

Supplementary figure and table legends

Figure S1. Schematic overview of study design and data analysis. The information of patients, samples and sequencing technology was indicated in red, blue and green colors respectively.

Figure S2. Genetic mutations associated with platinum response identified in patients received platinum-based chemotherapy only. (A) The VAF of TP53 mutation in responders and non-responders ($P=0.026$). **(B)** Types of TP53 mutation detected only in responders (green), only in non-responders (red), and common in both responders and non-responders (grey). **(C)** and **(D)** Locations of mutation sites in KRAS and EGFR genes. Mutation sites identified only in responders and non-responders was highlighted in green and red, respectively. Mutation sites common in both responders and non-responders were highlight in black. Green plots represent missense mutations and brown plots represent inframe InDel.

Figure S3. Spectrum of somatic mutations shared in at least 2 pre-chemotherapy samples.

Figure S4. Spectrum of somatic mutations shared in at least 2 post-chemotherapy samples.

Figure S5. Mutational signatures correlated with platinum response. (A) and (B) Distribution of mutational signatures of patient 1 (A) and patient 2 (B). (C) and (D) Venn diagram depicting shared mutational signatures detected only in pre (pre-chemotherapy) or only in post (post-chemotherapy) samples of patient 1 and patient 2. (E) Heatmap depicting shared mutational signatures detected in post-chemotherapy samples from another 9 patients. The depth of the color represents the proportion of this signature.

Figure S6. Distribution of nucleotide changes of the somatic mutations identified from pre- and post-chemotherapy samples of patient 1 and patient 2.

Figure S7. GO and KEGG enrichment analysis. (A) GO enrichment based on platinum-sensitive genes and platinum-resistance genes, respectively (green: cellular component; blue: biological process; red: molecular function). Green line and red line in the right represent the functions platinum-sensitive genes and platinum-resistance genes enriched in, respectively. (B) KEGG pathway analysis based on platinum-sensitive genes.

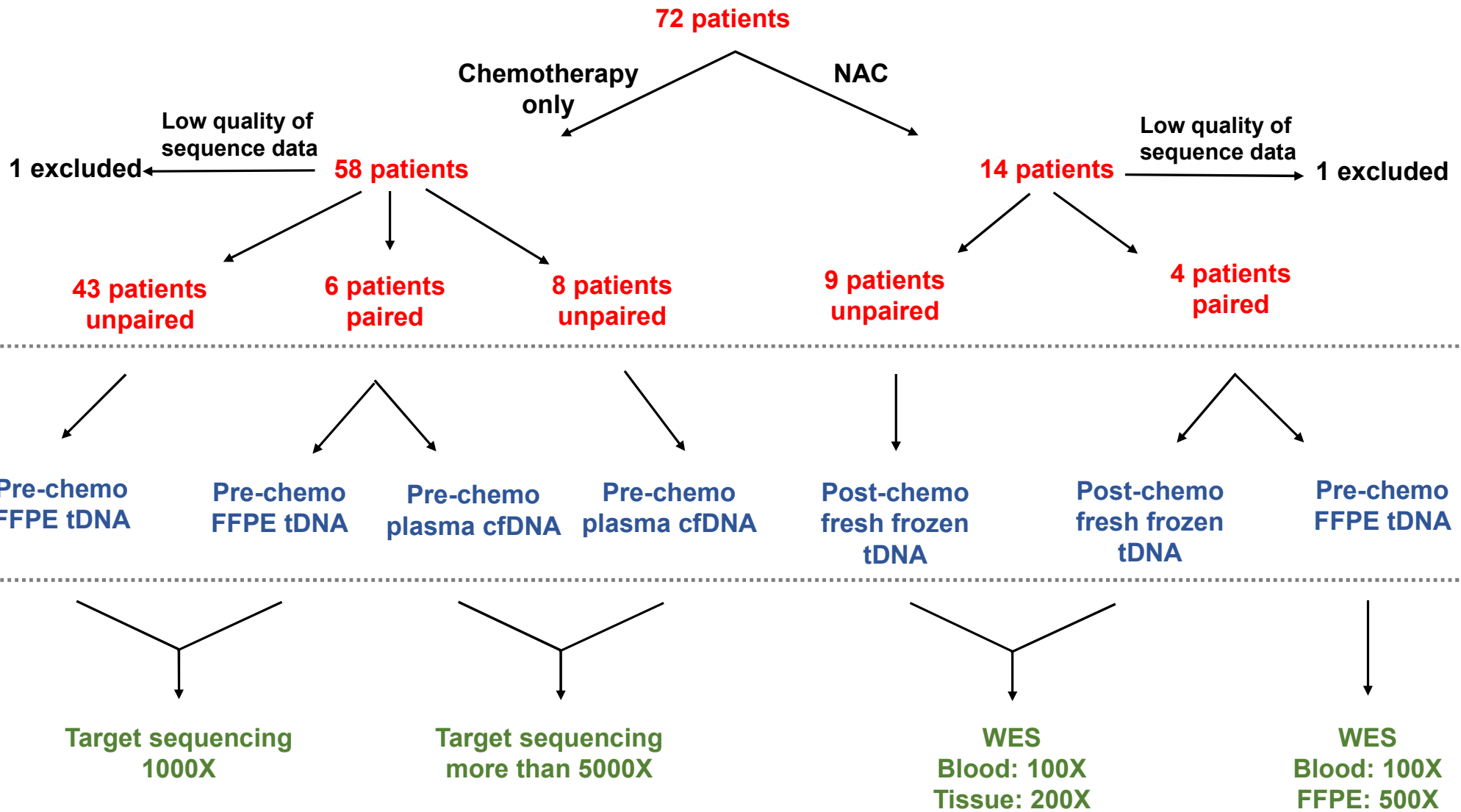
Figure S8. TMB change in pre (pre-chemotherapy) and post (post-chemotherapy) samples derived from patient 2 (A), patient 3 (B), patient 1 (C) and patient 4 (D).

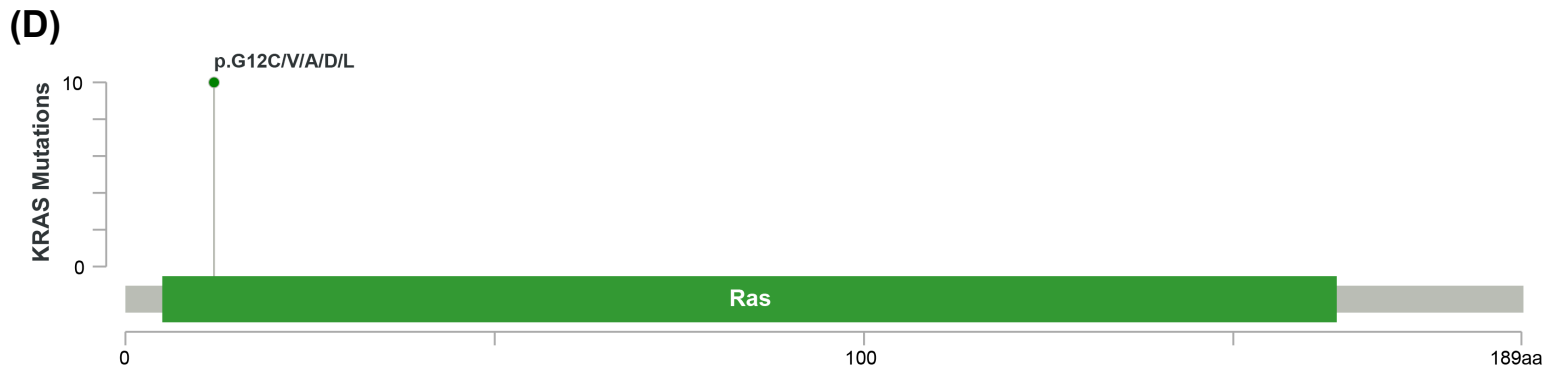
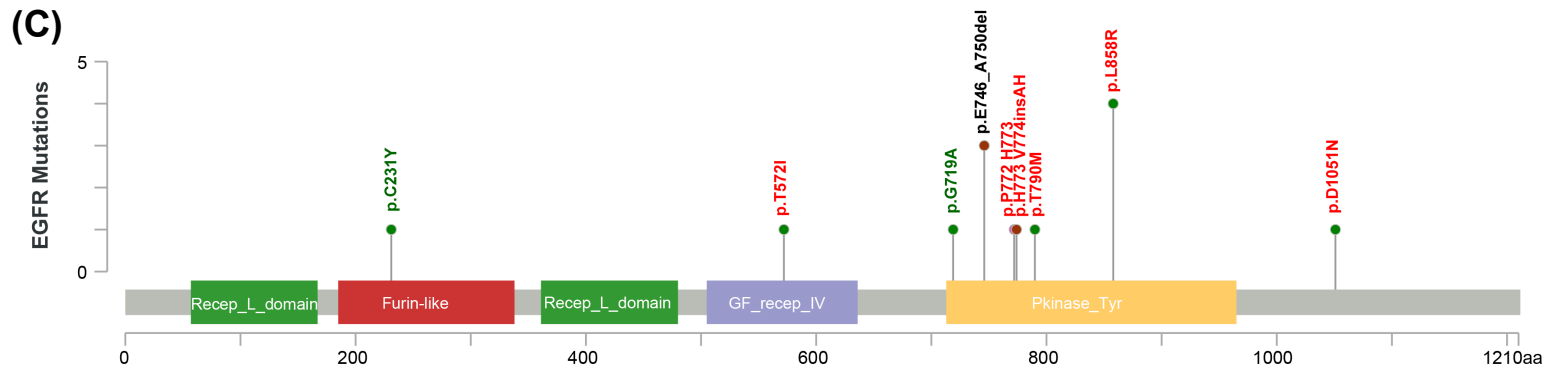
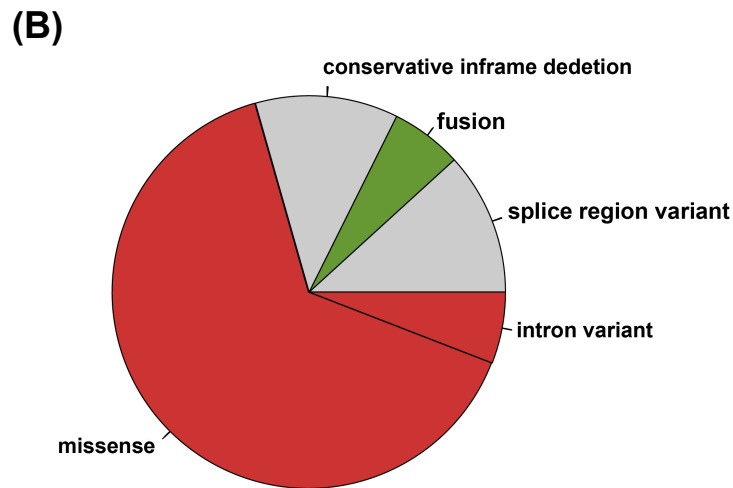
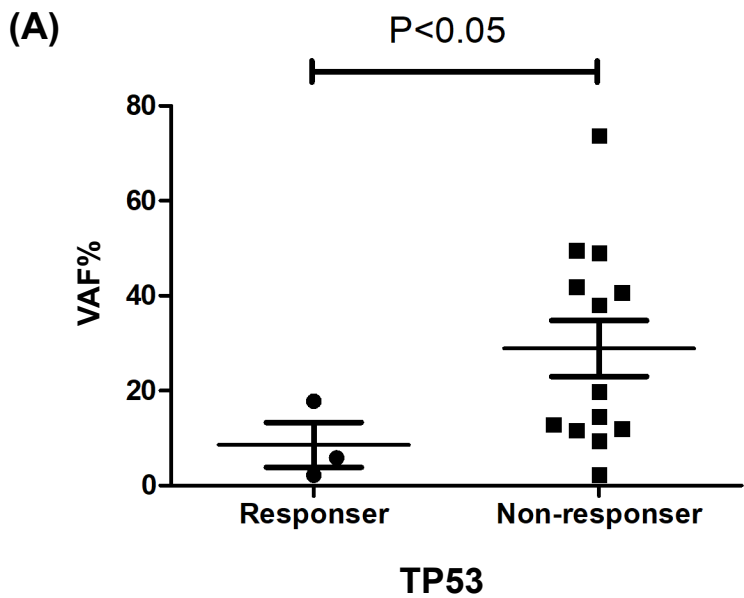
Figure S9. Validation of identified genes based on GDSC database. (A)

