonframeshift insertion | C | AACCCCCCTTT | 0.39 | p.S114delinsSKGGL |

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| T2_141 | *PHF6* | NM_001015877 | X | 133551264 | stopgain | T | TTAGG | 0.82 | p.T300_Y301delinsTX |
| T2_141 | *WT1* | NM_000378 | 11 | 32417943 | frameshift insertion | C | CGGTCATCG | 0.40 | p.R353fs |
| T2_142 | *CNOT3* | NM_014516 | 19 | 54652173 | nonframeshift deletion | TAGCGGA | T | 0.40 | p.396_397del |
| T2_142 | *RUNX1* | NM_001001890 | 21 | 36164771 | frameshift deletion | TGCCGATGCCG | C | 0.12 | p.I337fs |
| T2_143 | *NOTCH1* | NM_017617 | 9 | 139399390 | nonframeshift insertion | G | GGATCGA | 0.20 | p.L1585delinsSIL |
| T2_143 | *NOTCH1* | NM_017617 | 9 | 139399397 | nonframeshift insertion | C | CGGATAT | 0.21 | p.P1582delinsPYP |
| T2_144 | *COL6A5* | NM_001278298 | 3 | 130159614 | frameshift deletion | AC | A | 0.50 | p.P2145fs |
| T2_144 | *NOTCH1* | NM_017617 | 9 | 139390777 | stopgain | G | CTCCTACCTTT | 0.32 | p.L2472delinsGERX |
| T2_146 | *SPI1* | NM_001080547 | 11 | 47399860 | frameshift insertion | A | AG | 0.45 | p.P15fs |
| T2_48 | *NOTCH1* | NM_017617 | 9 | 139390789 | frameshift insertion | G | GCGCCC | 0.18 | p.L2468fs |
| T2_52 | *NOTCH1* | NM_017617 | 9 | 139390789 | frameshift insertion | G | GCGCCC | 0.11 | p.L2468fs |
| T2_52 | *SUZ12* | NM_015355 | 17 | 30264487 | frameshift insertion | G | GA | 0.40 | p.P74fs |
| T2_53 | *WT1* | NM_000378 | 11 | 32417912 | frameshift insertion | C | CGAGT | 0.81 | p.R363fs |
| T2_53 | *WT1* | NM_000378 | 11 | 32417926 | stopgain | G | GTGCTAATAT | 0.88 | p.P359delinsSYX |
| T2_54 | *IL7R* | NM_002185 | 5 | 35874570 | nonframeshift insertion | A | GGGGGTCATT | 0.34 | p.L242delinsLGGHC |
| T2_55 | *DNM2* | NM_001005360 | 19 | 10870487 | stopgain | G | GGGT | 0.38 | p.E79delinsGX |
| T2_60 | *NOTCH1* | NM_017617 | 9 | 139399398 | nonframeshift deletion | GGCGGCATCA | G | 0.54 | p.1579_1582del |
| T2_60 | *WT1* | NM_000378 | 11 | 32417911 | frameshift insertion | A | ACCGAC | 0.89 | p.S364fs |
| T2_62 | *NRAS* | NM_002524 | 1 | 115256515 | nonframeshift insertion | C | GTACTCTTCTT | 0.36 | p.A66delinsSQEEYSA |
| T2_65 | *PHF6* | NM_001015877 | X | 133527950 | frameshift insertion | G | GA | 0.97 | p.R129fs |
| T2_69 | *NOTCH1* | NM_017617 | 9 | 139390912 | frameshift insertion | C | CGG | 0.40 | p.G2427fs |
| T2_69 | *PHF6* | NM_001015877 | X | 133547982 | nonframeshift deletion | CATTATA | C | 0.80 | p.239_241del |
| T2_69 | *PTEN* | NM_000314 | 10 | 89717710 | frameshift insertion | G | GCC | 0.37 | p.Q245fs |
| T2_70 | *CTCF* | NM_006565 | 16 | 67645074 | stopgain | T | TTAG | 0.17 | p.L113delinsLX |
