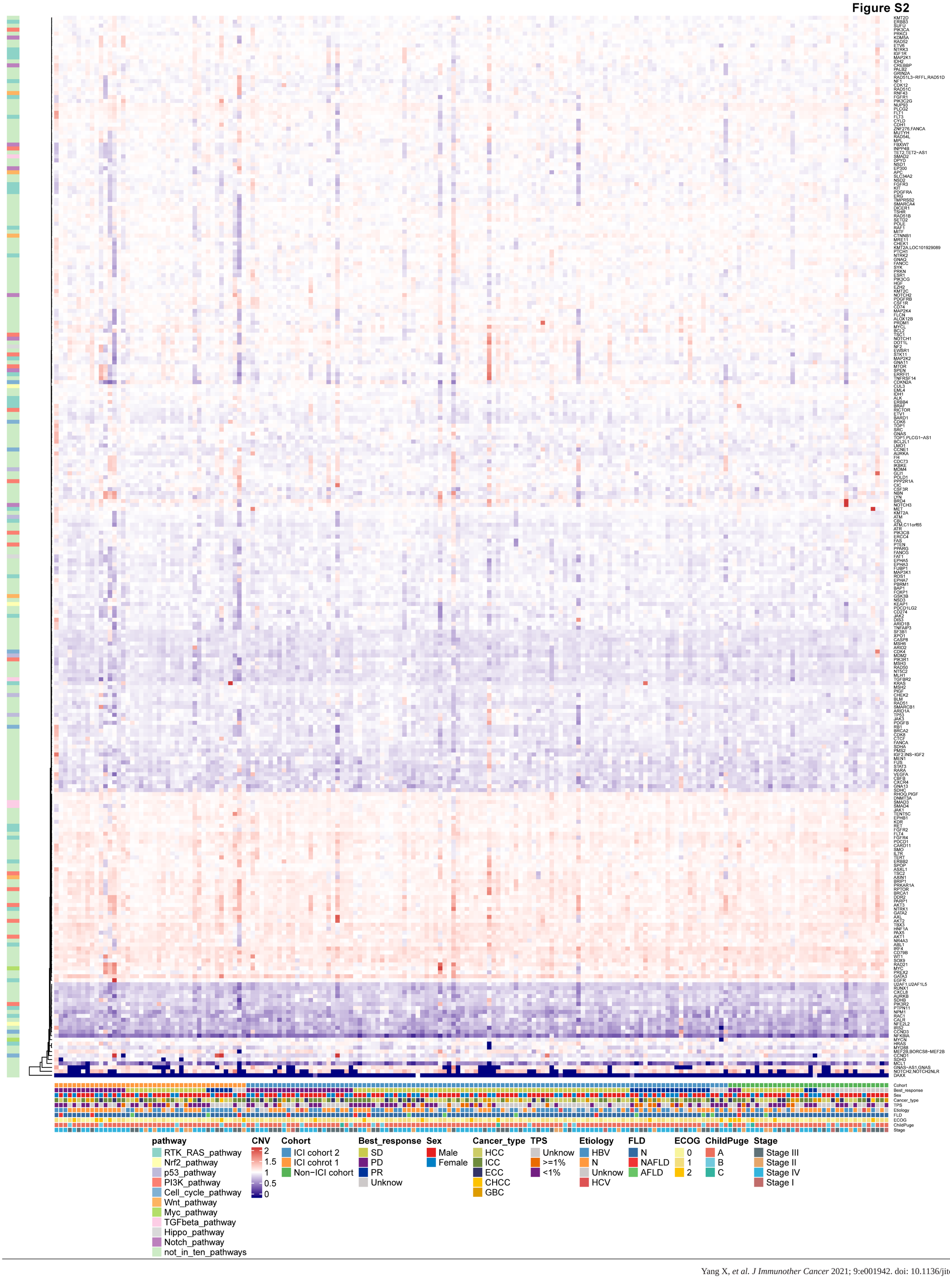
**Figure S2**


KMT2D
ERBB3
SUFU
PIK3CA
PRKCI
KDM5A
RAD52
ETV6
NTRK3
IGF1R
MAP2K1
IDH2
CREBBP
PALB2
GRIN2A
RAD51L3−RFFL,RAD51D
NF1
CDK12
RAD51C
RNF43
FGFR1
PIK3C2G
NUP93
PLCG2
FLT1
FLT3
CYLD
CDH1
ZNF276,FANCA
MUTYH
RAD54L
MPL
FBXW7
INPP4B
TET2,TET2−AS1
SMAD2
DPYD
NSD1
EP300
APC
SLC34A2
NSD2
FGFR3
KIT
PDGFRA
ERG
TMPRSS2
SMARCA4
DICER1
TSHR
RAD51B
SETD2
POLE
RAF1
MITF
CTNNB1
MRE11
CHEK1
KMT2A,LOC101929089
PTCH1
NTRK2
GNAQ
FANCC
SYK
PRKN
ESR1
PIK3CG
HGF
EZH2
KMT2C
NOTCH2
PDGFRB
CSF1R
CD74
MAP2K4
FLCN
ALOX12B
PRDM1
MYCL
BCL2
TSC1
NOTCH1
DOT1L
NF2
EWSR1
STK11
MAP2K2
GNA11
MTOR
SPEN
ERRFI1
TNFRSF14
CDKN2A
CUL3
EML4
IDH1
ALK
ERBB4
BRAF
RICTOR
ETV1
BARD1
CDK6
TOP1
SRC
GNAS
TOP1,PLCG1−AS1
BCL2L1
LMO1
CCNE1
AURKA
FH
CDC73
IKBKE
MDM4
GLI1
POLD1
PPP2R1A
CIC
CSF3R
NBN
LYN
BRD4
NOTCH3
MET
KMT2A
ATM
CBL
ATM,C11orf65
ATR
PIK3CB
ERCC4
FAS
PTEN
PPARG
FANCG
FAT1
EPHA5
EPHA3
FUBP1
MAP3K1
ROS1
EPHA7
PBRM1
BAP1
FOXP1
GSK3B
NSD3
KEAP1
PDCD1LG2
CD274
JAK2
DIS3
ARID1B
TNFAIP3
SF3B1
XPO1
CASP8
MSH6
ARID2
CDK4
MDM2
PIK3R1
MSH3
RAD50
NT5C2
MLH1
TGFBR2
KRAS
MSH2
PIGF
CHEK2