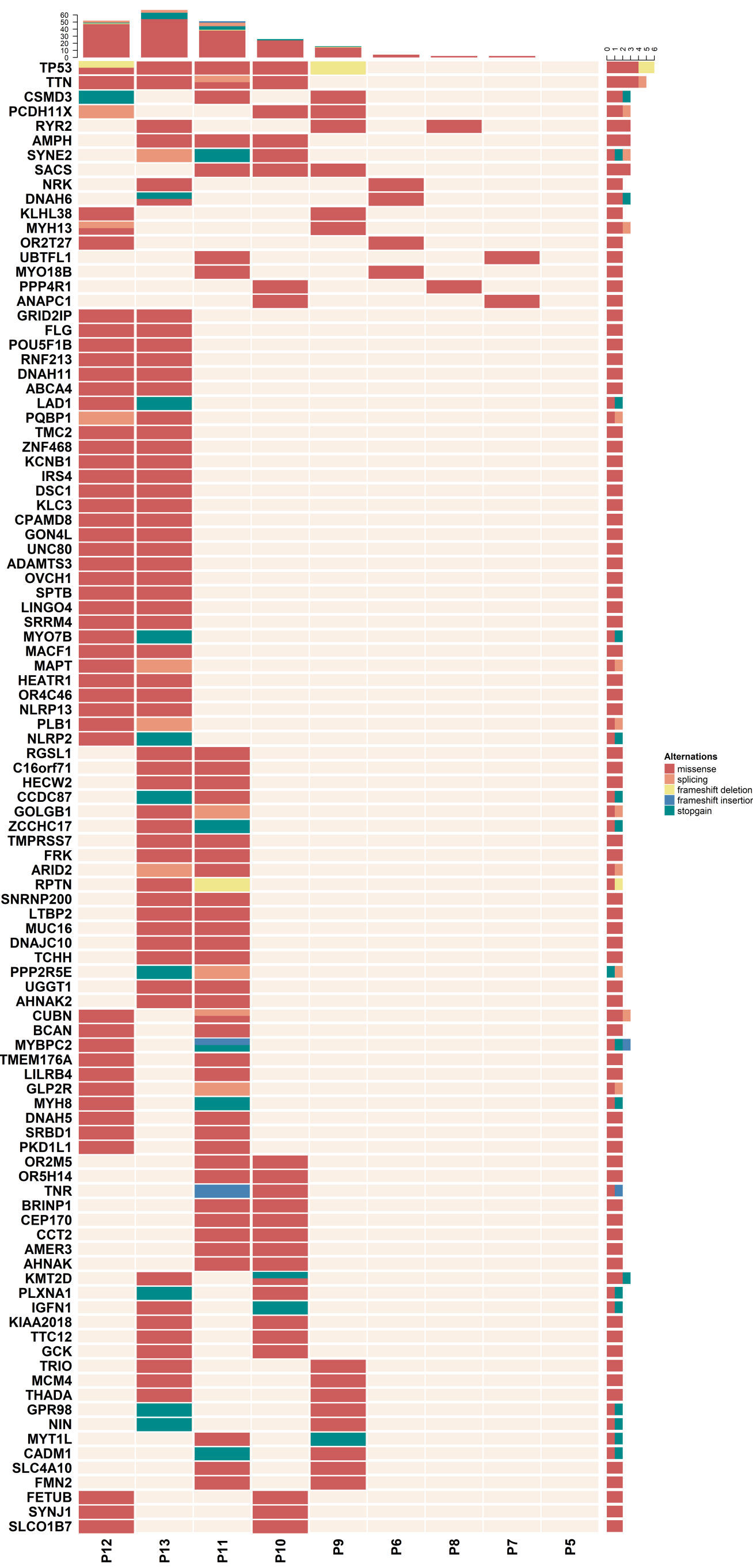
The IC50 values of cisplatin in TP53-mutated cells was higher than TP53-wild type cells ($P=0.018$). Dots represent different cancer cells. **(B)** The IC50 values of cisplatin in KRAS-mutated cells was higher than KRAS-wild type cells ($P=8.5 \times 10^{-5}$). **(C)** The IC50 values of cisplatin in EGFR-mutated cells and EGFR-wild type cells had no significant statistic difference ($P=0.23$).

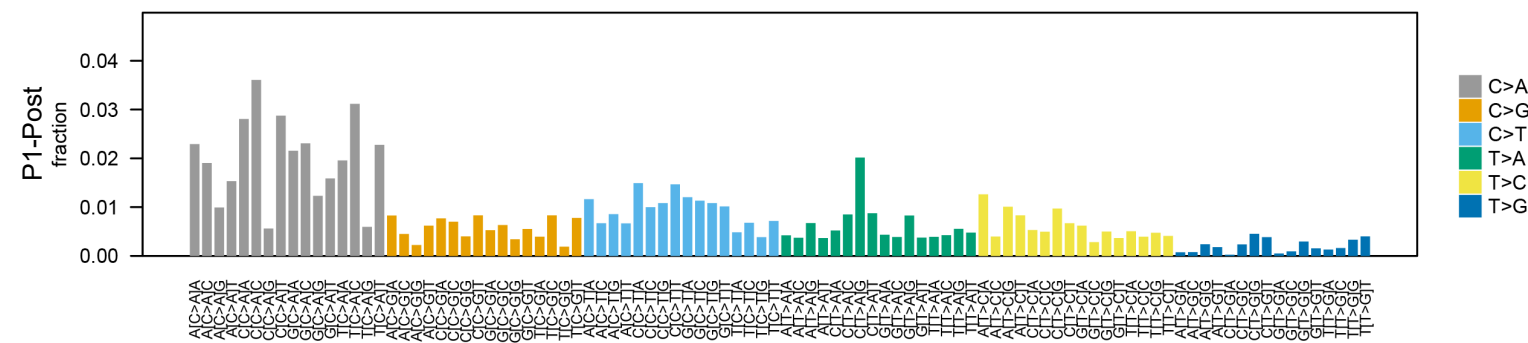
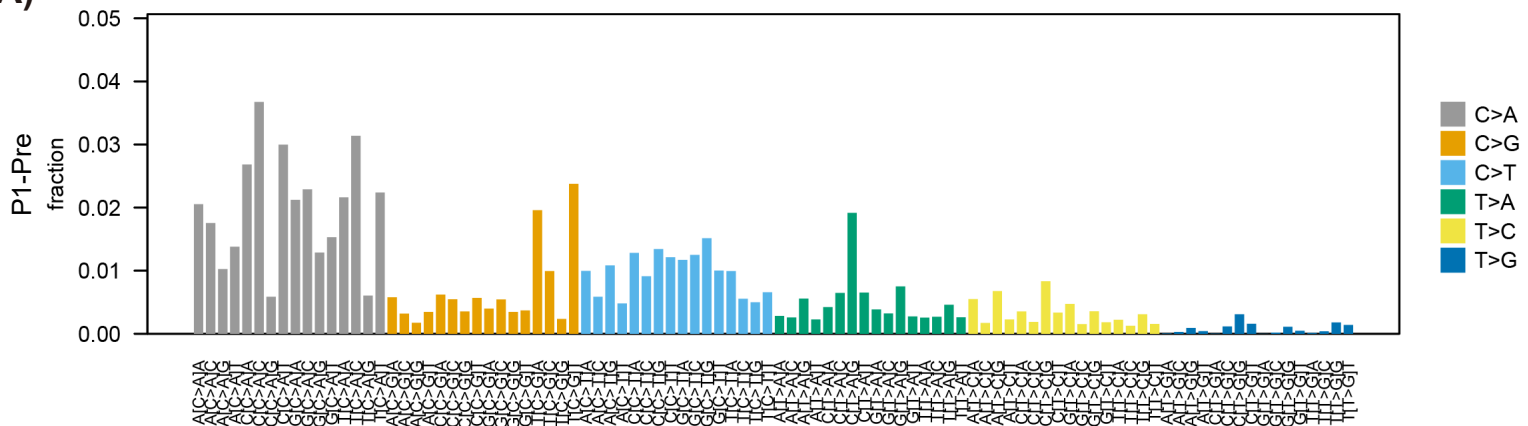
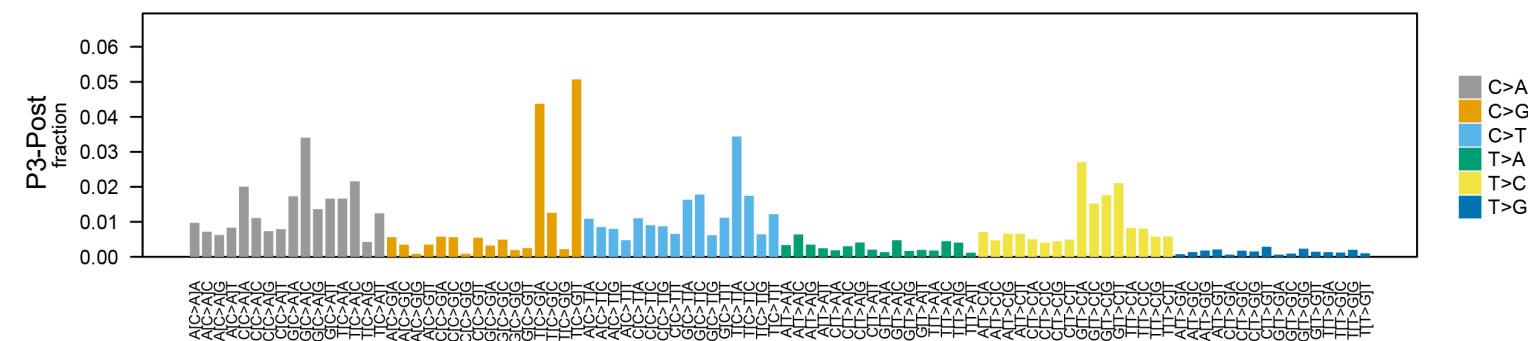
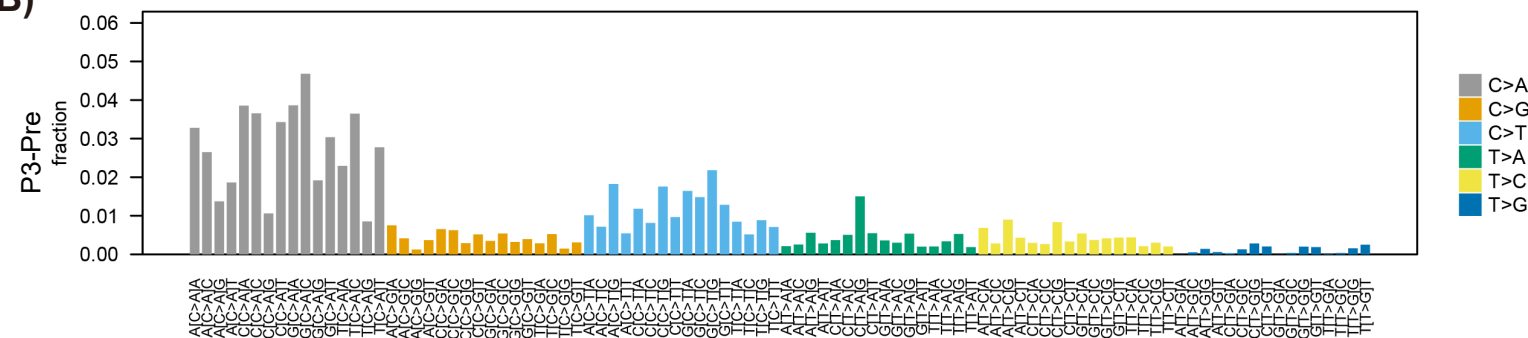
Table S1. The SNVs existed only in pre-chemotherapy samples.

Table S2. The SNVs existed only in post-chemotherapy samples.