| T2_70 | *ETV6* | NM_001987 | 12 | 12022430 | frameshift insertion | T | CCCCCGGGGA | 0.18 | p.L179fs |
| T2_70 | *PHF6* | NM_001015877 | X | 133547949 | frameshift deletion | TGCATATATTTA | C | 0.60 | p.L228fs |
| T2_70 | *PTEN* | NM_000314 | 10 | 89717713 | frameshift insertion | G | GTACCCGCC | 0.15 | p.P246fs |
| T2_70 | *SUZ12* | NM_015355 | 17 | 30322767 | frameshift insertion | G | GA | 0.50 | p.E594fs |
| T2_72 | *JAK3* | NM_000215 | 19 | 17949108 | missense SNV | C | T | 0.95 | p.M511I |
| T2_72 | *NOTCH1* | NM_017617 | 9 | 139390648 | frameshift deletion | CAG | C | 0.47 | p.P2514fs |
| T2_73 | *PHF6* | NM_001015877 | X | 133549082 | frameshift insertion | T | TTACCCAATCG | 0.30 | p.S256fs |
| T2_77 | *NOTCH1* | NM_017617 | 9 | 139390648 | frameshift deletion | CAG | C | 0.58 | p.P2514fs |
| T2_77 | *NOTCH1* | NM_017617 | 9 | 139399325 | nonframeshift insertion | G | GATACTTCTT | 0.40 | p.F1606delinsLRSI |
| T2_96 | *DNM2* | NM_001005360 | 19 | 10940938 | frameshift insertion | C | CCCAT | 0.30 | p.I805fs |
| T2_96 | *DNM2* | NM_001005360 | 19 | 10940942 | frameshift insertion | T | TCCAC | 0.26 | p.S807fs |
| T2_96 | *EZH2* | NM_004456 | 7 | 148506234 | frameshift deletion | GTTAAC | G | 0.49 | p.V651fs |
| T2_97 | *IL7R* | NM_002185 | 5 | 35874604 | nonframeshift insertion | G | GAGA | 0.50 | p.A254delinsET |
| T2_97 | *NOTCH1* | NM_017617 | 9 | 139390601 | frameshift insertion | G | GGGGGCCC | 0.26 | p.S2530fs |
| T20 | *NOTCH1* | NM_017617 | 9 | 139399396 | In_Frame_Ins | C | CCGG | 0.35 | p.E1583delinsPE |
| T21 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.94 | p.M511I |

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| T21 | *PHF6* | NM_001015877 | X | 133551319 | Nonsense | C | T | 0.94 | p.R319X |
| T24 | FBXW7 | NM_033632 | 4 | 153249468 | Missense | C | A | 0.507 | p.G437V |
| T24 | *JAK1* | NM_002227 | 1 | 65312362 | Missense | G | A | 0.37 | p.L653F |
| T24 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.38 | p.M511I |
| T24 | *MTRNR2L2* | NM_001190470 | 5 | 79945871 | Missense | G | A | 0.14 | p.S12L |
| T24 | *NOTCH1* | NM_017617 | 9 | 139390864 | Nonsense | C | AATTAATATCC | 0.16 | 2443_Q2444delinsNILGYX |
| T24 | *NOTCH1* | NM_017617 | 9 | 139412284 | Missense | T | C | 0.43 | p.N454S |
| T24 | *SUZ12* | NM_015355 | 17 | 30325743 | In_Frame_Del | AATT | A | 0.30 | p.648_648del |
| T24 | *SUZ12* | NM_015355 | 17 | 30303634 | Splice_Site | G | T | 0.38 | - |
| T26 | *CDC27* | NM_001114091 | 17 | 45234298 | Missense | G | C | 0.16 | p.L275V |
| T26 | *CDC27* | NM_001114091 | 17 | 45234343 | Missense | T | G | 0.16 | p.N260H |
