Title： Comprehensive characterization of genomic and radiologic features reveals distinct driver patterns of RTK/RAS pathway in ground-glass opacity pulmonary nodules

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Contents of the supplementary material

Supplementary Table S1. Clinical characteristics of 262 patients and 334 pulmonary nodules.

Characteristics	N = 262/334 (%)
Age at diagnosis	
Median (range)	54 (27-79)
Gender	
Female	185 (70.6%)
Male	77 (29.4%)
Smoking	
No	217 (82.8%)
Yes/Ever	30 (11.5%)
Unknown	15 (5.7%)
Nodule type	
Pure ground-glass nodule (pure GGO)	79 (23.7%)
Part-solid nodule (mixed GGO)	255 (76.3%)
Nodule size	
≤ 10.0 mm	121 (36.2%)
> 10.0, ≤ 20.0 mm	158 (47.3%)
> 20.0, ≤ 30.0 mm	55 (16.5%)
Mean CT attenuation	
≤ -500 HU	192 (57.5%)
> -500 HU	142 (42.5%)
CT volume	
≤ 400 mm^3	105 (31.4%)
> 400 mm^3	229 (68.6%)
Nodule mass	
≤ 200 mg	151 (45.2%)
> 200 mg	183(54.8%)
Consolidation-to-tumor ratio（CTR）	
= 0	79 (23.7%)
< 0.5	158 (47.3%)
> 0.5	97 (29.0%)
Histologic type	
Atypical adenomatous hyperplasia (AAH)	5 (1.5%)
Adenocarcinoma *in situ* (AIS)	33 (9.9%)
Minimally invasive adenocarcinoma (MIA)	80 (24.0%)
Invasive adenocarcinoma	216 (64.7%)
Tumor stage	
AAH+AIS	38 (11.4%)
IA1	168 (50.3%)
IA2	77 (23.1%)
IA3	11 (3.3%)
IB	40 (12.0%)

The AJCC (American Joint Committee on Cancer) 8th edition lung cancer staging system was used to classify tumor stage.

Supplementary Table S2. A target gene list of the 1021-gene panel.

Gene name	Coverage of capture probes
ABL1	Whole CDS
ABL2	Whole CDS
ACVR1B	Whole CDS
AKT1	Whole CDS
AKT2	Whole CDS
AKT3	Whole CDS
ALK	Whole CDS,non-coding region
APC	Whole CDS
AR	Whole CDS
ARAF	Whole CDS
ARID1A	Whole CDS
ARID1B	Whole CDS
ARID2	Whole CDS
ASXL1	Whole CDS
ATM	Whole CDS
ATR	Whole CDS
ATRX	Whole CDS
AURKA	Whole CDS
AURKB	Whole CDS
AXIN1	Whole CDS
AXIN2	Whole CDS
AXL	Whole CDS
B2M	Whole CDS
BAP1	Whole CDS
BARD1	Whole CDS
BCL2	Whole CDS
BCL2L1	Whole CDS
BCOR	Whole CDS
BLM	Whole CDS
BMPR1A	Whole CDS
BRAF	Whole CDS,non-coding region
BRCA1	Whole CDS,non-coding region
BRCA2	Whole CDS
BRD4	Whole CDS,non-coding region
BRIP1	Whole CDS
BTK	Whole CDS
C11orf30	Whole CDS
CASP8	Whole CDS
CBFB	Whole CDS
CBL	Whole CDS
CCND1	Whole CDS
CCND2	Whole CDS
CCND3	Whole CDS
CCNE1	Whole CDS
CD274	Whole CDS
CDC73	Whole CDS
CDH1	Whole CDS
CDK12	Whole CDS
CDK4	Whole CDS
CDK6	Whole CDS
CDK8	Whole CDS
CDKN1A	Whole CDS

CDKN1B	Whole CDS
CDKN2A	Whole CDS
CDKN2B	Whole CDS
CDKN2C	Whole CDS
CEBPA	Whole CDS
CHEK1	Whole CDS
CHEK2	Whole CDS
CIC	Whole CDS
CREBBP	Whole CDS
CRKL	Whole CDS
CSF1R	Whole CDS
CTCF	Whole CDS
CTNNA1	Whole CDS
CTNNB1	Whole CDS
CUL3	Whole CDS
CYLD	Whole CDS
DAXX	Whole CDS
DDR1	Whole CDS
DDR2	Whole CDS
DICER1	Whole CDS
DNMT3A	Whole CDS
EGFR	Whole CDS,non-coding region
ELAC2	Whole CDS
EME2	Whole CDS
EP300	Whole CDS
EPAS1	Whole CDS
EPCAM	Whole CDS
EPHA2	Whole CDS
EPHA3	Whole CDS
EPHA5	Whole CDS
EPHB2	Whole CDS
EPHB6	Whole CDS
ERBB2	Whole CDS
ERBB3	Whole CDS
ERBB4	Whole CDS
ERCC1	Whole CDS
ERCC3	Whole CDS
ERG	Whole CDS,non-coding region
ERRFI1	Whole CDS
ESR1	Whole CDS
EXT1	Whole CDS
EXT2	Whole CDS
EZH2	Whole CDS
FAM123B	Whole CDS
FAM175A	Whole CDS
FANCA	Whole CDS
FANCC	Whole CDS
FANCD2	Whole CDS
FANCG	Whole CDS
FANCM	Whole CDS
FAS	Whole CDS
FAT1	Whole CDS
FAT2	Whole CDS
FBXW7	Whole CDS

FCGR2A	Whole CDS
FCGR3A	Whole CDS
FGFR1	Whole CDS,non-coding region
FGFR2	Whole CDS,non-coding region
FGFR3	Whole CDS,non-coding region
FGFR4	Whole CDS
FH	Whole CDS
FLCN	Whole CDS
FLT1	Whole CDS
FLT3	Whole CDS
FLT4	Whole CDS
FOXA1	Whole CDS
FOXL2	Whole CDS
FOXP1	Whole CDS
FUBP1	Whole CDS
GAB2	Whole CDS
GALNT12	Whole CDS
GATA3	Whole CDS
GNA11	Whole CDS
GNAQ	Whole CDS
GNAS	Whole CDS
GRIN2A	Whole CDS
HDAC1	Whole CDS
HDAC4	Whole CDS
HGF	Whole CDS
HNF1A	Whole CDS
HOXB13	Whole CDS
HRAS	Whole CDS
HSP90AA1	Whole CDS
IDH1	Whole CDS
IDH2	Whole CDS
IFNG	Whole CDS
IFNGR1	Whole CDS
IGF1R	Whole CDS
IL7R	Whole CDS
INPP4B	Whole CDS
IRF2	Whole CDS
IRS2	Whole CDS
JAK1	Whole CDS
JAK2	Whole CDS
JAK3	Whole CDS
KDM5A	Whole CDS
KDM5C	Whole CDS
KDM6A	Whole CDS
KDR	Whole CDS
KEAP1	Whole CDS
KIT	Whole CDS,non-coding region
KRAS	Whole CDS
LRP1B	Whole CDS
MAP2K1	Whole CDS
MAP2K2	Whole CDS
MAP2K4	Whole CDS
MAP3K1	Whole CDS
MAPK1	Whole CDS

MAX	Whole CDS
MCL1	Whole CDS
MDM2	Whole CDS
MDM4	Whole CDS
MED12	Whole CDS
MEN1	Whole CDS
MET	Whole CDS,non-coding region
MITF	Whole CDS
MLH1	Whole CDS
MLH3	Whole CDS
MLL	Whole CDS
MLL2	Whole CDS
MLL3	Whole CDS
MPL	Whole CDS
MRE11A	Whole CDS
MS4A1	Whole CDS
MSH2	Whole CDS,non-coding region
MSH3	Whole CDS
MSH6	Whole CDS
MTOR	Whole CDS
MUTYH	Whole CDS
MYC	Whole CDS,non-coding region
MYCL1	Whole CDS,non-coding region
MYCN	Whole CDS
MYD88	Whole CDS
NBN	Whole CDS
NCOR1	Whole CDS
NDUFA13	Whole CDS
NF1	Whole CDS
NF2	Whole CDS
NOTCH1	Whole CDS
NOTCH2	Whole CDS,non-coding region
NOTCH3	Whole CDS
NOTCH4	Whole CDS
NPM1	Whole CDS
NRAS	Whole CDS
NSD1	Whole CDS
NTHL1	Whole CDS
NTRK1	Whole CDS,non-coding region
NTRK3	Whole CDS,non-coding region
PALB2	Whole CDS
PAX5	Whole CDS
PBRM1	Whole CDS
PCK1	Whole CDS
PDCD1LG2	Whole CDS
PDGFRA	Whole CDS,non-coding region
PDGFRB	Whole CDS
PDK1	Whole CDS
PHF6	Whole CDS
PIK3CA	Whole CDS
PIK3CB	Whole CDS
PIK3CG	Whole CDS
PIK3R1	Whole CDS
PIK3R2	Whole CDS

PMS1	Whole CDS
PMS2	Whole CDS,non-coding region
POLD1	Whole CDS
POLE	Whole CDS
POT1	Whole CDS
PPM1D	Whole CDS
PRKAR1A	Whole CDS
PTCH1	Whole CDS
PTCH2	Whole CDS
PTEN	Whole CDS
PTPN11	Whole CDS
RAD50	Whole CDS
RAD51	Whole CDS
RAD51B	Whole CDS
RAD51C	Whole CDS
RAD51D	Whole CDS
RAF1	Whole CDS,non-coding region
RARA	Whole CDS
RB1	Whole CDS
RBM10	Whole CDS
RET	Whole CDS,non-coding region
RHEB	Whole CDS
RHOA	Whole CDS
RICTOR	Whole CDS
RINT1	Whole CDS
RNASEL	Whole CDS
RNF43	Whole CDS
ROS1	Whole CDS,non-coding region
RPS6KB1	Whole CDS
RUNX1	Whole CDS
SDHA	Whole CDS
SDHAF2	Whole CDS
SDHB	Whole CDS
SDHC	Whole CDS
SDHD	Whole CDS
SERPINB3	Whole CDS
SERPINB4	Whole CDS
SETD2	Whole CDS
SLX4	Whole CDS
SMAD2	Whole CDS
SMAD4	Whole CDS
SMARCA4	Whole CDS
SMARCB1	Whole CDS
SMARCE1	Whole CDS
SMO	Whole CDS
SOX2	Whole CDS
SOX9	Whole CDS
SRC	Whole CDS
STAG2	Whole CDS
STAT3	Whole CDS
STK11	Whole CDS
SUFU	Whole CDS
SYK	Whole CDS
TBX3	Whole CDS