BLM
RAD51
SMARCB1
ARID1A
TP53
JAK3
PDGFB
RB1
BRCA2
CDK8
CTCF
FANCA
SDHA
PMS2
IGF2,INS−IGF2
MEN1
FUS
STAT3
RARA
VEGFA
CBFB
CXCR4
GNA13
SDHC
RHOQ,PIGF
DNMT3A
SMAD3
SMAD4
JAK1
TENT5C
EPHB1
KDR
RET
FGFR2
FLT4
FGFR4
PDCD1
CARD11
SMO
IL7R
TERT
ERBB2
SPOP
ASXL1
TSC2
AXIN1
BRIP1
PRKAR1A
RPTOR
BRCA1
DDR2
PARP1
AKT3
NTRK1
GATA2
AXL
AKT2
TBX3
HNF1A
PAX5
AKT1
NR4A3
ABL1
IRF4
CD79B
WT1
SOX9
RAD21
MYC
PREX2
GATA3
EGFR
U2AF1,U2AF1L5
RUNX1
CXCL8
AURKB
SDHB
PIK3R2
PTPN11
NPM1
RAC1
CALR
NFE2L2
IRS2
CCND3
NFKBIA
MYCN
HRAS
MYD88
MEF2B,BORCS8−MEF2B
CCND1
SDHD
MCL1
GNAS−AS1,GNAS
NOTCH2,NOTCH2NLR
DAXX
Cohort
Best_response
Sex
Cancer_type
TPS
Etiology
FLD
ECOG
ChildPuge
Stage
pathway
RTK_RAS_pathway
Nrf2_pathway
p53_pathway
PI3K_pathway
Cell_cycle_pathway
Wnt_pathway
Myc_pathway
TGFbeta_pathway
Hippo_pathway
Notch_pathway
not_in_ten_pathways
CNV
2
1.5
1
0.5
0
Cohort
ICI cohort 2
ICI cohrot 1
Non−ICI cohort
Best_response
SD
PD
PR
Unknow
Sex
Male
Female
Cancer_type
HCC
ICC
ECC
CHCC
GBC
TPS
Unknow
>=1%
<1%
Etiology
HBV
N
Unknow
HCV
FLD
N
NAFLD
AFLD
ECOG
0
1
2
ChildPuge
A
B
C
Stage
Stage III
Stage II
Stage IV
Stage I