| T26 | *COL6A5* | NM_001278298 | 3 | 130174322 | Frame_Shift_Ins | A | AT | 0.35 | p.D2201fs |
| T26 | *NOTCH1* | NM_017617 | 9 | 139399392 | In_Frame_Ins | T | TTCCCCA | 0.33 | p.Q1584delinsLGK |
| T26 | *RUNX1* | NM_001001890 | 21 | 36252937 | Frame_Shift_Ins | G | GCAGCA | 0.45 | p.A115fs |
| T27 | *ASXL1* | NM_015338 | 20 | 31022286 | Nonsense | T | CGTTTTATTGT | 0.41 | Y591_Q592delinsFVLLX |
| T27 | *EED* | NM_003797 | 11 | 85988161 | Missense | C | T | 0.18 | p.S369F |
| T27 | *ETV6* | NM_001987 | 12 | 11905444 | Frame_Shift_Del | ACTTCATGTTCCA | C | 0.28 | p.P32fs |
| T27 | *ETV6* | NM_001987 | 12 | 11905463 | Frame_Shift_Del | TCGAGCGCTCAGC | C | 0.29 | p.P38fs |
| T27 | *IL7R* | NM_002185 | 5 | 35867418 | Missense | G | A | 0.42 | p.V78M |
| T27 | *JAK1* | NM_002227 | 1 | 65312365 | Missense | A | G | 0.12 | p.Y652H |
| T27 | *JAK1* | NM_002227 | 1 | 65304237 | Missense | G | T | 0.26 | p.P960T |
| T27 | *NOTCH1* | NM_017617 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.38 | p.L2335fs |
| T27 | *PHF6* | NM_001015877 | X | 133549087 | Frame_Shift_Ins | A | AG | 0.90 | p.R257fs |
| T28 | FBXW7 | NM_033632 | 4 | 153244155 | Frame_Shift_Ins | T | TC | 0.378 | p.S668fs |
| T28 | *NOTCH3* | NM_000435 | 19 | 15281634 | Missense | G | A | 0.37 | p.S1580L |
| T29 | *COL6A5* | NM_001278298 | 3 | 130095517 | Missense | G | T | 0.43 | p.V169L |
| T29 | *CTCF* | NM_006565 | 16 | 67645919 | Missense | C | T | 0.34 | p.R283C |
| T29 | *MTRNR2L2* | NM_001190470 | 5 | 79945871 | Missense | G | A | 0.23 | p.S12L |
| T29 | *NOTCH1* | NM_017617 | 9 | 139397639 | Missense | A | C | 0.48 | p.V1721G |
| T3 | *JAK1* | NM_002227 | 1 | 65316516 | Missense | C | T | 0.51 | p.D576N |
| T3 | *JAK3* | NM_000215 | 19 | 17945918 | Missense | A | G | 0.92 | p.V674A |
| T3 | *NOTCH1* | NM_017617 | 9 | 139391169 | Frame_Shift_Del | GGGGCCTGTGTC | G | 0.32 | p.L2335fs |
| T3 | *NOTCH1* | NM_017617 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.48 | p.1578_1578del |
| T3 | *PHF6* | NM_001015877 | X | 133547940 | Nonsense | C | T | 0.95 | p.R225X |
| T3 | *SUZ12* | NM_015355 | 17 | 30315460 | Frame_Shift_Del | CAG | C | 0.46 | p.S382fs |
| T3 | *SUZ12* | NM_015355 | 17 | 30323848 | Missense | G | A | 0.48 | p.G609E |
| T3 | *WT1* | NM_000378 | 11 | 32417915 | Frame_Shift_Ins | T | CAAGAGTCCTT | 0.42 | p.V362fs |
| T30 | *NOTCH1* | NM_017617 | 9 | 139391019 | Frame_Shift_Ins | T | TC | 0.17 | p.Q2391fs |
| T31 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | A | 0.39 | p.M511I |
| T31 | *PTEN* | NM_000314 | 10 | 89717708 | In_Frame_Ins | C | CCCA | 0.39 | p.Q245delinsPK |