TCF7L2	Whole CDS
TET2	Whole CDS
TGFBR2	Whole CDS
TMEM127	Whole CDS
TMPRSS2	Whole CDS,non-coding region
TNFAIP3	Whole CDS
TOP1	Whole CDS
TOP2A	Whole CDS
TP53	Whole CDS
TP73	Whole CDS
TSC1	Whole CDS
TSC2	Whole CDS
VEGFA	Whole CDS
VHL	Whole CDS
WT1	Whole CDS
XPO1	Whole CDS
XRCC2	Whole CDS
XRCC3	Whole CDS
ZFHX3	Whole CDS
ZMAT3	Whole CDS
ABCA13	selected CDSs
ABCB1	selected CDSs
ABCC1	selected CDSs
ABCC11	selected CDSs
ABCC2	selected CDSs
ABCG2	selected CDSs
ACACA	selected CDSs
ACIN1	selected CDSs
ACTB	selected CDSs
ACTG1	selected CDSs
ACTG2	selected CDSs
ACVR2A	selected CDSs
ACVRL1	selected CDSs
ADAM29	selected CDSs
ADAMTS5	selected CDSs
ADCY1	selected CDSs
AFF1	selected CDSs
AFF2	selected CDSs
AFF3	selected CDSs
AFF4	selected CDSs
AHNAK	selected CDSs
AKAP9	selected CDSs
ALB	selected CDSs
AMOT	selected CDSs
ANGPT1	selected CDSs
ANK3	selected CDSs
ANKRD27	selected CDSs
ANKRD30A	selected CDSs
ANKRD30B	selected CDSs
ANKRD36B	selected CDSs
APEX1	selected CDSs
APOBEC3B	selected CDSs
ARAP3	selected CDSs
ARFGEF1	selected CDSs

ARFGEF2	selected CDSs
ARHGAP26	selected CDSs
ARHGAP29	selected CDSs
ARHGAP35	selected CDSs
ARID4B	selected CDSs
ARNT	selected CDSs
ASCL4	selected CDSs
ASH1L	selected CDSs
ASMTL	selected CDSs
ASPM	selected CDSs
ASTN1	selected CDSs
ASXL2	selected CDSs
ATIC	selected CDSs
ATP11B	selected CDSs
ATP12A	selected CDSs
ATP1A1	selected CDSs
ATP2B3	selected CDSs
BAZ2B	selected CDSs
BBS9	selected CDSs
BCAS1	selected CDSs
BCL11A	selected CDSs
BCL11B	selected CDSs
BCL2A1	selected CDSs
BCL2L11	selected CDSs,non-coding region
BCL3	selected CDSs
BCL9	selected CDSs
BCLAF1	selected CDSs
BCORL1	selected CDSs
BCR	selected CDSs
BIRC2	selected CDSs
BIRC3	selected CDSs
BMPR2	selected CDSs
BNC2	selected CDSs
BPTF	selected CDSs
BRD2	selected CDSs
BRD3	selected CDSs
BRSK1	selected CDSs
BRWD1	selected CDSs
BTLA	selected CDSs
BUB1	selected CDSs
C15orf23	selected CDSs
C15orf55	selected CDSs
C1QA	selected CDSs
C1S	selected CDSs
C3orf70	selected CDSs
C7orf53	selected CDSs
C8orf34	selected CDSs
CACNA1D	selected CDSs
CACNA1E	selected CDSs
CADM2	selected CDSs
CAMTA1	selected CDSs
CAPN7	selected CDSs
CARD11	selected CDSs
CASP1	selected CDSs

CASQ2	selected CDSs
CBLB	selected CDSs
CBR1	selected CDSs
CBR3	selected CDSs
CCDC168	selected CDSs
CCNA1	selected CDSs
CCNB3	selected CDSs
CCT3	selected CDSs
CCT5	selected CDSs
CCT6B	selected CDSs
CD22	selected CDSs
CD33	selected CDSs
CD5L	selected CDSs
CDA	selected CDSs
CDH11	selected CDSs
CDH18	selected CDSs
CDH23	selected CDSs
CDK13	selected CDSs
CHD1	selected CDSs
CHD1L	selected CDSs
CHD3	selected CDSs
CHD4	selected CDSs
CHD6	selected CDSs
CHD8	selected CDSs
CHD9	selected CDSs
CHFR	selected CDSs
CHI3L1	selected CDSs
CHN1	selected CDSs
CIITA	selected CDSs
CKS1B	selected CDSs
CLCC1	selected CDSs
CLDN18	selected CDSs
CLP1	selected CDSs
CLSPN	selected CDSs
CLTC	selected CDSs
CNOT3	selected CDSs
CNOT4	selected CDSs
CNTN1	selected CDSs
CNTN5	selected CDSs
CNTNAP1	selected CDSs
CNTNAP5	selected CDSs
COL1A1	selected CDSs
COL2A1	selected CDSs
COL5A1	selected CDSs
COL5A2	selected CDSs
COL5A3	selected CDSs
COPS2	selected CDSs
CPS1	selected CDSs
CREB3L1	selected CDSs
CRIPAK	selected CDSs
CRLF2	selected CDSs
CRNKL1	selected CDSs
CRTC1	selected CDSs
CRYBG3	selected CDSs

CSF1	selected CDSs
CSF3R	selected CDSs
CSMD1	selected CDSs
CSMD3	selected CDSs
CSNK1A1	selected CDSs
CSNK1G3	selected CDSs
CSNK2A1	selected CDSs
CTLA4	selected CDSs
CTNNA2	selected CDSs
CTNND1	selected CDSs
CUX1	selected CDSs
CYBA	selected CDSs
CYP19A1	selected CDSs
CYP1A1	selected CDSs
CYP1B1	selected CDSs
CYP2A13	selected CDSs
CYP2C19	selected CDSs
CYP2C8	selected CDSs
CYP2D6	selected CDSs
CYP3A4	selected CDSs
CYP3A5	selected CDSs
DCC	selected CDSs
DDX3X	selected CDSs
DDX5	selected CDSs
DEK	selected CDSs
DHX35	selected CDSs
DHX9	selected CDSs
DIAPH1	selected CDSs
DIS3L2	selected CDSs
DLC1	selected CDSs
DMD	selected CDSs
DNAH6	selected CDSs
DNAJC11	selected CDSs
DNM2	selected CDSs
DNMT1	selected CDSs
DOCK2	selected CDSs
DOCK7	selected CDSs
DOT1L	selected CDSs
DPYD	selected CDSs
DRGX	selected CDSs
DTX1	selected CDSs
DUSP22	selected CDSs
DYSF	selected CDSs
EBF1	selected CDSs
ECT2L	selected CDSs
EEF1A1	selected CDSs
EGR3	selected CDSs
EIF2AK3	selected CDSs
EIF2C3	selected CDSs
EIF3A	selected CDSs
EIF4G3	selected CDSs
ELF1	selected CDSs
ELF3	selected CDSs
ELF4	selected CDSs

ELL	selected CDSs
ELMO1	selected CDSs
ELN	selected CDSs
EMID2	selected CDSs
EPC1	selected CDSs
EPHA1	selected CDSs
EPHA4	selected CDSs
EPHA7	selected CDSs
EPHB1	selected CDSs
EPHB4	selected CDSs
EPOR	selected CDSs
EPPK1	selected CDSs
EPS15	selected CDSs
ERBB2IP	selected CDSs
ERCC2	selected CDSs
ESR2	selected CDSs
ETS1	selected CDSs
ETV1	selected CDSs
ETV5	selected CDSs
ETV6	selected CDSs,non-coding region
EWSR1	selected CDSs
EZR	selected CDSs,non-coding region
F8	selected CDSs
FAM131B	selected CDSs
FAM135B	selected CDSs
FAM157B	selected CDSs
FAM22A	selected CDSs
FAM46C	selected CDSs
FAM5C	selected CDSs
FAP	selected CDSs
FASLG	selected CDSs
FAT3	selected CDSs
FAT4	selected CDSs
FCGR1A	selected CDSs
FCGR2B	selected CDSs
FCRL4	selected CDSs
FGF10	selected CDSs
FGF14	selected CDSs
FGF23	selected CDSs
FGF3	selected CDSs
FGF4	selected CDSs
FGF6	selected CDSs
FKBP5	selected CDSs
FLG	selected CDSs
FLI1	selected CDSs
FLNC	selected CDSs
FMN2	selected CDSs
FMR1	selected CDSs
FN1	selected CDSs
FNDC4	selected CDSs
FOXA2	selected CDSs
FOXO3	selected CDSs
FOXQ1	selected CDSs
FRG1	selected CDSs

FRMPD4	selected CDSs
FUS	selected CDSs
FXR1	selected CDSs
FYN	selected CDSs
FZD1	selected CDSs
G3BP1	selected CDSs
G3BP2	selected CDSs
GABRA6	selected CDSs
GATA2	selected CDSs
GFRAL	selected CDSs
GIGYF1	selected CDSs
GKN2	selected CDSs
GLB1L3	selected CDSs
GLI1	selected CDSs
GLI2	selected CDSs
GLI3	selected CDSs
GMPS	selected CDSs
GNA12	selected CDSs
GNA13	selected CDSs
GNG2	selected CDSs
GPC3	selected CDSs
GPR124	selected CDSs
GPX1	selected CDSs
GRB7	selected CDSs
GRM3	selected CDSs
GSK3B	selected CDSs
GSTM5	selected CDSs
GSTP1	selected CDSs
GUSB	selected CDSs
H3F3A	selected CDSs
H3F3C	selected CDSs
HCLS1	selected CDSs
HCN1	selected CDSs
HDAC9	selected CDSs
HECW1	selected CDSs
HERC2	selected CDSs
HEY1	selected CDSs
HIP1	selected CDSs
HIST1H1C	selected CDSs
HIST1H1D	selected CDSs
HIST1H1E	selected CDSs
HIST1H2AC	selected CDSs
HIST1H2AG	selected CDSs
HIST1H2AL	selected CDSs
HIST1H2AM	selected CDSs
HIST1H2BC	selected CDSs
HIST1H2BD	selected CDSs
HIST1H2BJ	selected CDSs
HIST1H2BK	selected CDSs
HIST1H2BO	selected CDSs
HIST1H3B	selected CDSs
HIST1H4I	selected CDSs
HLF	selected CDSs
HMCN1	selected CDSs