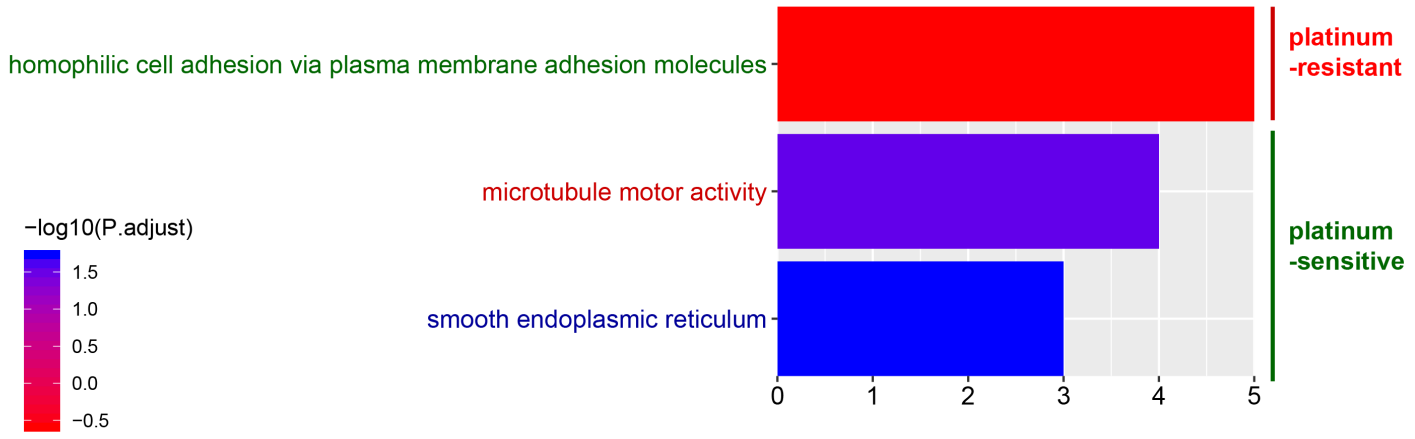




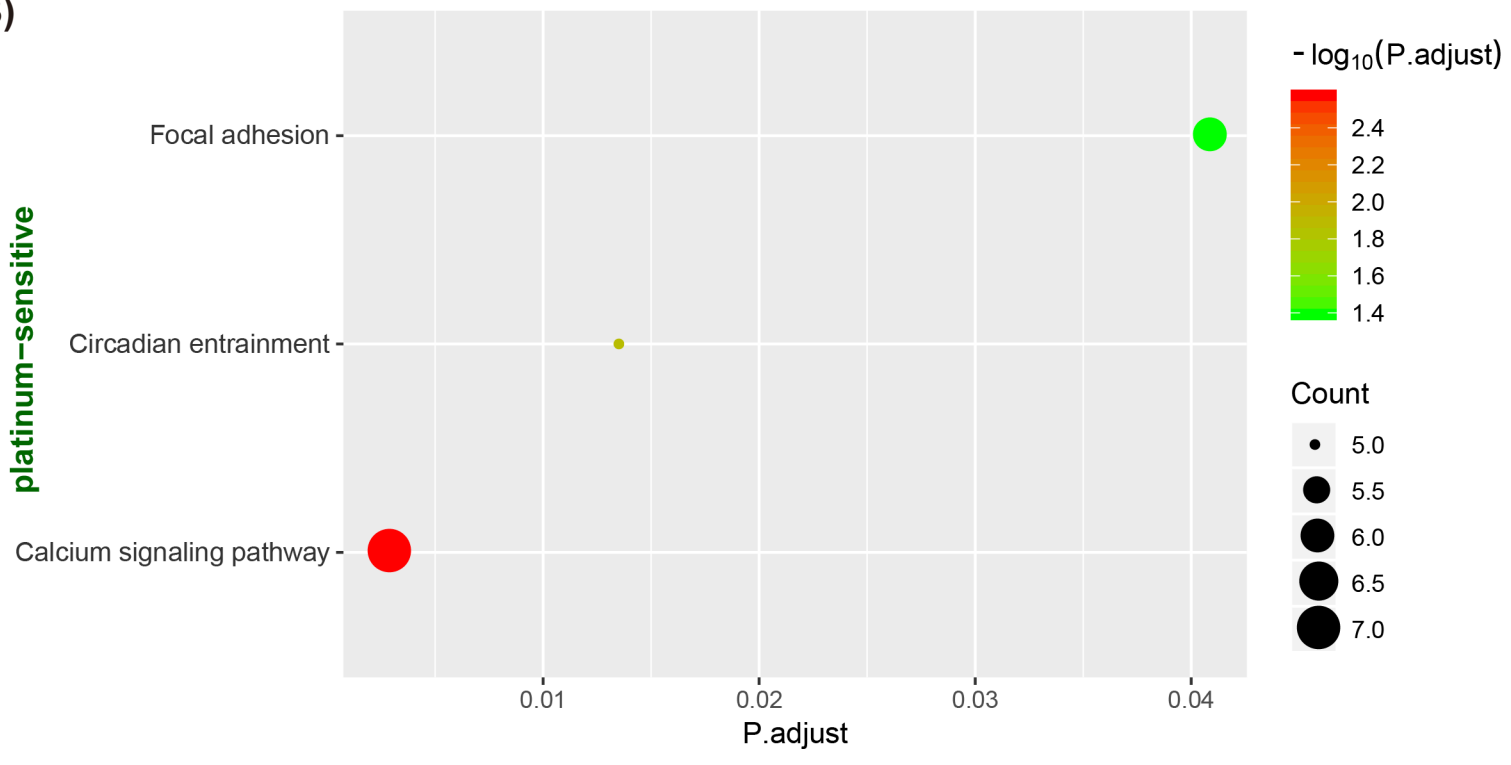


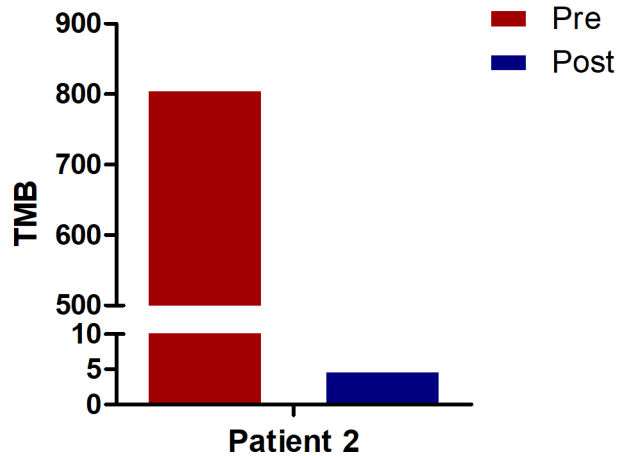
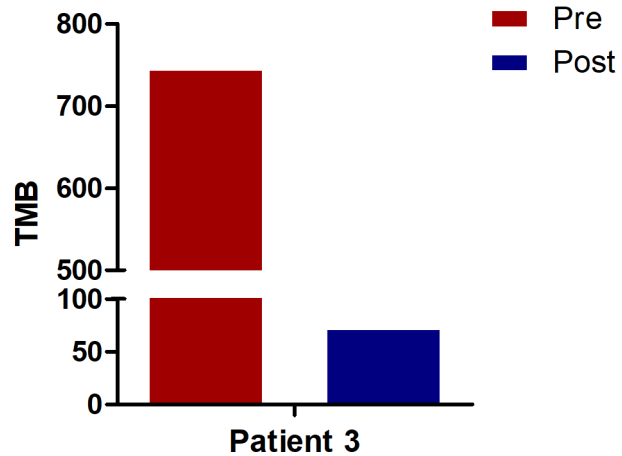
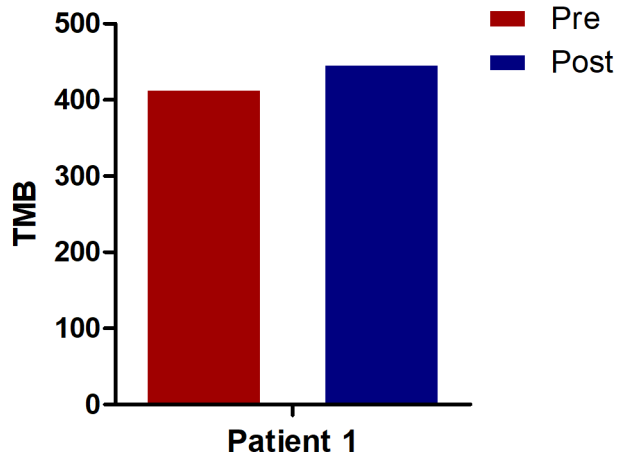
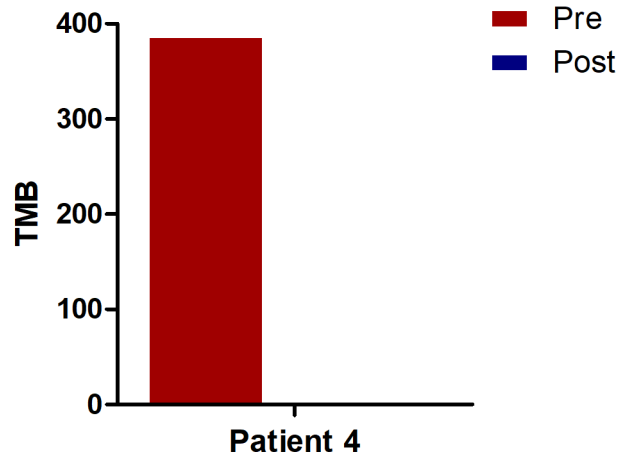
(A)**(B)**

(A)



(B)



(A)**(B)****(C)****(D)**

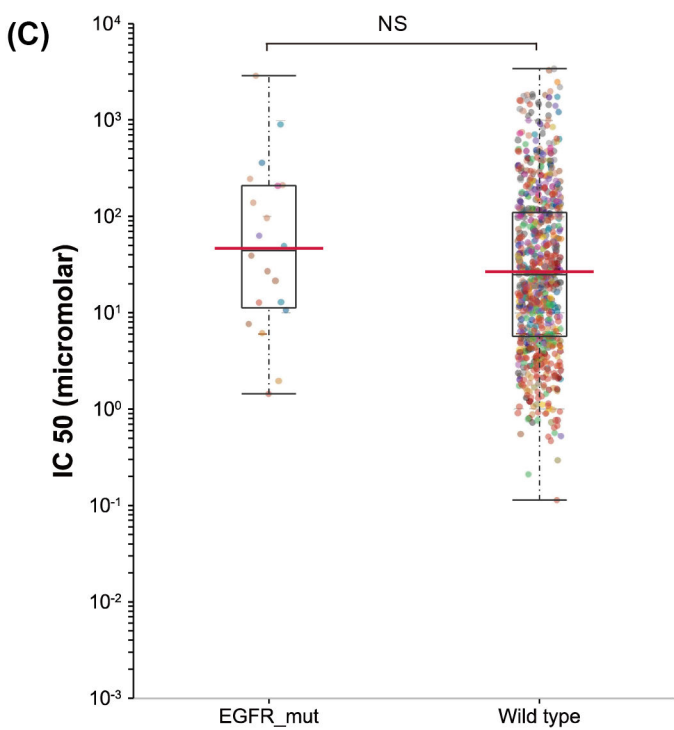
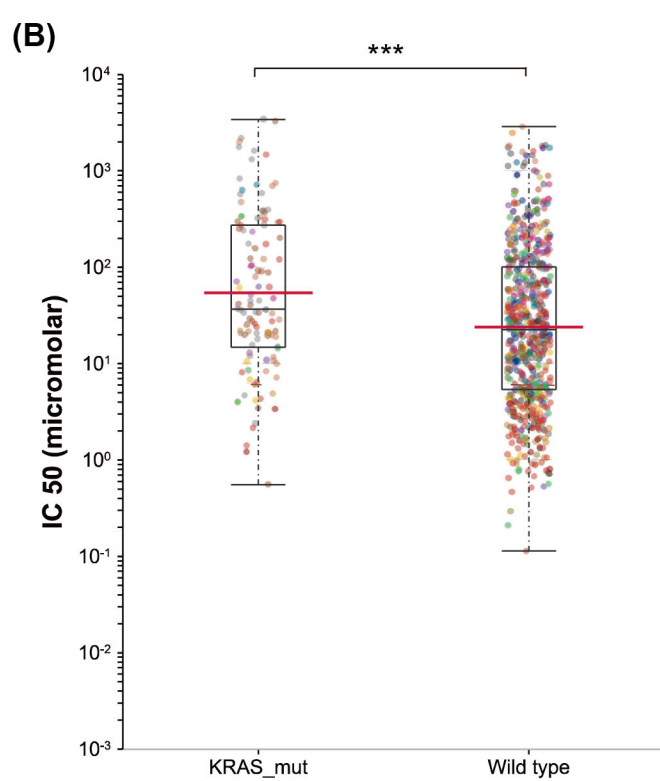
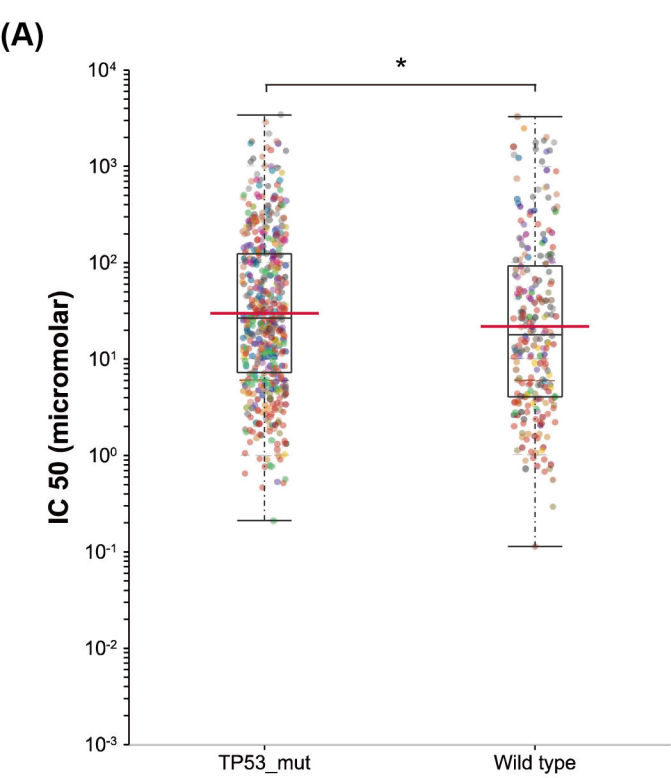