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| T32 | *NOTCH1* | NM_017617 | 9 | 139399408 | In_Frame_Del | GCAC | G | 0.40 | p.1578_1578del |
| T32 | *NOTCH1* | NM_017617 | 9 | 139390984 | Nonsense | G | A | 0.41 | p.Q2403X |
| T33 | *CDC27* | NM_001114091 | 17 | 45221273 | Missense | A | C | 0.08 | p.F388L |
| T33 | *ETV6* | NM_001987 | 12 | 11905491 | Frame_Shift_Ins | G | GGTCCC | 0.24 | p.S47fs |
| T33 | *EZH2* | NM_004456 | 7 | 148511202 | Missense | C | T | 0.42 | p.C511Y |
| T33 | *JAK1* | NM_002227 | 1 | 65312377 | In_Frame_Ins | T | TACA | 0.20 | p.K648delinsCK |
| T33 | *POTEG* | NM_001005356 | 14 | 19563537 | Missense | A | C | 0.08 | p.N351H |
| T33 | *RUNX1* | NM_001001890 | 21 | 36252939 | Frame_Shift_Ins | C | CATCCTCGGG | 0.41 | p.S114fs |
| T35 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.42 | p.M511I |
| T35 | *MTRNR2L2* | NM_001190470 | 5 | 79945871 | Missense | G | A | 0.11 | p.S12L |
| T35 | *NOTCH1* | NM_017617 | 9 | 139391014 | Nonsense | G | A | 0.40 | p.Q2393X |
| T35 | *PHF6* | NM_001015877 | X | 133511775 | Frame_Shift_Ins | A | ATGAAC | 0.35 | p.H43fs |
| T37 | *CHD4* | NM_001273 | 12 | 6702762 | Missense | G | C | 0.79 | p.F778L |
| T37 | *CTCF* | NM_006565 | 16 | 67654598 | Splice_Site | A | G | 0.37 | - |
| T37 | *EED* | NM_003797 | 11 | 85988147 | Missense | G | T | 0.38 | p.W364C |
| T37 | *EED* | NM_003797 | 11 | 85975226 | Missense | G | A | 0.41 | p.R216Q |
| T37 | *IL7R* | NM_002185 | 5 | 35874603 | In_Frame_Ins | C | CCCCGAGGCT | 0.33 | p.V253delinsVPEA |
| T37 | *PHF6* | NM_001015877 | X | 133549136 | Nonsense | C | T | 0.84 | p.R274X |
| T37 | *RUNX1* | NM_001001890 | 21 | 36206705 | Splice_Site | A | G | 0.34 | - |
| T37 | *U2AF1* | NM_001025203 | 21 | 44524456 | Missense | G | T | 0.44 | p.S34Y |
| T37 | *WT1* | NM_000378 | 11 | 32417923 | Frame_Shift_Ins | T | TCGGGGGTC | 0.34 | p.T360fs |
| T39 | *SPI1* | NM_001080547 | 11 | 47381534 | Nonsense | T | AAGTCCTTAG | 0.22 | p.E68_N69delinsVX |
| T39 | *SPI1* | NM_001080547 | 11 | 47381535 | Missense | C | G | 0.24 | p.E68Q |
| T4 | *ASXL1* | NM_015338 | 20 | 31022441 | Frame_Shift_Ins | A | AG | 0.36 | p.G642fs |
| T4 | *ASXL1* | NM_015338 | 20 | 31023289 | Missense | A | C | 0.48 | p.Q925P |
| T4 | *DNM2* | NM_001005360 | 19 | 10940850 | Missense | G | A | 0.43 | p.R776Q |
| T4 | *NRAS* | NM_002524 | 1 | 115256516 | In_Frame_Del | ACTG | A | 0.39 | p.64_65del |
| T4 | *PHF6* | NM_001015877 | X | 133547538 | Frame_Shift_Ins | T | ATCCCCACAG | 0.67 | p.F146fs |
| T4 | *SUZ12* | NM_015355 | 17 | 30325778 | Missense | A | G | 0.47 | p.H659R |