HNRPDL	selected CDSs
HOXA11	selected CDSs
HOXA13	selected CDSs
HOXA3	selected CDSs
HOXA9	selected CDSs
HOXC13	selected CDSs
HOXD11	selected CDSs
HOXD13	selected CDSs
HSD3B1	selected CDSs
HSD3B2	selected CDSs
HSP90AB1	selected CDSs
HSPA8	selected CDSs
HSPD1	selected CDSs
HSPH1	selected CDSs
ICK	selected CDSs
IFITM1	selected CDSs
IFITM3	selected CDSs
IGF2	selected CDSs
IGF2R	selected CDSs
IGLL5	selected CDSs
IGSF10	selected CDSs
IKBKE	selected CDSs
IKZF1	selected CDSs
IKZF2	selected CDSs
IKZF3	selected CDSs
IL1RAPL1	selected CDSs
IL21R	selected CDSs
IL6	selected CDSs
IL6ST	selected CDSs
IMPG1	selected CDSs
ING1	selected CDSs
INHBA	selected CDSs
INPP4A	selected CDSs
INPP5D	selected CDSs
INPPL1	selected CDSs
IRF4	selected CDSs
IRF6	selected CDSs
ITGB3	selected CDSs
ITK	selected CDSs
ITSN1	selected CDSs
JARID2	selected CDSs
KALRN	selected CDSs
KAT6A	selected CDSs
KAT6B	selected CDSs
KCNJ5	selected CDSs
KCNQ2	selected CDSs
KDM2B	selected CDSs
KDM3B	selected CDSs
KEL	selected CDSs
KIF5B	selected CDSs,non-coding region
KLB	selected CDSs
KLF4	selected CDSs
KLHL6	selected CDSs
KLK1	selected CDSs

KRTAP5-5	selected CDSs
L3MBTL1	selected CDSs
LAMA2	selected CDSs
LCP1	selected CDSs
LEF1	selected CDSs
LGALS8	selected CDSs
LIFR	selected CDSs
LPHN2	selected CDSs
LPP	selected CDSs
LRP2	selected CDSs
LRP4	selected CDSs
LRP5	selected CDSs
LRP6	selected CDSs
LRRC7	selected CDSs
LRRK2	selected CDSs
LYN	selected CDSs
LZTS1	selected CDSs
MACF1	selected CDSs
MAD1L1	selected CDSs
MAGI2	selected CDSs
MAGOH	selected CDSs
MAML2	selected CDSs,non-coding region
MAML3	selected CDSs
MAP3K13	selected CDSs
MAPK3	selected CDSs
MCC	selected CDSs
MCM3	selected CDSs
MDH2	selected CDSs
MECOM	selected CDSs
MEF2C	selected CDSs
MGA	selected CDSs
MIB1	selected CDSs
MIOS	selected CDSs
MKI67	selected CDSs
MKL1	selected CDSs
MLL4	selected CDSs
MLLT3	selected CDSs
MLLT6	selected CDSs
MMP11	selected CDSs
MMP2	selected CDSs
MN1	selected CDSs
MNDA	selected CDSs
MNX1	selected CDSs
MPO	selected CDSs
MSH4	selected CDSs
MSN	selected CDSs
MSR1	selected CDSs
MTHFR	selected CDSs
MTRR	selected CDSs
MUC5B	selected CDSs
MYB	selected CDSs
MYBL2	selected CDSs
MYH10	selected CDSs
MYH11	selected CDSs

MYH14	selected CDSs
MYH9	selected CDSs
MYO3A	selected CDSs
NAP1L1	selected CDSs
NAV3	selected CDSs
NBPF1	selected CDSs
NCAM2	selected CDSs
NCF2	selected CDSs
NCF4	selected CDSs
NCK1	selected CDSs
NCOA2	selected CDSs
NCOR2	selected CDSs
NCSTN	selected CDSs
NDRG1	selected CDSs
NEB	selected CDSs
NFATC4	selected CDSs
NFE2L2	selected CDSs
NFE2L3	selected CDSs
NIN	selected CDSs
NKX3-1	selected CDSs
NLRC3	selected CDSs
NOD1	selected CDSs
NOS3	selected CDSs
NQO1	selected CDSs
NR1I2	selected CDSs
NR2F2	selected CDSs
NR4A2	selected CDSs
NRP2	selected CDSs
NRXN1	selected CDSs
NTM	selected CDSs
NTRK2	selected CDSs,non-coding region
NUMA1	selected CDSs
NUP107	selected CDSs
NUP210	selected CDSs
NUP98	selected CDSs
OBSCN	selected CDSs
OGDH	selected CDSs
OMD	selected CDSs
OPCML	selected CDSs
OR11G2	selected CDSs
OR2T4	selected CDSs
OR4A15	selected CDSs
OR4C6	selected CDSs
OR5L2	selected CDSs
OR6F1	selected CDSs
P2RY8	selected CDSs
P4HB	selected CDSs
PABPC1	selected CDSs
PABPC3	selected CDSs
PAG1	selected CDSs
PAK1	selected CDSs
PAK3	selected CDSs
PARK2	selected CDSs
PARP1	selected CDSs

PASK	selected CDSs
PAX3	selected CDSs
PAX7	selected CDSs
PBX1	selected CDSs
PC	selected CDSs
PCDH18	selected CDSs
PCLO	selected CDSs
PCSK6	selected CDSs
PCSK7	selected CDSs
PDCD1	selected CDSs
PDCD11	selected CDSs
PDE4DIP	selected CDSs
PDGFB	selected CDSs
PDILT	selected CDSs
PER1	selected CDSs
PGR	selected CDSs
PHF1	selected CDSs
PIK3C2A	selected CDSs
PIK3C2B	selected CDSs
PIK3C2G	selected CDSs
PIK3R3	selected CDSs
PIP5K1A	selected CDSs
PKD1L2	selected CDSs
PKHD1	selected CDSs
PLAC8	selected CDSs
PLAG1	selected CDSs
PLCB1	selected CDSs
PLCG1	selected CDSs
PLCG2	selected CDSs
PLK1	selected CDSs
PLXNA1	selected CDSs
PLXNB2	selected CDSs
POLQ	selected CDSs
POLR2B	selected CDSs
POM121	selected CDSs
POM121L12	selected CDSs
POTEG	selected CDSs
POU2AF1	selected CDSs
PPP1R17	selected CDSs
PPP2R1A	selected CDSs
PPP6C	selected CDSs
PRAM1	selected CDSs
PRDM1	selected CDSs
PRDM16	selected CDSs
PREX2	selected CDSs
PRF1	selected CDSs
PRKAA1	selected CDSs
PRKCB	selected CDSs
PRKCI	selected CDSs
PRKDC	selected CDSs
PRRX1	selected CDSs
PRX	selected CDSs
PSG2	selected CDSs
PSIP1	selected CDSs

PSMB1	selected CDSs
PSMB5	selected CDSs
PTGS1	selected CDSs
PTGS2	selected CDSs
PTK2	selected CDSs
PTPN13	selected CDSs
PTPN2	selected CDSs
PTPRB	selected CDSs
PTPRD	selected CDSs
PTPRF	selected CDSs
PTPRJ	selected CDSs
PTPRK	selected CDSs
PTPRO	selected CDSs
PTPRT	selected CDSs
PTPRU	selected CDSs
RAB35	selected CDSs
RAC1	selected CDSs
RAC2	selected CDSs
RAD21	selected CDSs
RAD54B	selected CDSs
RANBP2	selected CDSs
RASA1	selected CDSs
RASGRP1	selected CDSs
RBL1	selected CDSs
RECQL4	selected CDSs
REL	selected CDSs
RELN	selected CDSs
RFC1	selected CDSs
RGS3	selected CDSs
RHOH	selected CDSs
RHOT1	selected CDSs
RIT1	selected CDSs
RNF213	selected CDSs
ROBO1	selected CDSs
ROBO2	selected CDSs
ROBO3	selected CDSs
ROCK1	selected CDSs
RPGR	selected CDSs
RPL22	selected CDSs
RPTOR	selected CDSs
RSPO2	selected CDSs,non-coding region
RSPO3	selected CDSs
RUNX1T1	selected CDSs
RUNX2	selected CDSs
RXRA	selected CDSs
RYR1	selected CDSs
RYR2	selected CDSs
SBDS	selected CDSs
SCUBE2	selected CDSs
SEC31A	selected CDSs
SEMA3A	selected CDSs
SEMA3E	selected CDSs
SEMA6A	selected CDSs
SERP2	selected CDSs

SERPINA7	selected CDSs
SETBP1	selected CDSs
SETDB1	selected CDSs
SF1	selected CDSs
SF3A1	selected CDSs
SF3A3	selected CDSs
SF3B1	selected CDSs
SFPQ	selected CDSs
SGCZ	selected CDSs
SH3PXD2A	selected CDSs
SHH	selected CDSs
SI	selected CDSs
SIN3A	selected CDSs
SLC16A1	selected CDSs
SLC1A2	selected CDSs
SLC22A16	selected CDSs
SLC22A18	selected CDSs
SLC22A2	selected CDSs
SLC22A3	selected CDSs
SLCO1B3	selected CDSs
SLIT1	selected CDSs
SLIT2	selected CDSs
SMAD3	selected CDSs
SMC1A	selected CDSs
SMC1B	selected CDSs
SMURF2	selected CDSs
SNCAIP	selected CDSs
SNTG1	selected CDSs
SNX29	selected CDSs
SOD2	selected CDSs
SOS1	selected CDSs
SOX10	selected CDSs
SOX17	selected CDSs
SPEN	selected CDSs
SPOP	selected CDSs
SPRR3	selected CDSs
SPSB4	selected CDSs
SPTA1	selected CDSs
SRD5A2	selected CDSs
SRGAP1	selected CDSs
SRGAP3	selected CDSs
SRSF2	selected CDSs
SRSF7	selected CDSs
SSX1	selected CDSs
STAG1	selected CDSs
STAT1	selected CDSs
STAT5A	selected CDSs
SUCLG1	selected CDSs
SUCLG2	selected CDSs
SULT1A1	selected CDSs
SUZ12	selected CDSs
SVEP1	selected CDSs
SYNCRIP	selected CDSs
SYNE1	selected CDSs

TAF1	selected CDSs
TAF15	selected CDSs
TAF1L	selected CDSs
TAL1	selected CDSs
TBL1XR1	selected CDSs
TBX15	selected CDSs
TBX22	selected CDSs
TCEB1	selected CDSs
TCERG1	selected CDSs
TCF12	selected CDSs
TCF3	selected CDSs
TCF4	selected CDSs
TCL1A	selected CDSs
TCP11	selected CDSs
TEC	selected CDSs
TENM3	selected CDSs
TERT	selected CDSs,non-coding region
TFDP1	selected CDSs
TFDP2	selected CDSs
TFE3	selected CDSs,non-coding region
TGFBR1	selected CDSs
TGFBR3	selected CDSs
TGM2	selected CDSs
THBS1	selected CDSs
THBS2	selected CDSs
THRAP3	selected CDSs
TJP1	selected CDSs
TLE1	selected CDSs
TLL2	selected CDSs
TLR4	selected CDSs
TLX3	selected CDSs
TMEM132D	selected CDSs
TNN	selected CDSs
TNPO1	selected CDSs
TOP2B	selected CDSs
TP53BP1	selected CDSs
TP63	selected CDSs
TPM3	selected CDSs,non-coding region
TPR	selected CDSs
TRAF5	selected CDSs
TRERF1	selected CDSs
TRIM24	selected CDSs
TRIM58	selected CDSs
TRIO	selected CDSs
TRPC5	selected CDSs
TRRAP	selected CDSs
TSHR	selected CDSs
TSHZ2	selected CDSs
TSHZ3	selected CDSs
TTF1	selected CDSs
TTL	selected CDSs
TUBA3C	selected CDSs
TUBB3	selected CDSs
TUSC3	selected CDSs