Table S1. The SNVs existed only in pre-chemotherapy samples

Patient	Chromosome	Position	Ref	Alt	GeneName	Mutation type	VAF
P1	9	96278367	C	A	FAM120A	missense	0.357
P1	11	64972286	G	C	CAPN1	missense	0.308
P1	8	56015236	G	T	XKR4	missense	0.27
P1	14	39706177	G	C	MIA2	missense	0.264
P1	12	49448166	C	T	KMT2D	stopgain	0.24
P1	X	53283792	C	A	IQSEC2	missense	0.235
P1	X	77268502	G	C	ATP7A	missense	0.217
P1	15	33765723	C	A	RYS3	missense	0.207
P1	3	97806764	G	T	OR5AC2	missense	0.206
P1	2	40657031	C	G	SLC8A1	missense	0.2
P1	X	149642019	A	G	MAMLD1	missense	0.19
P1	5	80785097	G	A	SSBP2	missense	0.189
P1	19	17644465	C	T	FAM129C	stopgain	0.162
P1	19	49878115	G	A	DKKL1	missense	0.16
P1	17	4495740	G	A	SMTNL2	missense	0.158
P1	12	49448169	G	T	KMT2D	missense	0.154
P1	19	49878196	G	A	DKKL1	missense	0.154
P1	19	4324658	T	G	STAP2	missense	0.148
P1	19	43019171	T	C	CEACAM1	missense	0.133
P1	5	178578171	A	T	ADAMTS2	missense	0.129
P1	19	10398859	G	C	ICAM4	stoploss	0.122
P1	17	2203167	T	G	SMG6	missense	0.118
P1	19	10091320	T	A	COL5A3	splicing	0.118
P1	1	229772693	T	G	URB2	missense	0.114
P1	17	64961232	G	T	CACNG4	missense	0.111
P1	7	158494554	T	C	NCAPG2	missense	0.107
P1	17	7592168	C	G	WRAP53	missense	0.1
P1	X	78426988	T	C	GPR174	missense	0.093
P1	6	7329448	C	G	CAGE1	missense	0.092
P1	3	64580068	C	T	ADAMTS9	missense	0.089
P1	9	35662251	T	C	ARHGEF39	missense	0.089
P1	5	79029749	A	G	CMYA5	missense	0.085
P1	6	30995786	A	G	MUC22	missense	0.085
P2	9	27949023	G	C	LINGO2	missense	1
P2	16	71602101	G	T	TAT	missense	1
P2	3	19559555	C	G	KCNH8	missense	0.982

P2	17	10353861	C	A	MYH4	stopgain	0.964
P2	17	10353862	C	A	MYH4	missense	0.964
P2	4	2130939	C	G	POLN	missense	0.958
P2	19	10273377	G	C	DNMT1	missense	0.958
P2	X	3261761	C	G	MXRA5	missense	0.926
P2	1	57756698	G	A	DAB1	missense	0.917
P2	10	68139093	C	T	CTNNA3	missense	0.909
P2	X	140993452	G	T	MAGEC1	stopgain	0.905
P2	4	144620919	G	T	FREM3	missense	0.904
P2	18	22029820	G	T	IMPACT	missense	0.867
P2	1	231398557	A	G	GNPAT	missense	0.846
P2	5	140263375	G	A	PCDHA13	missense	0.821
P2	5	140175708	T	A	PCDHA2	missense	0.815
P2	12	43769928	C	A	ADAMTS20	missense	0.81
P2	16	74528729	T	A	GLG1	missense	0.808
P2	1	247875579	G	T	OR6F1	missense	0.807
P2	19	36896539	A	T	ZFP82	missense	0.8
P2	9	21971209	T	C	CDKN2A	splicing	0.788
P2	1	237791361	C	A	RYR2	missense	0.741
P2	5	140023490	C	A	TMCO6	missense	0.733
P2	2	179540701	A	C	TTN	missense	0.725
P2	1	180780606	A	T	XPR1	missense	0.708
P2	1	248128963	G	T	OR2AK2	missense	0.708
P2	2	179614685	C	A	TTN	missense	0.705
P2	7	92161866	A	T	RBM48	splicing	0.688
P2	3	8787342	T	C	CAV3	missense	0.686
P2	1	237947074	T	G	RYR2	stopgain	0.667
P2	9	140967938	A	T	CACNA1B	missense	0.667
P2	16	84922956	G	T	CRISPLD2	missense	0.667
P2	20	61981063	G	A	CHRNA4	missense	0.667
P2	20	62572332	C	A	UCKL1	stopgain	0.667
P2	11	22833534	G	T	GAS2	missense	0.655
P2	19	12541399	C	A	ZNF443	missense	0.65
P2	16	4714714	A	G	MGRN1	missense	0.646
P2	20	18523812	G	A	SEC23B	missense	0.63
P2	18	74627608	A	T	ZNF236	stopgain	0.625
P2	2	38301877	G	A	CYP1B1	missense	0.616
P2	6	10404861	G	T	TFAP2A	missense	0.615

P2	3	69097224	G	C	TMF1	missense	0.6
P2	7	147336378	C	A	CNTNAP2	stopgain	0.6
P2	2	50573890	G	T	NRXN1	missense	0.578
P2	8	146067558	C	A	ZNF7	missense	0.575
P2	7	110763817	T	A	LRRN3	missense	0.571
P2	19	23328724	T	A	ZNF730	missense	0.571
P2	8	118159312	C	T	SLC30A8	missense	0.56
P2	1	27098999	G	T	ARID1A	stopgain	0.558
P2	5	140810778	G	T	PCDHGA12	missense	0.541
P2	1	207881592	G	C	CR1L	missense	0.538
P2	5	61661070	G	T	KIF2A	stopgain	0.538
P2	12	40953091	G	T	MUC19	splicing	0.538
P2	18	30350500	G	C	KLHL14	missense	0.53
P2	14	103571385	A	T	EXOC3L4	missense	0.527
P2	18	19116062	G	A	ESCO1	missense	0.519
P2	8	66637071	G	T	PDE7A	missense	0.517
P2	10	31138913	A	G	ZNF438	missense	0.514
P2	19	46328431	G	C	SYMPK	missense	0.512
P2	3	135742006	G	T	PPP2R3A	missense	0.51
P2	12	89865472	T	C	POC1B	missense	0.509
P2	12	53823982	C	A	AMHR2	missense	0.508
P2	2	133402952	C	T	GPR39	missense	0.5
P2	5	138661885	A	C	MATR3	missense	0.5
P2	7	74482491	G	T	WBSCR16	missense	0.5
P2	7	142829304	C	T	PIP	missense	0.5
P2	12	58006719	A	G	ARHGEF25	missense	0.5
P2	12	53045775	C	T	KRT2	missense	0.475
P2	12	53045776	C	A	KRT2	missense	0.475
P2	1	146756147	G	A	CHD1L	missense	0.471
P2	12	54448714	G	C	HOXC4	missense	0.471
P2	8	80567209	C	A	STMN2	missense	0.458
P2	18	65178742	G	T	DSEL	missense	0.458
P2	X	32716063	C	G	DMD	missense	0.455
P2	17	62018228	A	G	SCN4A	missense	0.443
P2	12	129189938	G	T	TMEM132C	missense	0.439
P2	2	163253342	A	T	KCNH7	missense	0.438
P2	12	114793615	A	T	TBX5	missense	0.438
P2	16	3363113	C	A	ZNF75A	missense	0.438

P2	17	64731685	G	T	PRKCA	missense	0.438
P2	10	104678647	G	T	CNNM2	missense	0.437
P2	16	2570886	T	C	AMDHD2	missense	0.436
P2	2	3751544	G	T	DCDC2C	missense	0.435
P2	15	89860011	A	T	POLG	missense	0.435
P2	2	27259411	G	T	TMEM214	missense	0.429
P2	7	34094890	G	T	BMPER	missense	0.429
P2	19	12849468	C	A	ASNA1	missense	0.429
P2	22	30860856	C	A	SEC14L3	missense	0.429
P2	17	26820689	T	A	SLC13A2	missense	0.42
P2	6	116977901	C	A	ZUFSP	missense	0.417
P2	10	84118558	C	T	NRG3	missense	0.417
P2	5	180664649	G	T	GNB2L1	missense	0.414
P2	12	132514244	A	T	EP400	splicing	0.414
P2	15	91422674	G	T	FURIN	missense	0.411
P2	15	44855347	C	A	SPG11	missense	0.4
P2	7	31117611	C	A	ADCYAP1R1	missense	0.396
P2	X	105137836	G	T	NRK	missense	0.39
P2	12	20890103	G	T	SLCO1C1	missense	0.381
P2	6	168709140	G	T	DACT2	missense	0.368
P2	12	20890088	A	G	SLCO1C1	missense	0.368
P2	X	49454074	T	C	PAGE1	missense	0.366
P2	1	244581014	C	A	ADSS	missense	0.364
P2	14	36244925	G	C	RALGAPA1	missense	0.364
P2	15	43470898	A	G	TMEM62	missense	0.364
P2	14	71543029	C	G	PCNX	missense	0.36
P2	12	69250378	C	A	CPM	missense	0.358
P2	14	105851249	C	T	PACS2	missense	0.358
P2	22	32889215	C	T	FBXO7	missense	0.358
P2	16	68266543	C	A	ESRP2	missense	0.356
P2	7	151292519	C	G	PRKAG2	missense	0.348
P2	3	9594208	G	T	LHFPL4	missense	0.345
P2	22	19964234	T	C	ARVCF	missense	0.345
P2	16	27374076	A	T	IL4R	missense	0.342
P2	18	72167116	G	T	CNDP2	splicing	0.341
P2	1	231506315	C	A	EGLN1	missense	0.333
P2	10	104159337	G	C	NFKB2	missense	0.333
P2	11	76871228	T	A	MYO7A	missense	0.333

P2	20	33954411 T	C	UQCC1	missense	0.333
P2	19	6678434 A	G	C3	missense	0.31
P2	3	33099698 G	T	GLB1	missense	0.308
P2	9	38413354 C	A	IGFBPL1	splicing	0.304
P2	5	151202431 C	T	GLRA1	missense	0.3
P2	9	107367878 C	A	OR13C2	stopgain	0.297
P2	16	2569386 G	A	ATP6V0C	missense	0.288
P2	9	26906060 C	A	PLAA	missense	0.286
P2	10	73590984 T	C	PSAP	missense	0.283
P2	11	22384296 G	C	SLC17A6	missense	0.279
P2	17	65889510 G	T	BPTF	stopgain	0.278
P2	20	62843442 G	T	MYT1	missense	0.278
P2	7	27224247 T	A	HOXA11	missense	0.275
P2	1	43907956 C	A	SZT2	missense	0.271
P2	22	40081974 G	C	CACNA1I	missense	0.269
P2	12	116434846 C	A	MED13L	missense	0.265
P2	14	104145731 A	G	KLC1	missense	0.26
P2	15	45403725 C	A	DUOX2	missense	0.259
P2	3	38051477 G	A	PLCD1	missense	0.256
P2	13	28562707 T	A	URAD	missense	0.255
P2	2	103281557 A	T	SLC9A2	splicing	0.254
P2	17	79988533 A	G	LRRC45	missense	0.254
P2	7	150034207 G	T	LRRC61	missense	0.25
P2	9	139341455 C	A	SEC16A	missense	0.25
P2	11	58979413 G	A	MPEG1	missense	0.25
P2	11	60165377 C	A	MS4A14	missense	0.25
P2	14	81972444 G	T	SEL1L	missense	0.25
P2	20	44573603 T	C	PCIF1	missense	0.25
P2	19	2210791 C	A	DOT1L	missense	0.248
P2	1	35835969 A	T	ZMYM4	splicing	0.246
P2	19	56126728 G	A	ZNF865	missense	0.241
P2	10	121086082 T	C	GRK5	missense	0.24
P2	10	53458903 G	T	CSTF2T	missense	0.235
P2	11	27362351 C	A	CCDC34	stopgain	0.233
P2	11	1244376 G	A	MUC5B	missense	0.231
P2	16	52478250 C	A	TOX3	stopgain	0.231
P2	19	13934316 T	G	ZSWIM4	splicing	0.222
P2	7	53103845 G	T	POM121L12	missense	0.216