| T43 | *CNOT3* | NM_014516 | 19 | 54649666 | Frame_Shift_Ins | T | TC | 0.34 | p.S242fs |
| T43 | *CTCF* | NM_006565 | 16 | 67660456 | Splice_Site | A | G | 0.34 | - |
| T43 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.42 | p.M511I |
| T43 | *NOTCH1* | NM_017617 | 9 | 139399422 | Missense | A | G | 0.53 | p.L1574P |
| T43 | *PHF6* | NM_001015877 | X | 133527529 | Splice_Site | A | ACGGG | 0.81 | - |
| T43 | *PHF6* | NM_001015877 | X | 133527523 | Splice_Site | TGCTG | T | 0.83 | - |
| T5 | FBXW7 | NM_033632 | 4 | 153244302 | Splice_Site | C | T | 0.253 | - |
| T5 | FBXW7 | NM_033632 | 4 | 153249510 | Missense | C | A | 0.277 | p.G423V |
| T5 | *GATA3* | NM_001002295 | 10 | 8106048 | Missense | T | A | 0.27 | p.Y291N |
| T5 | *JAK1* | NM_002227 | 1 | 65304237 | Missense | G | A | 0.16 | p.P960S |
| T5 | *JAK3* | NM_000215 | 19 | 17945969 | Missense | C | T | 0.35 | p.R657Q |

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| T5 | *NOTCH1* | NM_017617 | 9 | 139399422 | Missense | A | G | 0.30 | p.L1574P |
| T5 | *TMEM200C* | NM_001080209 | 18 | 5891177 | Missense | G | A | 0.23 | p.P296S |
| T6 | *CHD4* | NM_001273 | 12 | 6703680 | Missense | A | G | 0.22 | p.M753T |
| T6 | *EZH2* | NM_004456 | 7 | 148511215 | Missense | G | A | 0.46 | p.P507S |
| T6 | *JAK1* | NM_002227 | 1 | 65312383 | In_Frame_Ins | A | ACCT | 0.47 | p.S646delinsRS |
| T6 | *JAK3* | NM_000215 | 19 | 17943438 | Missense | A | G | 0.46 | p.L857P |
| T6 | *PHF6* | NM_001015877 | X | 133547940 | Nonsense | C | T | 0.36 | p.R225X |
| T7 | *CHD4* | NM_001273 | 12 | 6700646 | Missense | A | T | 0.50 | p.I1109N |
| T7 | *CNOT3* | NM_014516 | 19 | 54649666 | Frame_Shift_Ins | T | TC | 0.33 | p.S242fs |
| T7 | *DNM2* | NM_001005360 | 19 | 10870454 | Frame_Shift_Del | CCT | C | 0.50 | p.P68fs |
| T7 | *ETV6* | NM_001987 | 12 | 11992216 | Frame_Shift_Ins | T | TCG | 0.49 | p.F102fs |
| T7 | *FGFR1* | NM_001174066 | 8 | 38272124 | In_Frame_Ins | C | GTATCATTAAA | 0.02 | p.M578delinsIFNDT |
| T7 | *PHF6* | NM_001015877 | X | 133549136 | Nonsense | C | T | 0.73 | p.R274X |
| T7 | *WT1* | NM_000378 | 11 | 32417914 | Frame_Shift_Ins | G | AAGAGTCGGG | 0.62 | p.R363fs |
| T81 | *FGFR1* | NM_001174066 | 8 | 38272104 | Frame_Shift_Del | AAATAATGCCT | T | 0.03 | p.P580fs |
| T81 | *FGFR1* | NM_001174066 | 8 | 38272124 | In_Frame_Ins | C | GTATCATTAAA | 0.03 | p.M578delinsIFNDT |
| T81 | *JAK1* | NM_002227 | 1 | 65313328 | Missense | G | C | 0.29 | p.H596D |
| T81 | *JAK3* | NM_000215 | 19 | 17948006 | Missense | G | A | 0.39 | p.A573V |
| T82 | *ASXL1* | NM_015338 | 20 | 31022440 | Frame_Shift_Del | GA | G | 0.35 | p.G642fs |