TXNIP	selected CDSs
TYMS	selected CDSs
TYR	selected CDSs
TYRP1	selected CDSs
U2AF1	selected CDSs
UBE2D2	selected CDSs
UBR5	selected CDSs
UGT1A1	selected CDSs
UMPS	selected CDSs
UPF3B	selected CDSs
USH2A	selected CDSs
USP6	selected CDSs
USP8	selected CDSs
VDAC2	selected CDSs
VEZF1	selected CDSs
VIM	selected CDSs
WASF3	selected CDSs
WDR90	selected CDSs
WDTC1	selected CDSs
WHSC1	selected CDSs
WHSC1L1	selected CDSs
WIPF1	selected CDSs
WNK1	selected CDSs
WNT5A	selected CDSs
WSCD2	selected CDSs
WWOX	selected CDSs
WWP1	selected CDSs
WWP2	selected CDSs
XBP1	selected CDSs
XPC	selected CDSs
XRCC1	selected CDSs
YBX1	selected CDSs
YY1AP1	selected CDSs
ZBTB16	selected CDSs
ZC3H11A	selected CDSs
ZFP36L1	selected CDSs
ZFP36L2	selected CDSs
ZFPM2	selected CDSs
ZIC3	selected CDSs
ZNF217	selected CDSs
ZNF384	selected CDSs
ZNF521	selected CDSs
ZNF638	selected CDSs
ZNF750	selected CDSs
ZNF804B	selected CDSs
ZNF814	selected CDSs
CD74	non-coding region
EML4	non-coding region
NCOA4	non-coding region
PPARG	non-coding region
SLC34A2	non-coding region

Supplementary Table S3. Quality control of the sequencing data.

PatientID	SampleID	Total number of sequenced reads	Total number of uniquely mapped non-duplicate reads	Total number of covered targeted bases	Median coverage (and range) per targeted base	Percentage of targeted bases with coverage >200
D002	170013896	35746909	23302841	1838195356	695 (365-1025)	99.72%
D006	180000617	58499809	32873708	2620225932	1519 (412-2626)	99.82%
C001	180007124	50850789	31295064	2504140188	1071 (242-1900)	99.83%
C002	180008812	21986476	13446298	1103855236	420 (163-677)	79.71%
D022	180014924	58929738	33866578	2753239764	244 (144-344)	99.82%
D024	180017526	51206675	40355419	3201983740	947 (321-1573)	99.86%
D028	180017634	76540217	54350054	5641214300	751 (439-1063)	99.93%
D029	180017640	46830560	39231278	3116823460	298 (181-415)	99.79%
D030	180017648	30283780	24752556	1953514716	476 (231-1055)	99.20%
B003	180017686	77237829	53127144	4224527716	328 (188-468)	99.94%
C008	180017707	47944630	38163959	3021095760	392 (148-636)	99.70%
C009	180025989	68451775	49123597	3893340920	232 (81-383)	99.91%
D058	180025996	40686957	34118528	2709725888	295 (108-482)	99.87%
B006	180025998	42110838	28940809	3021586600	591 (345-1578)	99.83%
D061	180026012	38882030	32342481	3327443600	298 (187-409)	99.92%
D062	180026017	52158908	39781383	4111970200	850 (542-1810)	99.90%
C010	180029928	29450740	26799102	2486595780	887 (3-1771)	99.86%
D065	180029929	31202304	28232251	2222787884	293 (180-406)	99.83%
D066	180029930	28320530	25781558	2027358748	296 (239-353)	99.75%
D067	180029932	36097285	28627238	2956644600	1091 (896-1286)	99.91%
D068	180029933	42641486	33404345	3437197400	296 (254-338)	99.91%
D074	180031348	38328617	29459782	2319678384	1367 (1086-1648)	99.92%
D075	180031349	46304280	34921984	2745711584	369 (333-405)	99.92%
D076	180031350	50799516	37976732	3055941988	2047 (1506-2588)	99.89%
D080	180031367	45436065	35503151	3667117200	291 (241-341)	99.84%
C013	180031368	37462480	32079707	2542956504	1186 (709-1663)	99.83%
D081	180031369	42441228	36252055	2861819672	267 (172-362)	99.87%
C014	180031370	54025467	44622086	3526796112	1048 (1009-2117)	99.91%
D086	180031387	36659651	32607460	2561071940	241 (158-324)	99.92%
B007	180031389	55342492	42626627	3973339890	299 (234-364)	99.92%
D100	190000094	41297363	36609129	3395663010	261 (211-311)	99.96%
C018	190000095	39532830	35278323	3271738140	1358 (997-1719)	99.96%
D101	190000100	32568896	29335167	2330383820	1217 (916-1518)	99.68%
D103	190000104	26676279	21873799	1719668644	1078 (853-1303)	99.78%
D113	190000153	33057896	26411129	2078161936	279 (235-323)	99.67%
D114	190000154	40346639	31681995	2489628444	975 (417-1533)	99.86%
D115	190000155	32995225	27133727	2144789084	406 (319-493)	99.17%
C024	190000276	51926278	44231466	4617130500	1303 (805-1801)	99.88%
C026	190000288	42108274	33592197	2675634416	371 (283-459)	99.88%
D122	190001394	36156378	27753740	2672480912	2180 (1276-3084)	99.92%
C027	190001400	29425186	20368454	1970065442	728 (610-846)	99.88%
D124	190001401	47682658	36372710	3516676300	395 (339-451)	99.92%
D126	190001403	51569805	31054232	3023677884	871 (734-1008)	99.92%
D127	190001404	50017429	36121031	3497117908	714 (577-851)	99.92%
D129	190001407	60579303	49304601	4757358706	283 (236-330)	99.93%

B010	190001474	35879643	19525843	1580560144	727 (590-864)	99.51%
C029	190001482	26627761	24786230	2397065706	418 (367-469)	99.76%
D136	190007536	37921385	34533475	3369680698	415 (352-478)	99.91%
DN5	190007537	39393111	34976570	3433476618	706 (370-1042)	99.92%
DN4	190007538	37854543	34082629	3308362336	1103 (664-1542)	99.91%
D137	190007592	24776310	20410743	2117229000	378 (313-443)	99.79%
D140	190007603	40053456	26896448	2793859100	514 (450-578)	99.84%
D146	190007722	25152886	21854887	2107836354	453 (372-534)	99.26%
D150	190011449	23327627	21802625	2097862390	1537 (807-2267)	99.36%
A003	190011451	33066342	30678836	2956226774	577 (507-647)	99.39%
D155	190011527	43962186	29709489	2886019114	406 (328-484)	99.94%
D156	190011528	45880585	26744639	2608261522	1520 (1139-1901)	99.93%
D166	190011553	38439132	27850678	2903880100	1308 (987-1629)	99.70%
D171	190011564	28166294	25603781	2462096316	956 (737-1175)	99.38%
C037	190011582	31235307	25710429	2022554408	731 (209-1253)	99.28%
B015	190011593	25362261	20337523	1608000780	311 (251-371)	99.55%
D187	190011594	22748296	18342835	1448413396	1425 (986-1864)	99.23%
D188	190011595	23712515	19425693	1531684924	296 (224-368)	99.22%
D190	190011599	68572212	47160662	3755585524	283 (212-354)	99.88%
C041	190011600	48729486	41058983	3243989168	687 (571-803)	99.94%
D192	190011609	39276889	30618000	2386666228	348 (287-409)	99.44%
D193	190011612	26775613	21925592	1710995296	788 (627-949)	99.22%
D195	190014690	26512491	24353738	1904914236	1900 (1479-2321)	99.12%
D196	190014691	27620070	25426260	1991447076	418 (366-470)	99.18%
B017	190014737	32146646	21551430	1692599952	764 (622-906)	99.12%
D199	190014771	49809464	39469184	3807220054	305 (258-352)	99.92%
D206	190014786	36740394	32857966	3182867166	310 (247-373)	99.40%
D210	190014790	8977371	8488189	819996498	710 (187-1496)	79.88%
B018	190014791	9582413	9158292	880104046	661 (284-2756)	89.69%
C043	190014809	35992509	30619172	2411682084	963 (749-1177)	99.37%
D219	190014811	54787957	48966638	3817432424	387 (313-461)	99.41%
D221	190018152	36009077	30423175	2954530356	1458 (1082-1834)	99.81%
C046	190018153	53501604	42006467	4085443040	1767 (1224-2310)	99.82%
D223	190018182	29458904	27269383	2620768692	372 (303-441)	99.38%
D225	190018194	27942595	26133646	2518694468	337 (247-427)	99.38%
D231	190018210	31372485	27911454	2690120388	1026 (641-1411)	99.42%
D234	190018214	37105723	34168952	3286151828	1447 (848-2046)	99.42%
D235	190018215	31736569	29636853	2850588446	504 (433-575)	99.42%
D237	190018222	29076438	26388269	2062817460	1121 (766-1476)	99.19%
D238	190018223	19783876	17976891	1411992220	309 (259-359)	96.75%
C055	190021892	34125647	30029507	2896937120	248 (202-294)	99.93%
D249	190021894	49453036	38873362	3780584120	835 (714-956)	99.94%
D253	190021905	55555723	44736192	4382564444	941 (794-1088)	99.39%
D254	190021906	51677818	42963813	4168288812	1183 (613-1753)	99.41%
C056	190022015	64340082	48137336	3801206272	1363 (1111-1615)	99.89%
D258	190022017	81580133	55254605	5431198740	345 (288-402)	99.94%
D263	190026171	44455326	34684817	3340960220	1261 (1031-1491)	99.92%
C058	190026174	48693260	31496683	3196241392	1586 (1095-2077)	99.96%
D269	190026189	37141782	26755665	2582634866	1247 (945-1549)	99.90%
D276	190031271	82846762	63371459	6177040894	352 (279-425)	99.97%
D284	190033551	66416024	48931776	4731037202	481 (409-553)	99.93%