P2	2	71212425	C	A	ANKRD53	missense	0.214
P2	1	149907560	C	A	MTMR11	missense	0.211
P2	19	7688146	C	A	XAB2	missense	0.211
P2	1	204379261	C	A	PPP1R15B	missense	0.205
P2	1	155170761	T	A	THBS3	missense	0.2
P2	8	18258369	G	A	NAT2	missense	0.2
P2	9	34385776	G	T	C9orf24	missense	0.2
P2	13	33315249	T	C	PDS5B	missense	0.2
P2	19	53075559	C	T	ZNF701	missense	0.195
P2	1	151262415	G	T	ZNF687	missense	0.194
P2	2	11752655	C	A	GREB1	missense	0.193
P2	19	44223273	C	G	IRGC	missense	0.193
P2	1	201758879	G	T	NAV1	missense	0.192
P2	2	54080865	C	A	GPR75	missense	0.189
P2	16	30409926	A	G	ZNF48	missense	0.188
P2	2	141660599	C	A	LRP1B	missense	0.186
P2	2	102851383	G	A	IL1RL2	missense	0.185
P2	6	35108563	G	T	TCP11	missense	0.182
P2	7	142637639	C	T	C7orf34	missense	0.182
P2	7	142637640	C	T	C7orf34	missense	0.182
P2	11	59245740	C	A	OR4D10	missense	0.181
P2	10	100152821	C	A	PYROXD2	missense	0.179
P2	2	179455103	G	A	TTN	missense	0.175
P2	7	100680429	C	T	MUC17	missense	0.174
P2	11	82644444	C	A	C11orf82	missense	0.174
P2	1	232626700	C	A	SIPA1L2	stopgain	0.172
P2	1	249106382	T	C	SH3BP5L	missense	0.172
P2	2	107429627	C	G	ST6GAL2	missense	0.17
P2	17	55183515	C	A	AKAP1	missense	0.17
P2	14	60616907	T	A	DHRS7	splicing	0.169
P2	11	499825	T	C	RNH1	splicing	0.167
P2	12	21355466	G	T	SLCO1B1	stopgain	0.167
P2	16	2221313	C	A	TRAF7	missense	0.167
P2	19	35981260	C	A	KRTDAP	stopgain	0.167
P2	19	50099594	G	T	PRR12	missense	0.167
P2	X	102755190	C	A	RAB40A	missense	0.167
P2	15	78485971	G	T	ACSBG1	splicing	0.164
P2	7	111617188	T	C	DOCK4	missense	0.16

P2	11	117056876 G	A	SIDT2	missense	0.157
P2	9	131709088 G	C	DOLK	missense	0.156
P2	20	46256470 G	A	NCOA3	missense	0.154
P2	19	50183177 G	T	PRMT1	stopgain	0.152
P2	16	30100408 C	A	TBX6	missense	0.15
P2	16	30100409 T	G	TBX6	missense	0.15
P2	7	134632497 G	T	CALD1	missense	0.149
P2	10	44052472 A	C	ZNF239	missense	0.149
P2	9	139390801 G	C	NOTCH1	missense	0.148
P2	19	55604197 G	A	PPP1R12C	missense	0.148
P2	18	35065545 C	A	CELF4	missense	0.147
P2	3	197495444 C	A	FYTTD1	missense	0.145
P2	1	6512097 C	A	ESPN	missense	0.143
P2	1	26488110 C	A	FAM110D	missense	0.143
P2	14	73974967 C	G	HEATR4	missense	0.143
P2	16	1396292 G	A	BAIAP3	missense	0.143
P2	4	8239281 C	A	SH3TC1	missense	0.138
P2	22	39123264 G	A	GTPBP1	missense	0.136
P2	5	140482187 C	A	PCDHB3	missense	0.133
P2	11	92564950 C	A	FAT3	missense	0.133
P2	1	149895613 C	T	SF3B4	missense	0.131
P2	22	44074012 A	G	EFCAB6	missense	0.131
P2	11	66360309 T	C	CCDC87	missense	0.13
P2	X	153588015 C	T	FLNA	splicing	0.13
P2	11	125442350 C	A	EI24	splicing	0.128
P2	16	67241884 G	T	LRRC29	missense	0.128
P2	17	4713216 A	T	PLD2	missense	0.128
P2	6	31931457 C	T	SKIV2L	missense	0.127
P2	1	45671927 G	T	ZSWIM5	missense	0.125
P2	11	66461837 G	A	SPTBN2	splicing	0.125
P2	18	65180215 G	C	DSEL	missense	0.125
P2	19	32954343 A	G	DPY19L3	missense	0.125
P2	20	3732649 G	A	HSPA12B	missense	0.125
P2	11	1471817 G	T	BRSK2	missense	0.124
P2	2	238419431 C	A	MLPH	missense	0.123
P2	7	100490908 C	A	ACHE	stopgain	0.123
P2	14	64699971 C	A	ESR2	stopgain	0.123
P2	3	42705951 C	A	ZBTB47	missense	0.122

P2	X	114468292	C	T	LRCH2	missense	0.122
P2	9	99180101	G	A	ZNF367	missense	0.121
P2	1	33985489	G	T	CSMD2	missense	0.119
P2	5	133896493	T	C	JADE2	missense	0.119
P2	12	113909202	C	A	LHX5	missense	0.119
P2	11	35198196	G	T	CD44	stopgain	0.118
P2	X	47104189	G	T	USP11	missense	0.118
P2	8	61732627	G	A	CHD7	missense	0.117
P2	1	231830127	C	A	DISC1	stopgain	0.113
P2	19	11310991	C	A	DOCK6	missense	0.113
P2	3	182897280	C	A	MCF2L2	missense	0.109
P2	12	94641769	A	T	PLXNC1	stopgain	0.108
P2	13	103386918	C	A	CCDC168	missense	0.108
P2	14	64491855	T	C	SYNE2	missense	0.108
P2	19	11339668	C	A	DOCK6	missense	0.107
P2	2	179399791	T	C	TTN	missense	0.106
P2	15	69327843	C	A	NOX5	missense	0.106
P2	17	61574348	T	C	ACE	splicing	0.106
P2	10	100017750	G	A	LOXL4	missense	0.105
P2	11	134131047	G	A	ACAD8	missense	0.105
P2	15	90347829	G	C	ANPEP	missense	0.105
P2	16	1395890	A	G	BAIAP3	missense	0.105
P2	1	249142626	C	A	ZNF672	missense	0.104
P2	11	123810490	A	C	OR4D5	missense	0.104
P2	17	53844720	G	T	PCTP	missense	0.104
P2	2	220312919	G	A	SPEG	missense	0.103
P2	8	109226947	T	A	EIF3E	splicing	0.103
P2	11	126147430	G	A	FOXRED1	missense	0.103
P2	20	60640825	G	T	TAF4	missense	0.103
P2	17	15848605	C	A	ADORA2B	missense	0.101
P2	3	48698335	C	A	CELSR3	missense	0.1
P2	6	159204585	G	A	EZR	missense	0.1
P2	19	4229605	G	A	EBI3	missense	0.1
P2	19	58355669	A	G	ZNF587B	missense	0.099
P2	9	139925552	G	C	FUT7	missense	0.098
P2	12	50744605	G	A	FAM186A	stopgain	0.098
P2	19	42752760	C	T	ERF	missense	0.098
P2	20	44539831	G	T	PLTP	missense	0.097

P2	12	2933013 T	C	ITFG2	missense	0.096
P2	19	1487277 T	C	PCSK4	missense	0.096
P2	2	238672229 G	A	LRRFIP1	missense	0.095
P2	15	41804121 C	A	LTK	missense	0.095
P2	19	51483042 A	T	KLK7	splicing	0.095
P2	22	39178691 G	T	DNAL4	missense	0.095
P2	3	169513295 T	C	LRRC34	missense	0.093
P2	16	87417045 G	T	FBXO31	missense	0.093
P2	17	72365627 T	A	GPR142	missense	0.093
P2	18	32843982 C	T	ZSCAN30	missense	0.093
P2	19	52131224 G	T	SIGLEC5	missense	0.093
P2	3	122869103 G	A	PDIA5	missense	0.092
P2	6	168430272 T	A	KIF25	missense	0.092
P2	7	86542273 C	T	KIAA1324L	missense	0.091
P2	16	30747707 G	A	SRCAP	missense	0.091
P2	2	179448567 G	T	TTN	missense	0.089
P2	19	4028959 C	A	PIAS4	missense	0.089
P2	20	61919205 T	A	ARFGAP1	missense	0.089
P2	X	70444377 G	A	GJB1	missense	0.089
P2	6	34003531 G	C	GRM4	missense	0.086
P2	3	9781349 G	T	BRPF1	missense	0.085
P2	5	141694072 C	T	SPRY4	missense	0.085
P2	18	52556498 G	T	RAB27B	stopgain	0.085
P2	19	36435510 C	A	LRFN3	stopgain	0.085
P2	19	36224082 T	A	KMT2B	missense	0.084
P2	5	121187815 G	T	FTMT	missense	0.083
P2	7	150656798 C	A	KCNH2	missense	0.083
P2	22	20759990 G	T	ZNF74	missense	0.083
P2	2	25966871 C	T	ASXL2	missense	0.082
P2	3	126915571 C	T	C3orf56	missense	0.082
P2	10	96022445 C	T	PLCE1	stopgain	0.082
P2	11	64938826 G	T	SPDYC	stopgain	0.082
P2	12	5155141 G	T	KCNA5	stopgain	0.082
P2	15	93595342 C	G	RGMA	missense	0.082
P2	17	37933933 C	T	IKZF3	missense	0.082
P2	17	80050596 C	T	FASN	missense	0.082
P2	13	39598692 C	A	PROSER1	missense	0.081
P2	16	601565 C	A	CAPN15	missense	0.081

P2	17	7918085	G	T	GUCY2D	splicing	0.081
P2	20	62193452	G	T	HELZ2	missense	0.081
P2	X	153129897	C	T	L1CAM	missense	0.081
P3	5	127597503	G	T	FBN2	stopgain	0.87
P3	Y	24052528	A	T	RBMY1E,RBMY1D,RBMY1B	missense	0.733
P3	5	88056876	G	T	MEF2C	missense	0.717
P3	5	88056875	G	T	MEF2C	missense	0.705
P3	12	121678545	C	A	CAMKK2	missense	0.696
P3	4	80328658	C	A	GK2	missense	0.689
P3	5	94882848	T	C	TTC37	missense	0.658
P3	6	160961177	G	T	LPA	missense	0.596
P3	10	26414381	A	G	MYO3A	missense	0.558
P3	X	64709063	G	A	ZC3H12B	missense	0.535
P3	6	33372999	G	T	KIFC1	missense	0.525
P3	11	5730609	A	T	TRIM22	missense	0.516
P3	6	167754427	C	G	TTL2	missense	0.483
P3	6	139498126	A	T	HECA	missense	0.482
P3	15	90631824	C	T	IDH2	missense	0.48
P3	13	51915327	G	T	SERPINE3	missense	0.477
P3	3	142089368	C	A	XRN1	missense	0.463
P3	10	28276471	C	T	ARMC4	missense	0.463
P3	4	111542372	G	T	PITX2	missense	0.462
P3	2	71576133	C	A	ZNF638	missense	0.458
P3	11	57885980	T	G	OR9I1	missense	0.451
P3	12	108603971	A	T	WSCD2	missense	0.447
P3	5	176024386	C	T	GPRIN1	missense	0.438
P3	19	52825164	C	T	ZNF480	missense	0.423
P3	1	31896615	C	T	SERINC2	missense	0.412
P3	14	20296309	C	G	OR4N2	missense	0.41
P3	19	51563863	C	G	KLK13	missense	0.393
P3	4	121957720	C	G	NDNF	missense	0.39
P3	8	106814943	C	T	ZFPM2	missense	0.389
P3	7	37780296	C	A	GPR141	missense	0.383
P3	1	76199310	G	T	ACADM	missense	0.378
P3	7	34118759	G	T	BMPER	missense	0.373
P3	2	152476108	C	A	NEB	missense	0.368
P3	19	15079287	G	A	SLC1A6	missense	0.365
P3	19	17392697	G	T	ANKLE1	missense	0.355