| T82 | *KRT38* | NM_006771 | 17 | 39596435 | In_Frame_Del | GCATTGTCAATT | C | 0.02 | p.176_184del |
| T82 | *NOTCH3* | NM_000435 | 19 | 15281551 | Missense | C | T | 0.34 | p.A1608T |
| T82 | *NOTCH3* | NM_000435 | 19 | 15271781 | Nonsense | C | A | 0.43 | p.E2220X |
| T82 | *NRAS* | NM_002524 | 1 | 115258748 | Missense | C | T | 0.46 | p.G12S |
| T82 | *PHF6* | NM_001015877 | X | 133549134 | In_Frame_Del | AACG | A | 0.38 | p.273_274del |
| T82 | *PTEN* | NM_000314 | 10 | 89717712 | Missense | C | G | 0.09 | p.P246R |
| T82 | *PTEN* | NM_000314 | 10 | 89624298 | Missense | C | A | 0.38 | p.D24E |
| T83 | *NOTCH1* | NM_017617 | 9 | 139397774 | Missense | A | T | 0.13 | p.V1676D |
| T83 | *NOTCH1* | NM_017617 | 9 | 139399344 | Missense | A | G | 0.34 | p.L1600P |
| T83 | *NOTCH1* | NM_017617 | 9 | 139390864 | Frame_Shift_Ins | C | CCT | 0.98 | p.V2443fs |
| T83 | *NRAS* | NM_002524 | 1 | 115258748 | Missense | C | T | 0.41 | p.G12S |
| T83 | *PHF6* | NM_001015877 | X | 133549044 | Frame_Shift_Del | AGTT | A | 0.59 | p.L244fs |
| T83 | *RUNX1* | NM_001001890 | 21 | 36171607 | Nonsense | G | A | 0.49 | p.R293X |
| T83 | *ZFP36L2* | NM_006887 | 2 | 43452230 | Missense | G | T | 0.23 | p.T238K |
| T84 | *COL6A5* | NM_001278298 | 3 | 130150710 | Missense | A | G | 0.14 | p.T1884A |
| T84 | *GATA3* | NM_001002295 | 10 | 8100424 | Frame_Shift_Ins | A | AC | 0.41 | p.Y133fs |
| T84 | *GATA3* | NM_001002295 | 10 | 8106036 | Missense | G | A | 0.43 | p.A287T |
| T84 | *JAK3* | NM_000215 | 19 | 17945907 | Missense | C | A | 0.87 | p.V678L |
| T84 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.89 | p.M511I |
| T84 | *KRT38* | NM_006771 | 17 | 39594451 | Missense | C | A | 0.42 | p.D379Y |
| T84 | *NOTCH1* | NM_017617 | 9 | 139390863 | Frame_Shift_Ins | A | ACC | 0.43 | p.V2443fs |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| T85 | *JAK1* | NM_002227 | 1 | 65310518 | Missense | G | T | 0.16 | p.R724S |
| T85 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.33 | p.M511I |
| T85 | *JAK3* | NM_000215 | 19 | 17943648 | Missense | G | T | 0.70 | p.P814H |
| T85 | *JAK3* | NM_000215 | 19 | 17942143 | Missense | C | T | 0.75 | p.E958K |
| T85 | *NOTCH1* | NM_017617 | 9 | 139412291 | Missense | C | T | 0.16 | p.D452N |
| T85 | *NOTCH1* | NM_017617 | 9 | 139402689 | Missense | C | T | 0.37 | p.R1107Q |
| T85 | *PHF6* | NM_001015877 | X | 133551264 | In_Frame_Ins | T | TTGGGGC | 0.87 | p.T300delinsTWG |
| T85 | *SPI1* | NM_001080547 | 11 | 47381554 | Frame_Shift_Del | GCT | G | 0.14 | p.S61fs |
| T85 | *U2AF1* | NM_001025203 | 21 | 44524453 | Missense | C | A | 0.49 | p.R35L |