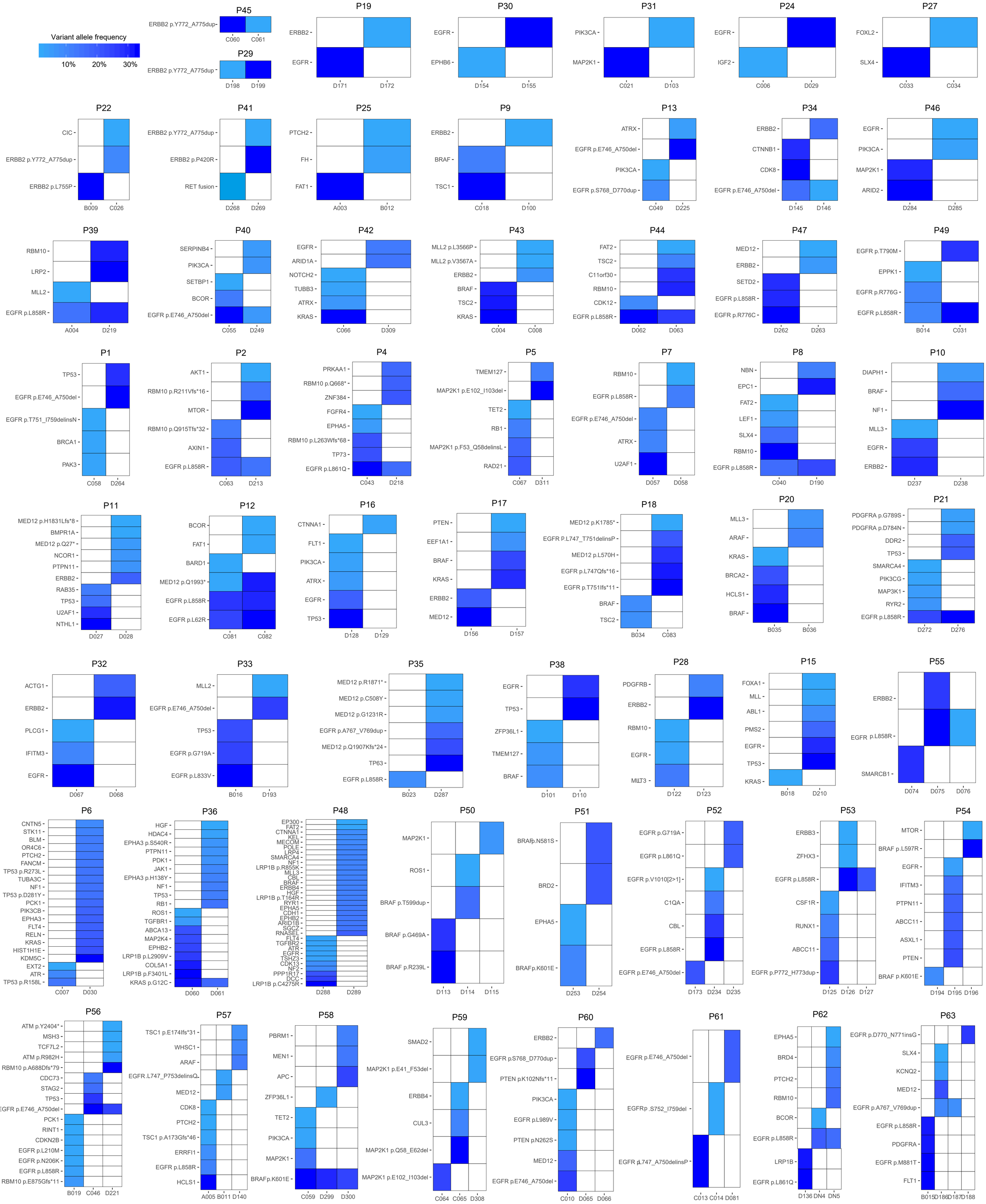
D285	190033552	52283927	36117839	3484467482	1079 (662-1496)	99.92%
B023	190033558	38568371	32028829	3085785282	931 (861-1001)	99.88%
D287	190033560	61795286	50954092	4894669958	813 (753-873)	99.93%
D289	190033627	46750553	37559018	3618259280	713 (664-762)	99.92%
C059	190033658	52441158	40982281	3963473340	1144 (874-1414)	99.71%
D300	190033659	56213867	46064185	4453797926	1345 (1000-1690)	99.69%
C061	190033675	56072978	40596180	3917136698	368 (296-440)	99.14%
C062	190033686	73058420	56358930	5418289626	1151 (535-1767)	99.94%
C063	190033687	51057739	42798787	4109350812	254 (205-303)	99.91%
D306	190033688	68712482	52507277	5041482824	1285 (711-1859)	99.96%
C064	190033691	48207282	40455651	3899809114	1031 (833-1229)	99.94%
C065	190033692	52360290	44536015	4291417062	315 (267-363)	99.94%
C066	190033694	56536708	48833209	4733109714	913 (756-1070)	99.91%
C067	190033699	39561507	35404506	3432421092	391 (301-481)	99.89%
D007	180007108	16056559	11605216	921645312	956 (696-1216)	75.79%
D012	180012989	17718904	10730779	847419304	831 (626-1036)	71.63%
C003	180013178	15078534	10756507	850872516	428 (357-499)	73.95%
D013	180013179	14644404	10376368	820091984	1501 (1218-1784)	66.17%
D014	180014769	13754639	11269645	885851592	479 (400-558)	78.97%
C004	180014787	12436231	10376317	815501052	1366 (967-1765)	78.93%
C005	180014800	10989867	8049655	631774472	558 (463-653)	62.06%
D025	180017530	17010770	14249138	1485441400	351 (293-409)	77.98%
C006	180017639	15875922	13531279	1066821880	378 (319-437)	96.59%
C007	180017649	11768502	9789443	771885184	386 (304-468)	76.85%
D031	180017662	17351631	14989813	1183894712	1333 (987-1679)	96.28%
D033	180017670	12671745	10805529	1110205200	885 (768-1002)	95.45%
D037	180017689	14361269	11846460	1219128000	1003 (862-1144)	92.28%
D038	180017696	15201467	12802805	1316731000	423 (378-468)	97.20%
D042	180017711	10272483	8150478	839052500	405 (338-472)	79.67%
D043	180017712	12984463	10162734	799676028	1246 (826-1666)	75.52%
D045	180022557	15170181	12306842	1312415500	328 (308-348)	89.76%
B004	180022560	17128705	14723508	1165152352	831 (783-879)	96.40%
D047	180022562	12456718	10510952	826973480	818 (769-867)	79.40%
D051	180025976	12274538	10033582	1034638700	387 (364-410)	93.17%
B005	180025980	12734967	10460787	1077110300	950 (857-1043)	95.47%
D052	180025981	11779617	9694931	999848200	1439 (968-1910)	92.16%
D053	180025983	15684405	12124680	955235412	449 (424-474)	86.21%
D057	180025995	11054838	9069285	716370528	916 (858-974)	69.53%
D060	180026011	10526588	8864665	911690800	1791 (1174-2408)	88.58%
D063	180026018	11644187	9455439	973458100	487 (447-527)	90.52%
D064	180029885	19528010	16525104	1301903864	1335 (1139-1531)	98.94%
D071	180029936	11002451	9026676	927734100	403 (368-438)	96.12%
D077	180031359	18434411	15368450	1211734196	379 (349-409)	96.77%
D082	180031376	17502150	14605146	1151270876	354 (322-386)	94.64%
D084	180031384	16016236	14673682	1154521016	1083 (770-1396)	97.04%
D087	180031390	17158857	15327195	1201108864	245 (233-257)	98.60%
D088	180031391	15097810	13653275	1318416646	590 (551-629)	99.46%
C016	180031392	16221544	14573039	1142421816	423 (370-476)	96.35%
D089	180031393	15174821	13697521	1073090512	821 (273-1369)	94.62%
A001	180031396	14289134	12798382	1002460444	1048 (960-1136)	92.47%
D090	190000001	12124562	11044984	1055887712	484 (430-538)	97.84%

D092	190000029	17154287	15013063	1167728524	488 (431-545)	96.24%
C017	190000030	15491422	13785791	1320121430	1321 (975-1667)	97.88%
D093	190000031	15584443	13797043	1320556086	306 (287-325)	98.94%
D097	190000076	13372356	12466534	1151944650	1248 (1155-1341)	98.14%
C019	190000099	11688802	10563720	828677628	1175 (1077-1273)	81.70%
C020	190000101	13809223	12629652	994218928	409 (389-429)	93.69%
D102	190000102	12127131	10348093	814388792	1200 (1070-1330)	77.84%
C021	190000103	12737471	10867091	855798912	399 (363-435)	76.63%
B008	190000105	8071413	6914063	542284700	1149 (1033-1265)	48.72%
D104	190000107	12878031	10719737	840483316	291 (268-314)	91.57%
D107	190000114	15938968	13045713	1024790916	734 (678-790)	95.44%
D108	190000115	11088646	8978976	923948900	337 (316-358)	91.27%
D109	190000142	13246102	10847443	1117007200	925 (835-1015)	94.27%
D110	190000144	12926047	10881315	850603096	273 (234-312)	88.96%
D111	190000148	19774700	14976933	1177009340	726 (608-844)	99.19%
D116	190000166	14742384	12264602	962086508	266 (227-305)	94.68%
C022	190000170	13500503	12384669	1148406300	761 (633-889)	97.04%
D119	190000277	12469199	10345205	1064911800	198 (170-226)	87.75%
C025	190000278	12315693	10197734	1050971700	1235 (984-1486)	89.27%
B009	190000287	12759775	10863042	852930824	325 (269-381)	73.41%
D125	190001402	9693461	8718386	837483130	1082 (865-1299)	92.94%
D130	190001467	14606958	11822019	930610728	676 (206-1146)	91.19%
D133	190001479	17912531	16305138	1573977078	388 (313-463)	99.66%
D134	190001480	13447831	12273922	1185487016	730 (497-963)	97.12%
D138	190007596	10753250	8987096	924502700	335 (263-407)	96.41%
D139	190007599	12940902	10244822	1051607400	1751 (1285-2217)	97.67%
B011	190007602	11990029	10060763	1036686300	1257 (886-1628)	98.12%
D142	190007609	12137609	9940325	779107084	387 (311-463)	86.76%
D143	190007715	16068413	14271555	1366705856	336 (281-391)	98.86%
D144	190007718	13165949	11720026	911547648	707 (389-1025)	92.07%
D145	190007721	6223531	5546035	531656668	473 (336-610)	44.03%
D147	190007723	9373995	5378007	421944476	216 (3-429)	23.64%
D148	190007725	16063243	14204824	1363744668	812 (628-996)	99.16%
B012	190011450	11819028	10859350	1040277602	284 (229-339)	97.39%
D151	190011515	8504989	7748071	743638324	975 (730-1220)	83.89%
D152	190011518	11047460	10113531	973356464	670 (541-799)	92.45%
D153	190011519	11978508	10867026	1047492290	368 (303-433)	93.40%
D157	190011529	10718417	9484787	911741438	954 (461-1447)	93.31%
D160	190011536	15169250	13304667	1280659854	1075 (990-1160)	98.82%
D161	190011537	12701792	11339549	1090483754	416 (389-443)	98.57%
D162	190011544	15303284	13786238	1327819184	956 (352-1560)	98.45%
D163	190011545	5009414	4722589	454116914	410 (382-438)	21.71%
D164	190011546	13357056	12058787	1161123908	1007 (532-2135)	98.12%
C030	190011547	12895001	10782319	1100769500	400 (312-488)	98.07%
D165	190011551	13186518	11842516	1139350688	1062 (897-1227)	98.69%
C031	190011560	11691093	10810543	1038777080	1670 (1263-2077)	95.83%
D170	190011562	12853145	11323214	1086429722	338 (276-400)	96.73%
D172	190011565	13789477	12339549	1183482560	343 (280-406)	97.64%
D174	190011568	12401695	11450359	1099676954	1947 (1312-2582)	96.96%
C032	190011569	12748036	11716863	1124558002	485 (405-565)	98.38%
D175	190011570	12548287	11606312	1113239932	275 (234-316)	95.36%