P3	19	52327045	T	A	FPR3	missense	0.342
P3	5	39341715	T	A	C9	missense	0.327
P3	3	20027112	T	G	PP2D1	missense	0.325
P3	7	87165770	G	A	ABCB1	splicing	0.316
P3	8	141551324	C	A	AGO2	missense	0.315
P3	11	118627894	C	A	DDX6	missense	0.313
P3	X	135572378	T	C	BRS3	missense	0.302
P3	8	110980765	A	G	KCNV1	missense	0.291
P3	19	57642159	G	T	USP29	missense	0.289
P3	18	29867305	C	A	GAREM	missense	0.286
P3	9	122011336	C	A	BRINP1	missense	0.282
P3	10	67680176	G	T	CTNNA3	missense	0.281
P3	13	39447012	A	T	FREM2	missense	0.279
P3	22	40058003	G	T	CACNA1I	missense	0.273
P3	7	127954945	C	A	RBM28	missense	0.272
P3	15	28947136	G	T	GOLGA8M	missense	0.271
P3	6	24654675	T	A	TDP2	missense	0.258
P3	11	11987471	C	T	DKK3	missense	0.255
P3	6	3259430	C	A	PSMG4	stopgain	0.254
P3	17	72368660	C	T	GPR142	missense	0.25
P3	6	70993506	C	A	COL9A1	missense	0.24
P3	12	130890749	A	C	RIMBP2	missense	0.239
P3	2	18741477	G	C	RDH14	missense	0.238
P3	4	128584729	C	T	INTU	missense	0.229
P3	6	117638326	G	A	ROS1	missense	0.227
P3	19	57328771	C	A	PEG3	missense	0.223
P3	11	101833585	G	A	KIAA1377	missense	0.221
P3	11	58189977	A	G	OR5B2	missense	0.218
P3	2	5833428	G	T	SOX11	missense	0.216
P3	7	7678778	A	G	RPA3	splicing	0.208
P3	14	20917415	T	G	OSGEP	missense	0.204
P3	11	55322174	C	A	OR4C15	missense	0.202
P3	9	34405926	C	G	FAM219A	missense	0.2
P3	20	62597501	T	C	ZNF512B	missense	0.19
P3	2	141459762	C	A	LRP1B	missense	0.188
P3	2	201726497	C	A	CLK1	missense	0.188
P3	11	128680503	A	G	FLI1	missense	0.186
P3	11	68773249	G	T	MRGPRF	missense	0.184

P3	22	26423609	G	T	MYO18B	missense	0.184
P3	8	42045071	G	T	PLAT	stopgain	0.182
P3	2	96688961	G	A	GPAT2	missense	0.18
P3	6	138753261	T	C	NHSL1	missense	0.171
P3	16	72827761	G	C	ZFHX3	missense	0.171
P3	1	16272798	G	T	ZBTB17	missense	0.167
P3	19	41089316	C	A	SHKBP1	missense	0.167
P3	19	54967985	G	A	LENG8	missense	0.167
P3	X	139866483	C	A	CDR1	stopgain	0.163
P3	9	103108419	G	T	TEX10	missense	0.16
P3	16	89753141	G	T	CDK10	missense	0.16
P3	1	220253185	C	A	BPNT1	missense	0.158
P3	3	169485672	C	T	ACTRT3	missense	0.158
P3	9	99700764	C	T	NUTM2G	missense	0.158
P3	5	58295336	C	A	PDE4D	missense	0.154
P3	16	67267649	G	T	FHOD1	missense	0.154
P3	10	113924315	C	A	GPAM	missense	0.153
P3	8	6479077	G	T	MCPH1	missense	0.152
P3	10	99126293	C	A	RRP12	missense	0.149
P3	19	3977282	C	A	EEF2	stopgain	0.148
P3	1	220253186	C	T	BPNT1	missense	0.145
P3	2	11351969	A	G	ROCK2	splicing	0.143
P3	8	144407589	G	A	TOP1MT	missense	0.143
P3	19	43258484	C	A	PSG8	missense	0.143
P3	2	109237845	C	T	LIMS1	missense	0.14
P3	4	187130268	G	T	CYP4V2	missense	0.14
P3	3	180372712	T	A	CCDC39	missense	0.139
P3	9	136226921	C	A	SURF2	missense	0.139
P3	2	128387379	C	A	MYO7B	missense	0.138
P3	5	140056318	G	T	HARS	missense	0.136
P3	1	153635707	G	T	ILF2	missense	0.135
P3	2	234704940	G	T	MROH2A	missense	0.135
P3	7	142460726	C	A	PRSS1	missense	0.134
P3	11	117869473	C	A	IL10RA	missense	0.133
P3	3	38766760	G	T	SCN10A	missense	0.132
P3	21	40181990	A	T	ETS2	missense	0.132
P3	19	18561368	C	T	ELL	missense	0.131
P3	7	150217224	G	T	GIMAP7	missense	0.13

P3	15	81282116	C	A	MESDC2	missense	0.13
P3	11	27363082	C	A	CCDC34	stopgain	0.129
P3	5	176778602	C	G	LMAN2	missense	0.128
P3	6	153078237	G	T	VIP	missense	0.127
P3	12	54765467	C	A	ZNF385A	stopgain	0.127
P3	15	58001109	C	T	POLR2M,GCOM1	missense	0.127
P3	15	42105867	G	T	MAPKBP1	missense	0.125
P3	8	41790178	G	T	KAT6A	missense	0.124
P3	2	97353569	G	T	FER1L5	missense	0.122
P3	2	220354087	C	A	SPEG	missense	0.122
P3	3	14206988	C	T	XPC	missense	0.122
P3	8	27303365	C	A	PTK2B	missense	0.122
P3	15	43028236	C	T	CDAN1	missense	0.122
P3	22	21065041	G	A	PI4KA	missense	0.122
P3	1	247267248	G	T	ZNF669	missense	0.121
P3	12	6729594	C	A	LPAR5	missense	0.121
P3	12	122217483	C	T	RHOF	missense	0.121
P3	16	77228267	C	A	MON1B	missense	0.121
P3	2	179552837	C	A	TTN	splicing	0.12
P3	12	129360562	G	T	GLT1D1	missense	0.12
P3	10	115451825	C	A	CASP7	missense	0.119
P3	1	11579504	G	C	PTCHD2	missense	0.118
P3	13	50589831	C	A	KCNRG	missense	0.118
P3	10	103916984	G	T	NOLC1	missense	0.116
P3	19	49518397	G	A	RUVBL2	missense	0.116
P3	19	55880249	C	A	IL11	missense	0.116
P3	4	110687962	C	A	CFI	stopgain	0.114
P3	15	83502065	A	C	WHAMM	missense	0.114
P3	10	29747448	G	T	SVIL	missense	0.113
P3	11	294643	G	T	ATHL1	missense	0.113
P3	11	64896071	C	A	SYVN1	missense	0.113
P3	15	83502066	C	G	WHAMM	missense	0.113
P3	7	47852816	G	T	PKD1L1	missense	0.112
P3	12	113633582	C	A	IQCD	missense	0.111
P3	X	56310880	C	T	KLF8	missense	0.111
P3	10	79595508	C	T	DLG5	missense	0.109
P3	16	28497925	G	T	CLN3	missense	0.109
P3	19	17728573	G	T	UNC13A	stopgain	0.109

P3	8	146003495	G	A	ZNF34	missense	0.108
P3	1	178427187	G	T	RASAL2	missense	0.107
P3	3	154002739	C	A	DHX36	missense	0.107
P3	15	22369053	G	T	LOC727924,LOC101927079,OR4	missense	0.107
P3	6	31133854	G	T	POU5F1	missense	0.105
P3	15	42164560	C	T	SPTBN5	missense	0.105
P3	3	51475791	C	A	VPRBP	missense	0.104
P3	4	129782960	C	A	JADE1	missense	0.104
P3	6	116574663	C	A	TSPYL4	missense	0.104
P3	7	103179707	C	A	RELN	missense	0.103
P3	14	59945965	A	G	L3HYPDH	missense	0.103
P3	19	40901021	G	A	PRX	missense	0.103
P3	X	118968953	C	T	UPF3B	missense	0.103
P3	1	172357799	C	A	DNM3	missense	0.102
P3	10	121411220	G	T	BAG3	missense	0.102
P3	11	5776197	G	T	OR52N4	missense	0.102
P3	X	133627547	G	T	HPRT1	missense	0.102
P3	14	24627405	G	T	RNF31	stopgain	0.101
P3	7	100240941	G	T	ACTL6B	missense	0.1
P3	15	100211595	C	A	MEF2A	missense	0.098
P3	16	58076243	C	T	MMP15	missense	0.098
P3	19	10077060	G	T	COL5A3	stopgain	0.098
P3	17	76182899	C	A	TK1	missense	0.097
P3	1	161144877	C	A	B4GALT3	missense	0.096
P3	3	111604075	C	G	PHLDB2	missense	0.096
P3	4	1389468	C	A	CRIPAK	missense	0.096
P3	10	1170262	C	A	WDR37	missense	0.096
P3	1	186646783	C	A	PTGS2	missense	0.095
P3	5	63665546	G	T	RNF180	missense	0.095
P3	5	63802619	G	T	RGS7BP	splicing	0.095
P3	8	101717220	C	T	PABPC1	missense	0.095
P3	10	90429618	C	A	LIPF	missense	0.094
P3	11	63681782	C	T	RCOR2	missense	0.094
P3	1	6007196	C	A	NPHP4	missense	0.093
P3	2	207564450	C	T	DYTN	splicing	0.093
P3	7	149462672	G	A	ZNF467	missense	0.093
P3	9	90537344	C	A	SPATA31C1	missense	0.093
P3	17	80059685	G	T	CCDC57	missense	0.093

P3	19	11537743	G	T	CCDC151	missense	0.093
P3	6	33170701	G	T	SLC39A7	missense	0.092
P3	11	65733827	C	G	SART1	missense	0.092
P3	17	66928656	C	A	ABCA8	splicing	0.092
P3	5	66462008	C	A	MAST4	missense	0.091
P3	9	116832011	C	G	AMBP	missense	0.091
P3	10	45799821	C	A	OR13A1	missense	0.091
P3	12	48375575	C	A	COL2A1	missense	0.091
P3	1	228463697	G	C	OBSCN	missense	0.09
P3	3	28373410	G	A	AZI2	missense	0.09
P3	9	102992093	C	A	INVS	missense	0.09
P3	16	1248662	G	T	CACNA1H	missense	0.09
P3	17	41341684	C	A	NBR1	missense	0.089
P3	19	7584223	A	G	ZNF358	missense	0.089
P3	5	11098778	G	T	CTNND2	missense	0.088
P3	15	42984511	G	T	STARD9	missense	0.088
P3	19	42736247	G	T	GSK3A	missense	0.088
P3	19	15905287	C	A	OR10H5	stopgain	0.087
P3	22	21800942	G	T	HIC2	missense	0.087
P3	4	52777344	C	T	DCUN1D4	splicing	0.086
P3	X	147919202	C	G	AFF2	missense	0.086
P3	1	10713692	G	A	CASZ1	missense	0.085
P3	1	46751477	G	T	LRRC41	missense	0.085
P3	2	206614492	C	A	NRP2	missense	0.085
P3	10	121689221	G	T	SEC23IP	missense	0.085
P3	6	43152384	G	T	CUL9	missense	0.084
P3	9	35403218	C	A	UNC13B	missense	0.084
P3	Y	16831365	G	T	NLGN4Y	missense	0.084
P3	6	32267714	C	A	C6orf10	splicing	0.083
P3	11	247295	G	T	PSMD13	stopgain	0.083
P3	11	14989369	C	A	CALCA	missense	0.083
P3	18	47810350	G	A	CXXC1	missense	0.083
P3	2	238680767	G	T	LRRFIP1	missense	0.082
P3	6	119136775	G	T	MCM9	missense	0.082
P3	11	4661722	C	G	OR51D1	missense	0.082
P3	15	64067257	C	A	HERC1	missense	0.082
P3	17	76212078	A	C	BIRC5	missense	0.082
P3	19	10782069	G	A	ILF3	missense	0.082