| T86 | *PHF6* | NM_001015877 | X | 133551285 | Frame_Shift_Ins | A | ACC | 0.52 | p.V307fs |
| T86 | *TMEM200C* | NM_001080209 | 18 | 5890729 | Missense | G | A | 0.33 | p.A445V |
| T86 | *U2AF1* | NM_001025203 | 21 | 44524453 | Missense | C | A | 0.41 | p.R35L |
| T86 | *ZFP36L2* | NM_006887 | 2 | 43452464 | Frame_Shift_Ins | C | CG | 0.34 | p.R160fs |
| T88 | *ETV6* | NM_001987 | 12 | 12037478 | Missense | T | C | 0.17 | p.I370T |
| T88 | *NOTCH1* | NM_017617 | 9 | 139390873 | Nonsense | G | A | 0.24 | p.Q2440X |
| T88 | *NRAS* | NM_002524 | 1 | 115258747 | Missense | C | T | 0.12 | p.G12D |
| T88 | *SUZ12* | NM_015355 | 17 | 30267481 | Frame_Shift_Del | GA | G | 0.46 | p.R121fs |
| T89 | *JAK1* | NM_002227 | 1 | 65310517 | Missense | C | T | 0.36 | p.R724H |
| T89 | *JAK3* | NM_000215 | 19 | 17945969 | Missense | C | T | 0.28 | p.R657Q |
| T89 | *JAK3* | NM_000215 | 19 | 17949108 | Missense | C | T | 0.45 | p.M511I |
| T89 | *NOTCH1* | NM_017617 | 9 | 139391187 | Frame_Shift_Ins | A | AG | 0.39 | p.L2335fs |
| T90 | *CATSPER4* | NM_198137 | 1 | 26527888 | Nonsense | G | T | 0.41 | p.E415X |
| T90 | *CNOT3* | NM_014516 | 19 | 54647246 | Missense | G | T | 0.48 | p.K54N |
| T90 | FBXW7 | NM_033632 | 4 | 153249384 | Missense | C | A | 0.479 | p.R465H |
| T90 | *JAK3* | NM_000215 | 19 | 17948006 | Missense | G | A | 0.77 | p.A573V |
| T90 | *NOTCH1* | NM_017617 | 9 | 139399324 | In_Frame_Ins | T | TTGG | 0.41 | p.K1607delinsPK |
| T90 | *RUNX1* | NM_001001890 | 21 | 36164546 | Frame_Shift_Ins | G | GCCCCC | 0.45 | p.N416fs |
| T90 | *ZFP36L2* | NM_006887 | 2 | 43452301 | In_Frame_Ins | G | GTCT | 0.48 | p.F214delinsLD |
| T91 | *DNM2* | NM_001005360 | 19 | 10904484 | Nonsense | C | T | 0.46 | p.R361X |
| T91 | *EZH2* | NM_004456 | 7 | 148523560 | Missense | C | T | 0.41 | p.R298H |
| T91 | *JAK1* | NM_002227 | 1 | 65311203 | Missense | C | G | 0.13 | p.S703T |
| T91 | *JAK1* | NM_002227 | 1 | 65310518 | Missense | G | A | 0.25 | p.R724C |
| T91 | *JAK3* | NM_000215 | 19 | 17948009 | Missense | G | A | 0.50 | p.A572V |
| T91 | *WT1* | NM_000378 | 11 | 32449596 | Nonsense | G | A | 0.35 | p.Q260X |
| T92 | *CATSPER4* | NM_198137 | 1 | 26517292 | Missense | G | C | 0.42 | p.E58D |
| T92 | *COL6A5* | NM_001278298 | 3 | 130110550 | Missense | A | G | 0.12 | p.D982G |
| T92 | *PHF6* | NM_001015877 | X | 133549137 | Missense | G | A | 0.93 | p.R274Q |
| T92 | *PTEN* | NM_000314 | 10 | 89717681 | Frame_Shift_Del | GACAA | G | 0.33 | p.D236fs |

Supplementary Table 8. Prognostic factors for OS and PFS in the cohort of 66 adult T-LBL patients treated uniformly with the Hyper-CVAD regimen.