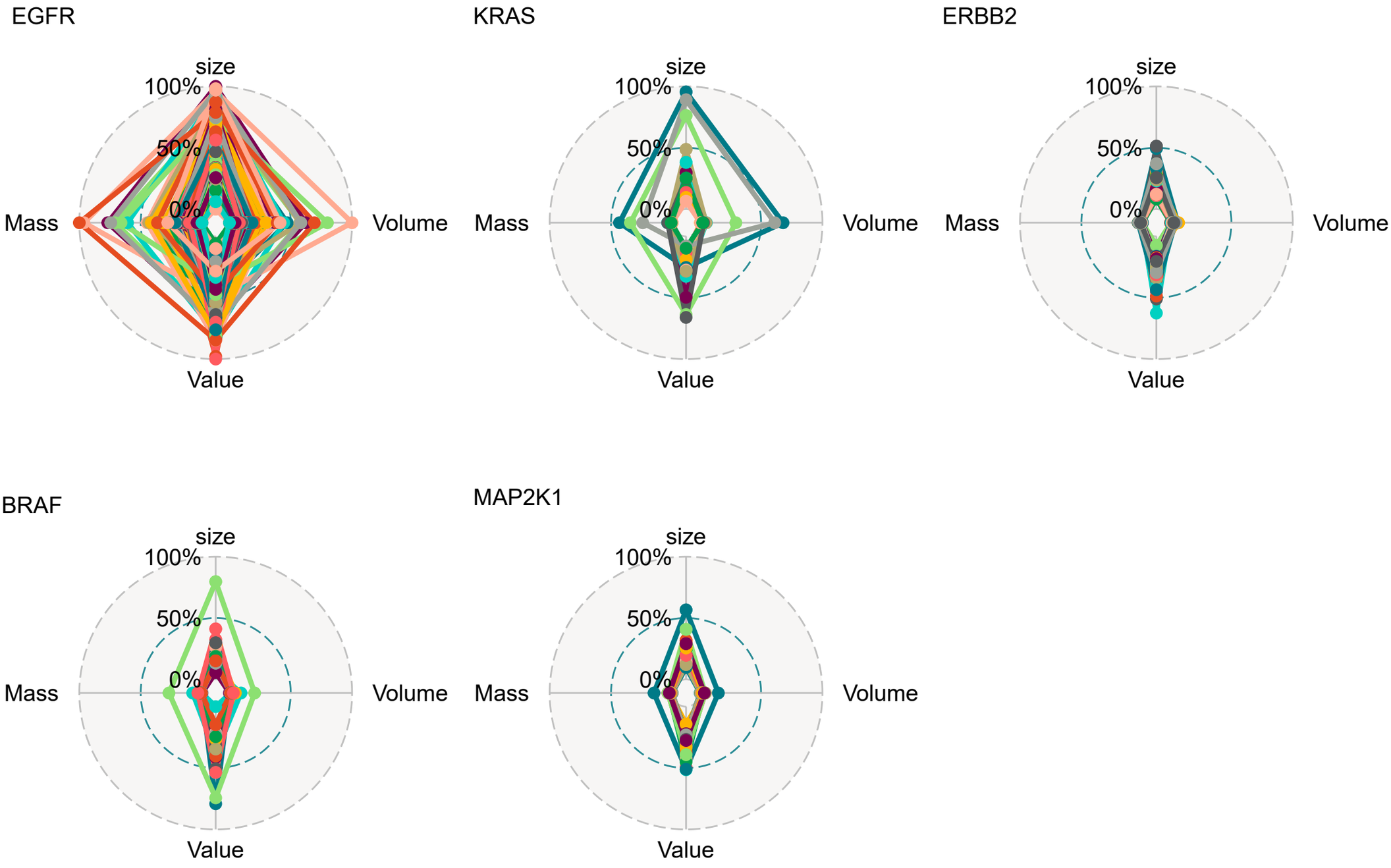
D176	190011571	12222361	10488125	1006550214	896 (701-1091)	95.68%
C033	190011572	11102173	9995561	958760990	1159 (807-1511)	94.04%
D177	190011575	14343410	12781668	1226793718	1194 (711-1677)	97.98%
C035	190011576	12476555	11250753	1078681208	296 (272-320)	98.10%
D178	190011577	14624353	13015859	1009044476	450 (379-521)	95.90%
C036	190011578	14113849	12536931	971549876	357 (322-392)	94.03%
D179	190011579	13130295	11727686	908485608	838 (449-1227)	92.59%
D180	190011580	13457548	12415779	1190515452	281 (257-305)	97.74%
D181	190011583	15794760	13285300	1041742868	1411 (964-1858)	94.10%
C038	190011586	19831133	16528925	1297442816	939 (477-1401)	98.35%
D184	190011587	9380977	7852666	799868800	1121 (277-1965)	88.77%
D185	190011588	17286130	13948080	1081657232	1350 (796-1904)	98.03%
D186	190011592	16721274	13656393	1087890144	1272 (1076-1468)	69.50%
C039	190011597	13212741	11912053	934664112	130 (124-136)	90.70%
C040	190011598	13571557	12161921	954770596	355 (301-409)	90.60%
DT6	190011606	17600024	14588173	1139662028	1892 (1463-2321)	97.24%
C042	190011610	18912616	12843940	1003194832	1736 (1135-2337)	92.24%
B016	190011611	10769545	8985300	700058344	270 (216-324)	70.80%
D194	190014689	11555282	10681041	829724984	873 (562-1184)	86.11%
D197	190014767	15801423	12708127	1222027824	335 (267-403)	98.87%
D198	190014770	8847055	8186721	785131052	1076 (820-1332)	88.84%
D200	190014774	12031295	10926964	1047569276	232 (195-269)	98.45%
D201	190014778	11191552	10024384	780143648	829 (670-988)	79.57%
D203	190014780	13214143	12025219	1151921966	676 (77-1275)	97.57%
D204	190014781	14731580	13234468	1266340552	1065 (992-1138)	98.99%
D209	190014789	15032890	13219884	1029690408	961 (912-1010)	93.30%
D214	190014803	16558216	14584314	1148202376	424 (393-455)	91.28%
D218	190014808	17923108	14883737	1160578596	965 (919-1011)	98.59%
C044	190014810	17628565	14651943	1143614256	466 (431-501)	97.34%
A004	190014812	29252652	25936283	2020072932	319 (295-343)	99.34%
C045	190014813	30385793	26869892	2094846900	797 (757-837)	99.24%
D220	190018149	12669935	11600225	907645580	1191 (1112-1270)	84.49%
B019	190018150	10877831	9568885	922269156	1158 (1053-1263)	90.53%
D222	190018175	11151241	10353120	811177108	1176 (1074-1278)	64.41%
B020	190018188	14464940	13219694	1266417350	380 (314-446)	98.93%
C047	190018190	11847167	10793441	1031669646	769 (627-911)	97.34%
C048	190018192	13135835	11887592	1137898576	1230 (839-1621)	98.52%
C049	190018196	10606686	9833288	945288910	372 (308-436)	90.40%
D226	190018197	14606938	13023376	1012212536	421 (319-523)	96.53%
D227	190018199	12454581	11401388	1092342792	1795 (1465-2125)	98.05%
D229	190018208	11924784	10866514	1041648122	413 (345-481)	96.12%
C050	190018212	12550908	11259002	1078144938	1221 (625-1817)	97.13%
D236	190018221	15761410	14003092	1089130996	938 (549-2149)	95.52%
C051	190021858	9202888	8354459	800473356	324 (249-399)	90.56%
D239	190021859	9464119	8644634	828451046	572 (409-1710)	91.48%
D241	190021866	8749749	8121454	777513104	650 (472-1527)	87.44%
D242	190021867	11512957	10527334	1008408406	1075 (631-1519)	96.96%
D243	190021868	12064710	10793055	1035558708	308 (249-367)	98.90%
D245	190021870	9097095	8393625	804422766	910 (830-990)	88.70%
D246	190021871	9798864	9084379	868683140	780 (718-842)	93.91%
D247	190021874	10562014	9604408	922111800	339 (303-375)	89.82%

C053	190021882	9213287	8528103	819359930	828 (734-922)	92.55%
C054	190021886	13227851	11968120	1153503798	191 (170-212)	97.92%
D251	190021901	10634454	9793134	940563812	765 (658-872)	91.96%
D256	190022008	6178588	5807524	558020754	518 (459-577)	49.84%
D257	190022010	12195293	11075856	1068038152	1014 (937-1091)	95.50%
D259	190026113	25242249	21997937	2142584112	767 (729-805)	98.80%
C057	190026167	14480651	12873680	1234479722	318 (301-335)	99.57%
D265	190026173	14792031	12962046	1009639404	974 (905-1043)	97.24%
D267	190026186	13953354	12304162	1182148982	1005 (945-1065)	99.51%
D268	190026188	10947275	10168392	975643296	280 (258-302)	95.77%
D271	190029506	12176862	10604996	1019027022	2600 (1409-5355)	98.34%
D272	190029509	14350719	12377290	1189065972	1539 (876-2202)	99.22%
B022	190029520	9025789	8179547	785489474	1567 (1067-2067)	90.41%
D274	190029522	7577026	6923673	664503766	361 (331-391)	78.53%
D275	190029523	8788024	8006338	767542524	406 (360-452)	89.87%
D278	190033513	13182020	11243527	1080020802	982 (229-1735)	98.86%
D279	190033514	7759997	7059466	676964500	298 (267-329)	78.00%
D280	190033532	15327228	12895176	1238490326	1128 (549-1707)	97.56%
D281	190033543	16249020	13470189	1293572822	1041 (226-1856)	97.13%
D282	190033545	9756800	8666451	831050240	351 (313-389)	90.91%
CDD5	190033546	9534449	8504105	814883838	776 (354-1198)	87.52%
D283	190033548	10795835	9587344	919261438	1971 (1271-2671)	93.29%
D286	190033553	7249899	6526772	625178208	1618 (813-2423)	68.55%
D288	190033626	13022265	11225528	1082301430	490 (431-549)	95.69%
D294	190033642	14808588	12912074	1239223714	470 (427-513)	99.06%
D297	190033651	9407502	8249593	794388454	1516 (1126-1906)	79.28%
D298	190033653	6582769	5977255	574517660	163 (157-169)	47.79%
D299	190033657	10112638	8653691	828941914	411 (375-447)	80.17%
D301	190033660	9874956	8436891	809122578	1424 (1014-1834)	76.54%
D303	190033667	14250940	12424653	1195812164	414 (339-489)	94.62%
C060	190033674	21624938	16060189	1541201816	1833 (1200-2466)	95.34%
D307	190033689	10901813	9943661	953456570	441 (400-482)	95.37%
D308	190033690	11661606	10622164	1018974382	1532 (978-2086)	97.42%
D309	190033693	12932158	11715106	1123403494	323 (264-382)	98.76%
D311	190033697	13617691	12280874	1178783312	370 (347-393)	99.10%
D312	190033698	10742595	9745740	933946870	1171 (907-1435)	93.49%
D313	190033700	11076905	10019884	960716472	307 (289-325)	94.82%
A002	190007607	13014944	10346797	811056572	1090 (855-1325)	89.81%
C012	180031364	13848930	11708518	1208478600	372 (325-419)	97.88%
B014	190011561	41402717	34479830	3330329196	1229 (452-2006)	99.93%
C028	190001408	12332670	10067741	791487864	907 (831-983)	72.49%
C034	190011573	56551865	7910714	806593978	444 (399-489)	71.08%
C052	190021864	12055265	10839451	1038716732	853 (771-935)	97.81%
D027	180017633	17639594	14854853	1553975100	950 (890-1010)	41.53%
D048	180025971	9977950	8125181	838446900	427 (388-466)	84.03%
D072	180029937	10523200	8638586	677103988	916 (852-980)	71.92%
D123	190001399	13491170	11541772	1106538672	389 (364-414)	99.27%
D128	190001406	11396684	9730841	936274216	1430 (622-2238)	92.42%
D154	190011526	13844210	12252073	1177481882	406 (377-435)	98.43%
D173	190011566	14456889	13300987	1277329340	995 (923-1067)	98.63%
D213	190014801	22287872	19638754	1547631396	388 (364-412)	98.11%