P3	19	11606875	A	G	ZNF653	missense	0.082
P3	2	189872819	C	A	COL3A1	missense	0.081
P3	3	44945399	C	A	TGM4	missense	0.081
P3	7	44802938	G	A	ZMIZ2	missense	0.081
P3	10	76993986	G	T	COMTD1	splicing	0.081
P3	11	65786358	G	A	CATSPER1	missense	0.081
P3	17	76490241	G	T	DNAH17	missense	0.081
P4	X	125685627	G	A	DCAF12L1	missense	0.375
P4	X	78011477	T	C	LPAR4	stoploss	0.333
P4	X	114424992	G	T	RBMXL3	stopgain	0.333
P4	X	47918722	G	C	ZNF630	missense	0.324
P4	X	135428803	A	T	GPR112	missense	0.294
P4	X	17818566	C	G	RAI2	missense	0.272
P4	X	154011768	C	G	MPP1	missense	0.264
P4	1	157557090	G	T	FCRL4	missense	0.263
P4	19	17370755	C	A	USHBP1	missense	0.263
P4	1	220863970	G	C	C1orf115	missense	0.256
P4	X	82763615	C	T	POU3F4	missense	0.254
P4	2	128477016	C	A	WDR33	missense	0.246
P4	9	21974780	A	T	CDKN2A	missense	0.239
P4	2	152397291	T	A	NEB	stopgain	0.238
P4	14	63246577	C	A	KCNH5	missense	0.228
P4	2	32614012	G	A	BIRC6	splicing	0.227
P4	14	62547877	C	T	SYT16	missense	0.222
P4	X	132161318	G	C	USP26	missense	0.222
P4	6	32065139	C	A	TNXB	missense	0.221
P4	X	140984712	A	T	MAGEC3	missense	0.216
P4	15	72190370	T	C	MYO9A	missense	0.215
P4	2	179590628	G	T	TTN	stopgain	0.214
P4	17	42337808	C	A	SLC4A1	missense	0.213
P4	1	62739453	C	A	KANK4	missense	0.212
P4	17	72350664	G	A	KIF19	missense	0.212
P4	10	104590724	G	T	CYP17A1	missense	0.211
P4	2	21226031	T	A	APOB	missense	0.21
P4	2	176829257	C	A	KIAA1715	missense	0.21
P4	2	192711573	T	A	SDPR	missense	0.21
P4	19	2078400	C	A	MOB3A	missense	0.209
P4	2	3595576	T	C	RNASEH1	missense	0.208

P4	19	54409668 G	T	PRKCG	missense	0.204
P4	5	170239221 C	A	GABRP	missense	0.203
P4	2	242814055 G	C	CXXC11	missense	0.2
P4	12	118517258 C	A	VSIG10	missense	0.2
P4	18	8718552 A	T	SOGA2	missense	0.2
P4	19	10406265 G	A	ICAM5	missense	0.2
P4	7	156469117 T	C	RNF32	missense	0.198
P4	2	179455430 T	A	TTN	missense	0.197
P4	8	145577640 T	A	TMEM249	missense	0.196
P4	4	111398196 C	A	ENPEP	missense	0.194
P4	X	48674335 G	A	HDAC6	missense	0.194
P4	2	54131223 A	G	PSME4	missense	0.193
P4	2	179436865 G	T	TTN	missense	0.191
P4	14	104219518 C	G	PPP1R13B	missense	0.191
P4	13	103249407 G	A	TPP2	missense	0.19
P4	12	57618776 G	T	NXPH4	missense	0.189
P4	17	48243424 C	T	SGCA	missense	0.188
P4	2	179412135 A	T	TTN	missense	0.186
P4	3	43097745 C	T	FAM198A	missense	0.185
P4	X	134992248 G	A	SAGE1	missense	0.185
P4	21	34634883 G	T	IFNAR2	missense	0.182
P4	12	131605388 G	T	GPR133	splicing	0.181
P4	17	40330149 C	A	KCNH4	missense	0.181
P4	2	1320089 G	T	SNTG2	missense	0.179
P4	5	55252064 C	A	IL6ST	splicing	0.179
P4	16	904542 C	A	LMF1	missense	0.179
P4	1	179526186 C	A	NPHS2	missense	0.178
P4	20	7875866 C	T	HAO1	missense	0.176
P4	19	56599685 C	A	ZNF787	missense	0.175
P4	5	141693992 G	C	SPRY4	missense	0.173
P4	21	43411500 G	T	ZBTB21	missense	0.173
P4	3	49698764 G	T	BSN	missense	0.171
P4	3	195505829 G	A	MUC4	missense	0.171
P4	6	132643976 C	A	MOXD1	missense	0.171
P4	9	130829073 C	T	NAIF1	missense	0.17
P4	2	74867335 C	G	M1AP	missense	0.169
P4	2	164466229 G	A	FIGN	missense	0.169
P4	2	170863624 A	T	UBR3	missense	0.169

P4	5	55809696	G	T	LOC101928448	missense	0.169
P4	12	54349188	G	T	HOXC12	missense	0.169
P4	9	101797366	T	A	COL15A1	missense	0.168
P4	12	26749887	T	C	ITPR2	missense	0.168
P4	12	8906593	G	T	RIMKLB	stopgain	0.167
P4	19	45815072	C	G	CKM	missense	0.167
P4	1	186327683	A	G	TPR	missense	0.166
P4	19	44377895	T	C	ZNF404	missense	0.165
P4	1	26369041	T	C	SLC30A2	missense	0.164
P4	7	142836275	C	A	PIP	stopgain	0.164
P4	8	124138386	A	T	TBC1D31	missense	0.164
P4	4	73149047	C	A	ADAMTS3	missense	0.163
P4	5	24511625	T	A	CDH10	splicing	0.163
P4	7	103038403	T	A	SLC26A5	missense	0.162
P4	9	139358924	G	A	SEC16A	missense	0.162
P4	17	10359873	C	T	MYH4	splicing	0.161
P4	3	124748215	T	A	HEG1	missense	0.16
P4	6	66042287	G	C	EYS	missense	0.16
P4	14	20848590	C	A	TEP1	missense	0.16
P4	2	210791636	C	A	UNC80	missense	0.159
P4	8	95504959	G	A	KIAA1429	missense	0.159
P4	19	39899117	C	G	ZFP36	missense	0.159
P4	5	40976935	G	A	C7	missense	0.157
P4	10	63170359	C	A	TMEM26	missense	0.157
P4	17	40817543	A	G	TUBG2	missense	0.157
P4	3	28454562	G	T	ZCWPW2	missense	0.156
P4	7	50467841	C	T	IKZF1	missense	0.155
P4	3	49899817	G	T	CAMKV	missense	0.154
P4	16	20559766	C	A	ACSM2B	missense	0.154
P4	3	98073458	G	C	OR5K4	missense	0.152
P4	5	140915627	A	G	DIAPH1	missense	0.152
P4	14	51444072	C	A	TRIM9	splicing	0.151
P4	5	81548378	C	G	ATG10	splicing	0.15
P4	2	21233594	G	A	APOB	missense	0.149
P4	2	69298895	C	A	ANTXR1	missense	0.149
P4	2	21236277	T	A	APOB	missense	0.148
P4	7	82997325	C	A	SEMA3E	missense	0.148
P4	19	16630960	G	A	CHERP	missense	0.148

P4	10	71010389 G	T	HKDC1	missense	0.147
P4	12	104995723 G	T	CHST11	missense	0.147
P4	16	8890363 G	T	TMEM186	missense	0.147
P4	3	48626351 C	T	COL7A1	missense	0.146
P4	19	6735687 T	G	GPR108	missense	0.146
P4	1	197073763 C	A	ASPM	missense	0.145
P4	2	179582777 G	A	TTN	missense	0.145
P4	12	58112157 G	T	OS9	stopgain	0.145
P4	12	121093947 G	C	CABP1	missense	0.145
P4	20	17928219 C	A	SNX5	missense	0.145
P4	X	18779691 C	G	PPEF1	stopgain	0.145
P4	1	79387388 A	T	ELTD1	stopgain	0.144
P4	3	183824021 C	A	HTR3E	missense	0.144
P4	4	102117094 C	A	PPP3CA	missense	0.144
P4	7	107194733 C	T	COG5	missense	0.144
P4	12	9333680 G	T	PZP	missense	0.144
P4	2	108881411 C	G	SULT1C3	missense	0.143
P4	3	134968233 G	A	EPHB1	missense	0.143
P4	4	79353711 G	T	FRAS1	missense	0.143
P4	17	35836906 G	T	TADA2A	missense	0.143
P4	16	28847579 G	T	ATXN2L	missense	0.142
P4	4	114179501 C	A	ANK2	missense	0.14
P4	7	26678782 G	T	C7orf71	missense	0.14
P4	19	58455429 C	A	ZNF256	splicing	0.14
P4	5	169310815 G	C	FAM196B	missense	0.139
P4	9	115941082 C	A	FKBP15	splicing	0.139
P4	1	175323555 G	T	TNR	missense	0.137
P4	6	32017971 C	A	TNXB	missense	0.137
P4	9	107457732 T	A	OR13D1	missense	0.137
P4	14	31598297 A	G	HECTD1	missense	0.137
P4	16	28847578 G	T	ATXN2L	missense	0.137
P4	1	44083182 C	T	PTPRF	missense	0.136
P4	4	114280153 C	A	ANK2	missense	0.136
P4	6	133827283 G	A	EYA4	missense	0.136
P4	7	82997324 C	A	SEMA3E	missense	0.136
P4	19	12383307 T	C	ZNF44	missense	0.136
P4	8	139839024 C	G	COL22A1	missense	0.135
P4	13	23912470 C	T	SACS	missense	0.135

P4	4	101947157	G	T	PPP3CA	missense	0.134
P4	19	57803236	A	G	ZNF460	missense	0.134
P4	14	32319373	A	T	NUBPL	missense	0.133
P4	5	1420743	C	T	SLC6A3	missense	0.132
P4	3	130287026	A	G	COL6A6	missense	0.131
P4	1	150525650	C	T	ADAMTSL4	missense	0.129
P4	2	186673571	C	A	FSIP2	missense	0.129
P4	5	89971103	C	A	GPR98	missense	0.129
P4	11	94759176	G	C	KDM4E	missense	0.129
P4	18	48723066	C	G	MEX3C	missense	0.129
P4	22	39176982	C	A	DNAL4	missense	0.129
P4	4	115997215	C	A	NDST4	missense	0.128
P4	1	66102467	G	T	LEPR	missense	0.127
P4	10	63195999	G	T	TMEM26	missense	0.127
P4	12	8612189	A	G	CLEC6A	splicing	0.126
P4	20	44588926	C	A	ZNF335	missense	0.126
P4	2	219893108	C	A	CCDC108	missense	0.125
P4	3	164764675	C	T	SI	stopgain	0.125
P4	19	2249596	A	G	AMH	missense	0.125
P4	5	13751184	C	A	DNAH5	splicing	0.124
P4	17	41062957	C	T	G6PC	missense	0.124
P4	6	29364592	G	A	OR12D2	missense	0.122
P4	6	102069820	C	G	GRIK2	splicing	0.122
P4	8	91937824	C	G	NECAB1	missense	0.122
P4	20	62597524	C	A	ZNF512B	missense	0.122
P4	6	152651158	C	A	SYNE1	missense	0.121
P4	17	74073460	C	A	GALR2	missense	0.121
P4	6	29323678	C	T	OR5V1	missense	0.12
P4	6	138196843	G	T	TNFAIP3	missense	0.12
P4	3	98251665	T	G	GPR15	missense	0.119
P4	7	158695178	C	A	WDR60	missense	0.119
P4	9	112005908	G	T	EPB41L4B	missense	0.119
P4	16	24580323	G	T	RBBP6	missense	0.118
P4	16	67684015	C	T	RLTPR	missense	0.118
P4	22	39482374	G	T	APOBEC3G	missense	0.118
P4	11	5067775	G	T	OR52J3	missense	0.117
P4	13	58207879	G	T	PCDH17	missense	0.117
P4	11	73076586	C	T	ARHGEF17	missense	0.116

P4	2	234628242	G	T	UGT1A4	missense	0.115
P4	10	125447646	C	A	GPR26	missense	0.115
P4	1	78034124	T	A	ZZZ3	missense	0.114
P4	1	155172652	C	T	THBS3	missense	0.114
P4	1	182841590	C	T	DHX9	missense	0.114
P4	3	1414588	G	T	CNTN6	missense	0.114
P4	5	9202278	C	A	SEMA5A	missense	0.114
P4	6	111672966	C	G	REV3L	missense	0.114
P4	21	45711071	C	T	AIRE	missense	0.114
P4	5	79945871	G	A	MTRNR2L2	missense	0.113
P4	5	143586867	G	A	KCTD16	missense	0.113
P4	6	36298001	C	T	C6orf222	missense	0.113
P4	6	152768646	C	A	SYNE1	stopgain	0.113
P4	8	24259537	A	T	ADAMDEC1	missense	0.113
P4	17	7357826	T	G	CHRNB1	missense	0.113
P4	1	75862291	G	A	SLC44A5	missense	0.111
P4	8	90802450	G	T	RIPK2	missense	0.111
P4	9	27017051	G	T	IFT74	splicing	0.111
P4	11	17438476	C	T	ABCC8	splicing	0.111
P4	16	2278477	G	A	E4F1	missense	0.111
P4	5	140564388	G	A	PCDHB16	missense	0.11
P4	6	110098224	A	T	FIG4	missense	0.11
P4	9	107513294	C	T	NIPSNAP3A	missense	0.11
P4	11	123847548	C	A	OR10S1	missense	0.11
P4	14	33292965	G	T	AKAP6	missense	0.11
P4	2	186656208	G	A	FSIP2	missense	0.109
P4	5	21752099	G	T	CDH12	missense	0.109
P4	6	46190962	C	A	RCAN2	missense	0.109
P4	6	160431743	A	T	IGF2R	missense	0.109
P4	X	19369445	A	C	PDHA1	missense	0.109
P4	11	6023510	G	T	OR56A4	missense	0.107
P4	11	55606597	C	A	OR5D16	missense	0.106
P4	6	132643859	G	A	MOXD1	stopgain	0.105
P4	11	47644320	C	T	MTCH2	missense	0.105
P4	1	111147335	C	T	KCNA2	missense	0.104
P4	2	119751983	G	A	MARCO	missense	0.104
P4	10	82264535	G	A	TSPAN14	splicing	0.104
P4	17	45234343	T	G	CDC27	missense	0.104