Univariate analysis

| | OS | PFS |
|---|---|---|
| | p | p |
| Age ( > 50) | 0.070 | 0.103 |
| Gender (male) | 0.938 | 0.639 |
| Ann Arbor stage (III/IV) | **0.021** | 0.054 |
| Elevated LDH | 0.105 | 0.333 |
| Effusion | 0.918 | 0.790 |
| Mediastinal tumor | 0.359 | 0.478 |
| BM involvement | 0.218 | 0.368 |
| CNS involvement | **0.001** | **0.001** |
| *N/F* mutation | **0.001** | **0.001** |
| *PHF6* mutations | **0.001** | **0.004** |
| *JAK3* mutations | 0.445 | 0.843 |
| *JAK1* mutations | 0.998 | 0.434 |
| *ETV6* mutations | 0.530 | 0.560 |
| *NRAS* mutations | 0.449 | **0.031** |
| *RUNX1* mutations | 0.722 | 0.681 |
| *PTEN* mutations | 0.311 | 0.279 |
| *WT1* mutations | 0.905 | 0.776 |
| *SUZ12* mutations | 0.310 | 0.743 |
| *IL7R* mutations | 0.873 | 0.749 |

Multivariate analysis

| | OS | | PFS | |
|---|---|---|---|---|
| | HR (95%CI) | *p* | HR (95%CI) | *p* |
| Age ( > 50) | 0.789 (0.127-4.914) | 0.800 | 0.866 (0.171-4.396) | 0.862 |
| Ann Arbor stage (III/IV) | 1.186 (0.321-4.383) | 0.798 | 0.960 (0.293-3.144) | 0.947 |
| BM involvement | 3.316 (0.686-16.017) | 0.136 | 2.327 (0.564-9.606) | 0.243 |
| CNS involvement | 2.630 (0.447-15.457) | 0.285 | 2.211 (0.394-12.388) | 0.367 |
| Elevated LDH | 1.339 (0.492-3.644) | 0.568 | 1.008 (0.408-2.490) | 0.986 |
| *N/F* mutation | 0.131 (0.027-0.629) | **0.011** | 0.176 (0.047-0.667) | **0.012** |
| *PHF6* mutation | 0.098 (0.012-0.783) | **0.028** | 0.192 (0.042-0.879) | **0.033** |

Abbreviations: *N/F*, *NOTCH1 and/or FBXW7*; LDH, lactate dehydrogenase; BM, bone marrow; CNS, central nervous system; HR, hazard ratio; CI, confidence interval.

Supplementary Table 9. IHC staining of MMR proteins (MLH1, MSH2, MSH6, and PMS2) and MSI testing using a PCR-based assay for detection of instability on a subset of cases.

| ID | Expression of MMR proteins | | | | MSI testing (+: unstable; - : stable ) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MLH1 | MSH2 | MSH6 | PMS2 | MONO-27 | NR-27 | NR-21 | PentaD | BAT-25 | PentaC | BAT-26 | NR-24 |
| T4 | + | + | + | + | - | - | - | - | - | - | - | - |
| T7 | + | + | + | + | - | - | - | - | - | - | - | - |
| T13 | + | + | + | + | - | - | - | - | - | - | - | - |
| T19 | + | + | + | + | - | - | - | - | - | - | - | - |
| T26 | + | + | + | + | - | - | - | - | - | - | - | - |
| T27 | NA | ± | ± | + | - | - | - | - | - | - | - | - |
| T30 | + | + | + | + | - | - | - | - | - | - | - | - |
| T31 | + | + | + | - | - | - | - | - | - | - | - | - |
| T35 | + | + | + | + | - | - | - | - | - | - | - | - |
| T37 | + | - | - | - | - | - | - | - | - | - | - | - |
| T39 | + | + | + | + | NA | NA | NA | NA | NA | NA | NA | NA |
| T82 | - | + | + | - | - | - | - | - | - | - | - | - |
| T83 | + | + | + | - | - | - | - | - | - | - | - | - |
| T84 | - | + | + | - | + | + | + | - | - | + | + | + |
| T87 | + | + | + | + | - | - | - | - | - | - | - | - |
| T89 | + | + | + | + | - | - | - | - | - | - | - | - |

MMR: DNA mismatch repair; MSI: microsatellite instability; NA, not available.