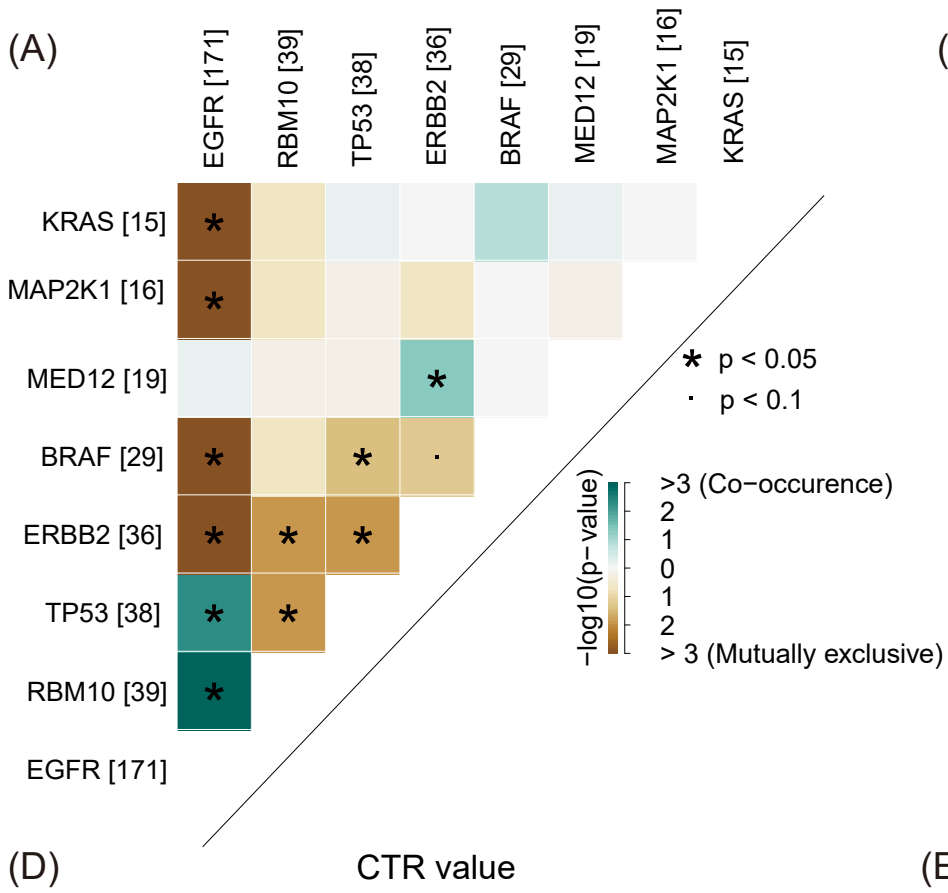
D228	190018202	10747466	9843518	943548218	781 (689-873)	94.42%
D240	190021865	37450288	28726646	2789090168	336 (303-369)	99.87%
D260	190026131	14898277	12778656	997038604	367 (156-932)	94.61%
D262	190026170	13760909	11485294	1169958500	716 (652-2132)	99.43%
D264	190026172	16977582	14983351	1166482580	234 (187-2209)	99.03%
D290	190033628	16786992	14823612	1422251678	1337 (1186-1488)	99.30%
B025	199007437	46234707	37091317	3825825100	408 (370-446)	99.99%
B031	199007455	56910321	33258240	3240711758	1000 (783-2043)	99.98%
B034	199007500	82846762	63371459	6177040894	881 (812-950)	99.97%
C074	199007480	47852540	40633815	3907094114	385 (343-427)	99.97%
A005	199007434	82499395	67022532	5299632152	1003 (904-1102)	99.96%
B027	199007447	66926958	45539883	4714994400	363 (323-403)	99.96%
B028	199007449	63341808	52482167	4154302120	1276 (800-1752)	99.96%
B029	199007451	54383100	46604680	3656474608	344 (308-380)	99.96%
B030	199007453	41297363	36609129	3395663010	939 (894-984)	99.96%
C068	199007461	39532830	35278323	3271738140	414 (386-442)	99.96%
C069	199007463	48693260	31496683	3196241392	635 (515-755)	99.96%
C072	199007472	46684073	37797830	3653114856	610 (504-716)	99.96%
C073	199007474	66669373	51556157	4985060358	339 (284-394)	99.96%
C075	199007482	68572445	52667912	5069568614	321 (237-405)	99.96%
C080	199007492	46210978	36789620	3543324924	439 (363-515)	99.96%
C081	199007494	68712482	52507277	5041482824	841 (581-1101)	99.96%
C082	199007495	62686666	50467210	4859728654	423 (351-495)	99.96%
C083	199007498	86361705	50268337	3996281172	308 (252-364)	99.95%
C079	199007490	42755070	30862945	2976289194	1139 (423-1855)	99.95%
C076	199007484	50124222	39109566	3808646598	436 (338-534)	99.95%
B026	199007445	56883785	45710912	4399103744	1158 (902-1414)	99.95%
B032	199007457	67370601	50349807	4903215498	573 (468-678)	99.95%
B033	199007459	77852678	54732174	5328145318	247 (201-293)	99.95%
C070	199007466	70734471	55383533	5335852002	579 (453-705)	99.95%
C077	199007486	87229761	68877555	5429475720	528 (418-638)	99.94%
B036	199007503	77237829	53127144	4224527716	574 (464-684)	99.94%
C071	199007470	57387409	43652270	4523277900	323 (296-350)	99.94%
B035	199007502	62659446	47401599	4646485612	649 (601-697)	99.94%

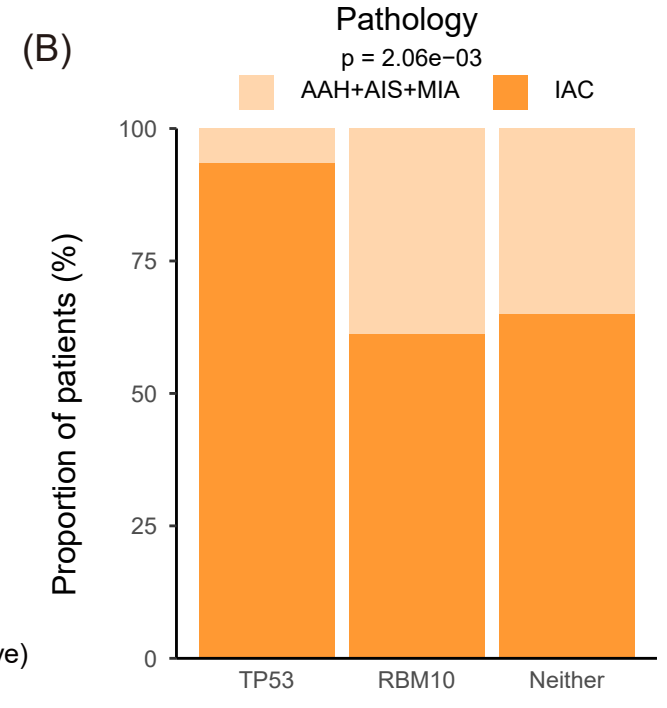


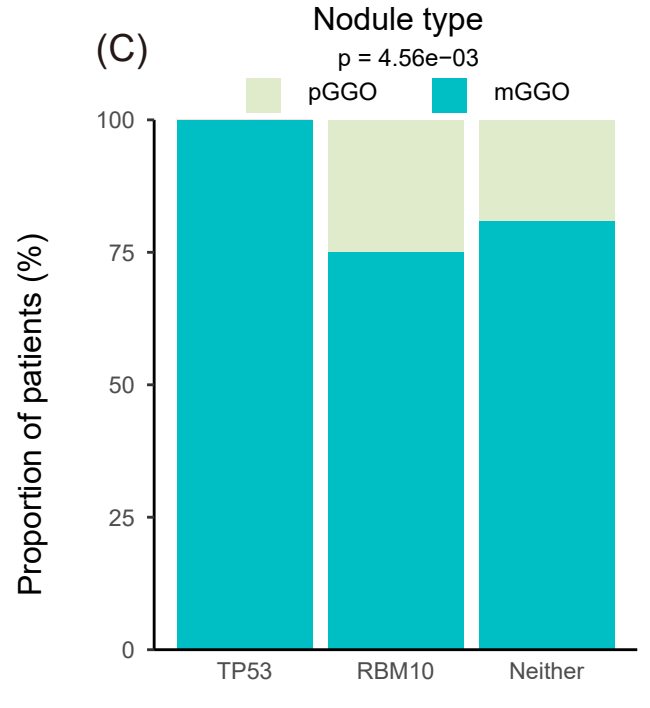
Supplementary Figure S1. Internodal heterogeneity comparison in the same patients presenting as GGO. Each patient with multiple GGO nodules is depicted as a small heatmap, where each row indicates a mutation, and each column indicates a nodule. The shade of color is corresponding to the variant allele frequency.