P4	1	196288612	A	G	KCNT2	splicing	0.103
P4	4	71889373	G	T	DCK	missense	0.103
P4	7	127894748	G	T	LEP	missense	0.103
P4	8	105456647	C	G	DPYS	missense	0.103
P4	9	96214846	A	G	FAM120AOS	missense	0.103
P4	19	59068097	G	C	UBE2M	missense	0.103
P4	6	35471532	C	G	TULP1	missense	0.102
P4	7	94539941	G	T	PPP1R9A	missense	0.102
P4	12	109604776	G	T	ACACB	missense	0.102
P4	11	93778916	C	A	HEPHL1	missense	0.101
P4	X	53634512	G	C	HUWE1	missense	0.101
P4	6	155450723	G	C	TIAM2	missense	0.1
P4	9	37740723	C	G	FRMPD1	missense	0.1
P4	9	116346655	G	A	RGS3	missense	0.1
P4	12	85257381	C	A	SLC6A15	splicing	0.1
P4	16	723526	G	T	RHOT2	missense	0.1
P4	17	45234360	A	C	CDC27	stopgain	0.1
P4	22	22842187	C	T	ZNF280B	missense	0.1
P4	1	117297274	C	A	CD2	missense	0.099
P4	1	176175826	C	G	RFWD2	missense	0.098
P4	3	74351839	A	T	CNTN3	splicing	0.098
P4	3	142243040	T	A	ATR	missense	0.098
P4	4	70802172	A	T	CSN1S1	splicing	0.098
P4	17	7577541	T	A	TP53	missense	0.098
P4	19	51133376	C	A	SYT3	missense	0.098
P4	1	152058786	C	T	TCHHL1	missense	0.097
P4	3	107096583	C	G	CCDC54	missense	0.097
P4	12	80663902	T	A	OTOGL	missense	0.097
P4	2	211473189	T	A	CPS1	missense	0.096
P4	8	80567271	G	T	STMN2	missense	0.096
P4	11	58034708	G	A	OR10W1	missense	0.096
P4	1	233225841	C	G	PCNXL2	missense	0.095
P4	3	154857987	C	T	MME	missense	0.095
P4	7	117864990	G	T	ANKRD7	missense	0.095
P4	7	129919438	A	G	CPA2	missense	0.095
P4	8	113275980	G	T	CSMD3	missense	0.095
P4	9	2039826	C	A	SMARCA2	missense	0.095
P4	14	32561694	G	T	ARHGAP5	missense	0.095

P4	21	18976514	G	A	BTG3	missense	0.095
P4	5	169310157	G	T	FAM196B	missense	0.094
P4	8	26366164	C	A	PNMA2	missense	0.094
P4	19	42720857	G	C	DEDD2	missense	0.094
P4	4	81967450	G	A	BMP3	missense	0.093
P4	4	114274446	G	A	ANK2	missense	0.093
P4	11	5968666	G	T	OR56A3	missense	0.093
P4	5	13865967	C	T	DNAH5	missense	0.092
P4	8	113347585	T	C	CSMD3	missense	0.092
P4	11	59857200	A	T	MS4A2	missense	0.092
P4	1	152324372	G	C	FLG2	missense	0.091
P4	5	24535848	G	A	CDH10	stopgain	0.091
P4	7	70853319	G	A	WBSCR17	missense	0.091
P4	19	21720870	G	A	ZNF429	missense	0.091
P4	21	45953648	A	T	TSPEAR	missense	0.091
P4	5	169472902	A	T	DOCK2	missense	0.09
P4	8	113299291	A	T	CSMD3	splicing	0.09
P4	20	31623433	G	T	BPIFB6	missense	0.09
P4	5	33630991	G	A	ADAMTS12	missense	0.089
P4	7	71177001	A	T	WBSCR17	splicing	0.089
P4	8	105502998	C	A	LRP12	missense	0.089
P4	15	67713676	A	G	IQCH	missense	0.089
P4	19	6442126	G	T	SLC25A23	missense	0.089
P4	1	222801569	G	T	MIA3	missense	0.088
P4	10	51829323	A	G	FAM21A	missense	0.088
P4	11	59630103	G	T	TCN1	missense	0.088
P4	19	51960935	C	A	SIGLEC8	missense	0.088
P4	1	33778194	G	A	A3GALT2	splicing	0.086
P4	7	50742329	C	A	GRB10	missense	0.086
P4	11	55563940	C	G	OR5D14	missense	0.086
P4	16	20328663	C	A	GP2	stopgain	0.086
P4	22	38522427	C	T	PLA2G6	missense	0.086
P4	7	50607687	G	A	DDC	missense	0.085
P4	1	144917555	C	A	PDE4DIP	missense	0.084
P4	11	6007308	G	T	OR52L1	missense	0.084
P4	5	140769706	T	A	PCDHGB4	missense	0.083
P4	6	44223188	C	T	SLC35B2	missense	0.083
P4	9	79635001	C	A	FOXB2	missense	0.083

P4	3	52519844 G	A	NISCH	splicing	0.082
P4	5	179264731 T	C	C5orf45	missense	0.082
P4	7	48317837 G	C	ABCA13	missense	0.082
P4	19	2433903 G	A	LMNB2	missense	0.082
P4	3	147131304 C	G	ZIC1	missense	0.081
P4	11	56954919 C	A	LRRC55	missense	0.081
P4	17	5378110 C	A	DERL2	splicing	0.081
P4	19	39001205 G	T	RYR1	missense	0.08

Table S2. The SNVs existed only in post-chemotherapy samples

Patient	Chromosome	Position	Ref	Alt	GeneName	Mutation type	VAF
P1	5	69328169	G	T	SERF1A	missense	0.9
P1	21	33976452	C	A	C21orf59	missense	0.744
P1	1	26349624	C	A	EXTL1	missense	0.738
P1	13	39540971	A	C	STOML3	missense	0.735
P1	17	4060359	T	A	CYB5D2	missense	0.714
P1	19	17994798	C	T	SLC5A5	missense	0.709
P1	17	10296222	G	A	MYH8	stopgain	0.675
P1	X	119513343	C	T	ATP1B4	missense	0.66
P1	6	41121522	C	T	TREML1	missense	0.623
P1	15	84683476	G	T	ADAMTSL3	stopgain	0.577
P1	3	59032983	A	G	C3orf67	splicing	0.569
P1	15	29346789	G	C	APBA2	missense	0.547
P1	7	94879441	A	G	PPP1R9A	missense	0.525
P1	1	240371405	C	A	FMN2	missense	0.5
P1	2	220047289	G	T	FAM134A	missense	0.485
P1	18	7013887	G	A	LAMA1	missense	0.482
P1	17	34171796	G	A	TAF15	missense	0.463
P1	14	71492998	A	T	PCNX	missense	0.457
P1	1	109517188	C	T	WDR47	missense	0.438
P1	18	163358	G	C	USP14	missense	0.417
P1	19	55418081	C	T	NCR1	missense	0.412
P1	7	23293786	A	G	GPNMB	splicing	0.411
P1	10	134010539	C	A	DPYSL4	missense	0.411
P1	20	60899232	T	A	LAMA5	missense	0.4
P1	9	135866303	C	T	GFI1B	stopgain	0.396
P1	1	166890374	C	T	ILDR2	missense	0.387
P1	17	72356219	C	G	BTBD17	missense	0.382
P1	7	30961691	G	T	AQP1	missense	0.372
P1	16	30566619	G	A	ZNF764	missense	0.372
P1	12	11420480	T	G	PRB3	missense	0.368
P1	12	115114176	G	C	TBX3	missense	0.368
P1	2	26798831	C	T	C2orf70	missense	0.366
P1	12	114377845	C	G	RBM19	missense	0.364
P1	12	85515608	A	T	LRRIQ1	missense	0.362
P1	10	63170363	A	G	TMEM26	missense	0.361
P1	15	72190527	G	C	MYO9A	missense	0.358

P1	7	751114 T	A	PRKAR1B	missense	0.351
P1	16	50745956 G	T	NOD2	missense	0.339
P1	22	38519207 G	T	PLA2G6	missense	0.337
P1	10	50960179 C	A	OGDHL	missense	0.327
P1	3	133191199 T	A	BFSP2	missense	0.326
P1	14	75374227 A	G	RPS6KL1	missense	0.325
P1	12	131589418 G	C	GPR133	missense	0.323
P1	1	46685542 C	T	LURAP1	stopgain	0.316
P1	20	23030108 G	C	THBD	missense	0.31
P1	15	52188623 C	T	TMOD3	missense	0.302
P1	12	2791123 C	T	CACNA1C	missense	0.3
P1	22	30200635 C	T	ASCC2	missense	0.295
P1	5	1036383 C	T	NKD2	missense	0.288
P1	1	161094319 G	C	DEDD	splicing	0.286
P1	5	1432592 C	T	SLC6A3	missense	0.278
P1	16	24566932 A	G	RBBP6	splicing	0.276
P1	5	32098738 T	G	PDZD2	missense	0.241
P1	11	4929123 C	G	OR51A7	missense	0.202
P1	3	89499366 C	A	EPHA3	missense	0.197
P1	9	67968525 T	C	ANKRD20A1,ANKRD20A3	missense	0.18
P1	3	52325942 T	G	GLYCTK	splicing	0.129
P1	3	189456474 G	C	TP63	missense	0.127
P1	6	166755912 C	A	SFT2D1	missense	0.126
P1	19	54745481 G	T	LILRA6,LILRB3	missense	0.113
P1	11	76062520 T	A	PRKRIR	missense	0.108
P1	22	38120965 T	C	TRIOBP	missense	0.087
P1	6	146276273 C	A	SHPRH	missense	0.086
P1	11	76062552 T	G	PRKRIR	missense	0.086
P1	4	183657999 G	C	TENM3	missense	0.083
P1	11	63141271 G	T	SLC22A9	splicing	0.083
P1	22	17688161 A	C	CECR1	missense	0.082
P1	17	34797679 T	G	TBC1D3G	missense	0.08
P1	1	36785910 A	T	SH3D21	missense	0.079
P1	2	223793627 G	C	ACSL3	missense	0.078
P1	15	91420753 G	A	FURIN	splicing	0.067
P1	8	24813495 C	T	NEFL	missense	0.064
P1	12	112744010 T	C	HECTD4	missense	0.062
P1	20	61463524 G	T	COL9A3	missense	0.058

P1	22	16279194 C	T	POTEH	splicing	0.058
P1	5	179201506 G	T	MAML1	missense	0.055
P1	13	43839593 G	A	ENOX1	splicing	0.051
P1	4	91230330 A	T	CCSER1	missense	0.046
P1	X	32613906 G	A	DMD	missense	0.043
P1	5	24487788 C	A	CDH10	missense	0.034
P1	11	63586345 A	G	C11orf84	missense	0.028
P2	22	41222580 T	G	ST13	exonic	0.325
P2	1	148252841 G	A	NBPF14	splicing	0.159
P2	16	29831052 T	G	PAGR1	exonic	0.127
P2	7	86522420 T	A	KIAA1324L	splicing	0.068
P2	X	45013241 A	G	CXorf36	exonic	0.045
P3	X	150908168 G	A	CNGA2	missense	0.143
P3	16	2229720 C	T	CASKIN1	stopgain	0.138
P3	Y	15417937 C	G	UTY	missense	0.137
P3	3	195514441 G	T	MUC4	missense	0.108
P3	10	28272833 T	C	ARMC4	missense	0.106
P3	17	48774331 G	C	ANKRD40	missense	0.106
P3	6	117884508 C	G	GOPC	missense	0.1
P3	Y	24052528 A	T	RBMY1B,RBMY1D,RBMY1E	missense	0.097
P3	12	96104273 G	T	NTN4	missense	0.095
P3	8	87126069 C	G	ATP6V0D2	missense	0.094
P3	15	95013594 C	G	MCTP2	missense	0.092
P3	4	140297578 G	C	NAA15	missense	0.088
P3	21	11097574 T	A	BAGE3,BAGE5,BAGE2,BAGE4,BAG	missense	0.085
P3	4	118006025 G	T	TRAM1L1	missense	0.082
P3	12	95694012 G	A	VEZT	missense	0.081