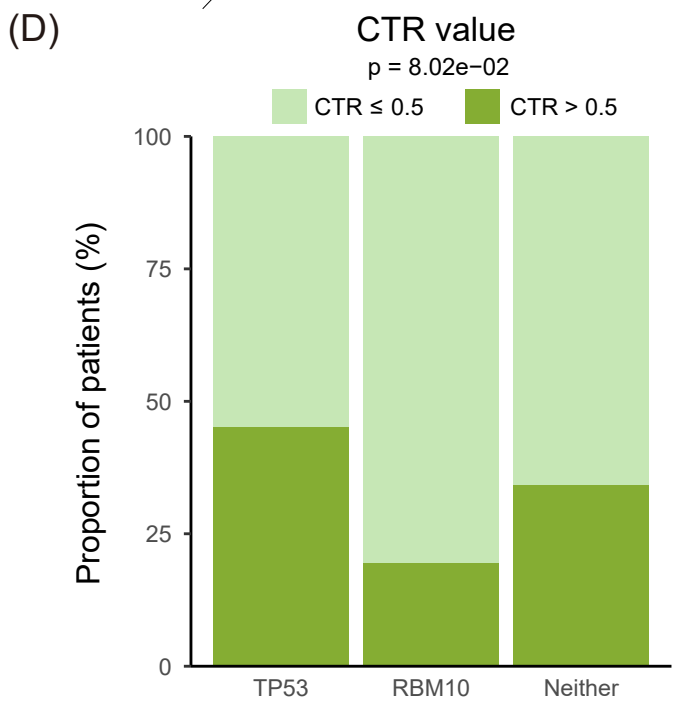


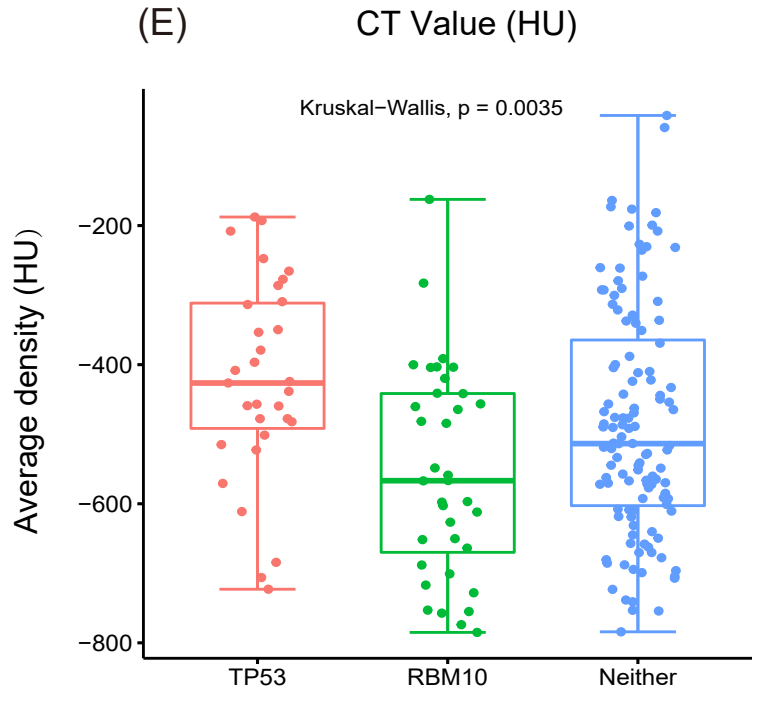
Supplementary Figure S2. Radar plots showing the standard radiologic features including CT size, CT mass, CT volume and CT value in each group of GGO nodules defined by different driver genes.

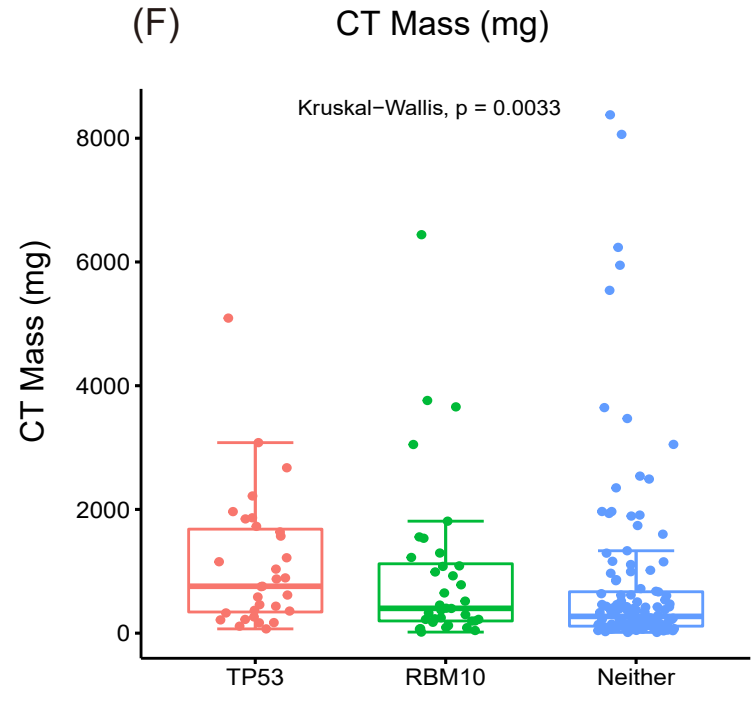


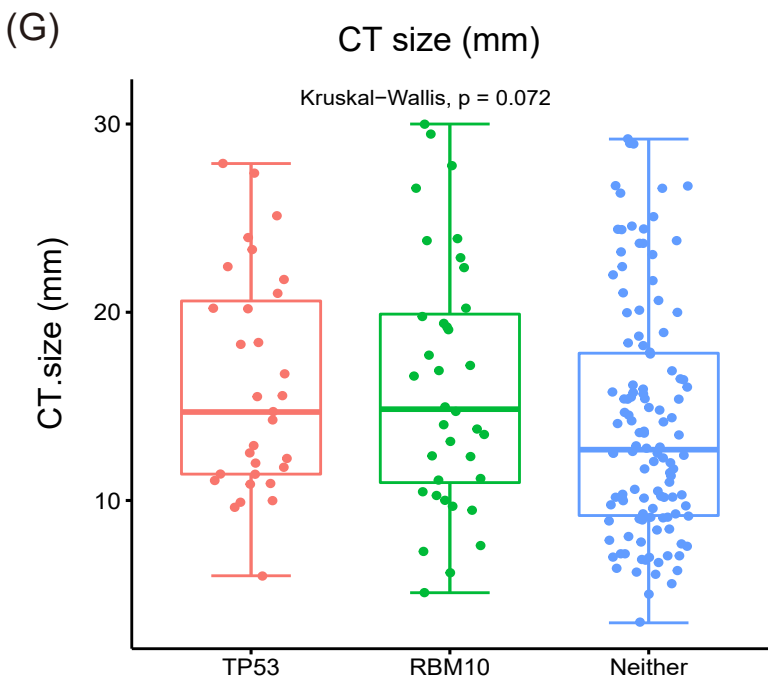


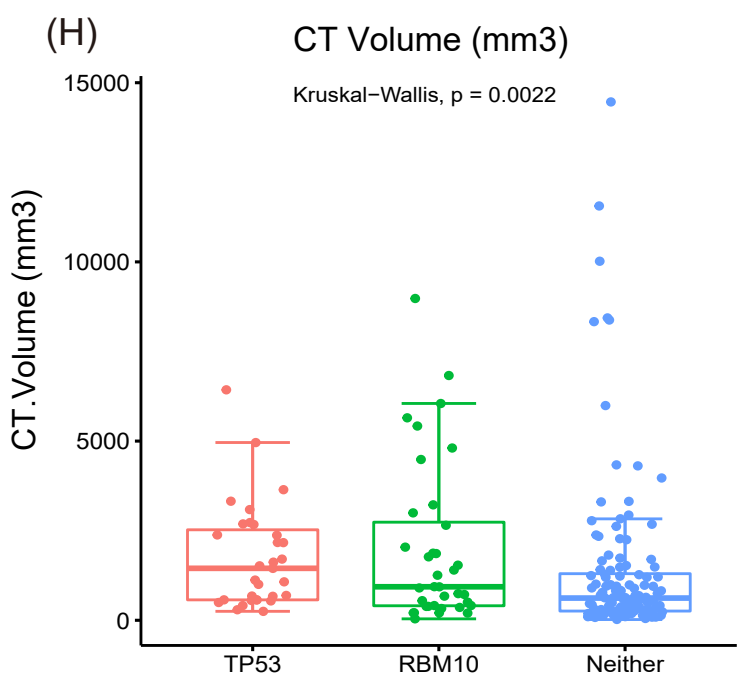


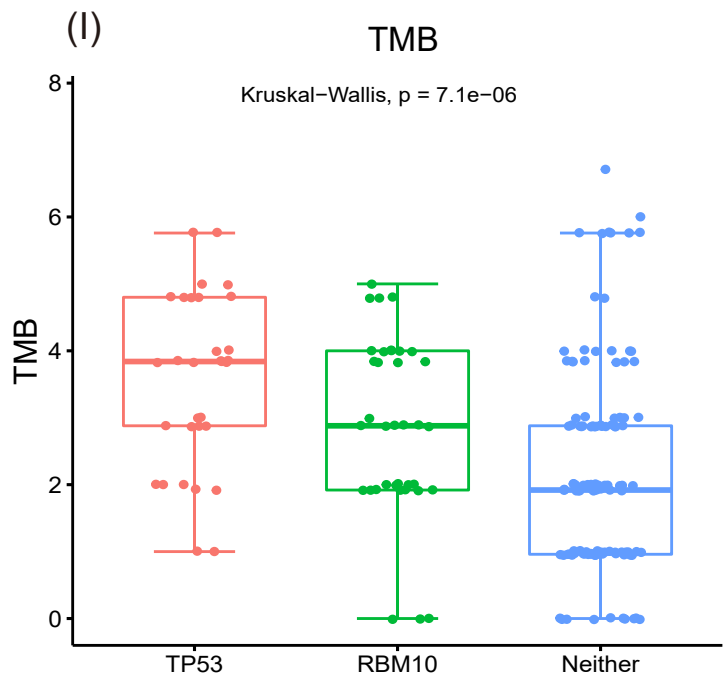












Supplementary Figure S3. The association of co-mutation with clinicopathologic and radiologic features in GGO nodules (A) Co-occurrence of the top 8 mutated genes in the cohort. Only genes with mutations in at least 15 samples were considered. (B-I) Comparisons of pathology (B), nodule type (C), CTR value (D), CT value (E), CT mass (F), CT size (G), CT volume (H) and TMB (I) among different gene co-mutation groups. The global differences among the groups were assessed by Fisher's exact test or by Kruskal-Wallis test as appropriate.