

Supplementary Table 1 The gene set of lipid metabolic pathway

Genes	Pathway
HSD3B1	Lipid
HSD3B2	Lipid
AP2A1	Lipid
AP2A2	Lipid
AP2B1	Lipid
AP2M1	Lipid
A2M	Lipid
AP2S1	Lipid
PRKAA2	Lipid
PRKAB2	Lipid
PRKAG2	Lipid
ABCB11	Lipid
ABCA1	Lipid
ABCG5	Lipid
ABCG8	Lipid
DBI	Lipid
ACADL	Lipid
ACADM	Lipid
ACADS	Lipid
ACADVL	Lipid
ACHE	Lipid
ACLY	Lipid
SCD	Lipid
NDUFAB1	Lipid
AGPS	Lipid
PLIN2	Lipid
FDXR	Lipid

FDX1	Lipid
GLA	Lipid
AHR	Lipid
AKR1C1	Lipid
AKR1C2	Lipid
AKR1C3	Lipid
AKR1C4	Lipid
AKR1D1	Lipid
ALB	Lipid
AKR1B1	Lipid
ABCD1	Lipid
AMACR	Lipid
AGT	Lipid
ANGPTL3	Lipid
ANGPTL4	Lipid
APOA1	Lipid
APOA2	Lipid
APOA4	Lipid
APOB	Lipid
APOC1	Lipid
APOC2	Lipid
APOC3	Lipid
APOC4	Lipid
APOE	Lipid
APOF	Lipid
ACER3	Lipid
LPA	Lipid
ARF1	Lipid
ARF3	Lipid

ARNT2	Lipid
ARNT	Lipid
ARSA	Lipid
ARSB	Lipid
ARSD	Lipid
ARSE	Lipid
ARSF	Lipid
ASAH1	Lipid
SMPD1	Lipid
ACOT7	Lipid
CEL	Lipid
BDH1	Lipid
GLB1	Lipid
BHMT	Lipid
BMX	Lipid
CYP11A1	Lipid
CYP39A1	Lipid
ACOT12	Lipid
CRAT	Lipid
B4GALNT1	Lipid
ACOX1	Lipid
ACOX2	Lipid
ACOX3	Lipid
CAV1	Lipid
NFYB	Lipid
CREBBP	Lipid
CD36	Lipid
CDS1	Lipid
CDS2	Lipid

UGCG	Lipid
CETP	Lipid
ACOT9	Lipid
CCNC	Lipid
UGT8	Lipid
BCHE	Lipid
CIDEA	Lipid
CLOCK	Lipid
CPNE1	Lipid
CPNE3	Lipid
CPNE6	Lipid
CPNE7	Lipid
ACACB	Lipid
POMC	Lipid
CLPS	Lipid
COQ3	Lipid
COQ6	Lipid
COQ7	Lipid
CYP1A1	Lipid
CYP1A2	Lipid
CYP1B1	Lipid
CYP27A1	Lipid
CYP46A1	Lipid
CYP4B1	Lipid
CYP4A11	Lipid
CYP51A1	Lipid
CYP7A1	Lipid
CYP7B1	Lipid
CYP8B1	Lipid

CYP2C8	Lipid
CYP2C9	Lipid
CYP2C19	Lipid
CYP4F2	Lipid
CYP4F3	Lipid
CYP4F11	Lipid
CYP2J2	Lipid
CYP11B1	Lipid
CYP11B2	Lipid
CYP21A2	Lipid
CPT1A	Lipid
CPT2	Lipid
CYP17A1	Lipid
CPT1B	Lipid
CYP19A1	Lipid
MED17	Lipid
MED7	Lipid
SPTLC3	Lipid
FITM2	Lipid
CTGF	Lipid
PCYT1A	Lipid
PCYT1B	Lipid
MID1IP1	Lipid
ALDH7A1	Lipid
DAB1	Lipid
GNPAT	Lipid
MLYCD	Lipid
DECR1	Lipid
DGAT1	Lipid

ALDH3B1	Lipid
ALDH3B2	Lipid
HSD17B1	Lipid
HSD17B2	Lipid
HSD17B3	Lipid
HSD17B4	Lipid
HSD17B8	Lipid
DHCR7	Lipid
CBR1	Lipid
DHCR24	Lipid
HSD11B1	Lipid
HSD11B2	Lipid
EBP	Lipid
HADHA	Lipid
HADHB	Lipid
ECHS1	Lipid
EHHADH	Lipid
ETNK1	Lipid
ETNK2	Lipid
ELOVL1	Lipid
ELOVL2	Lipid
ELOVL3	Lipid
ELOVL4	Lipid
MVD	Lipid
TM7SF2	Lipid
SQLE	Lipid
LSS	Lipid
ESRRA	Lipid
FAAH	Lipid

FABP4	Lipid
FABP7	Lipid
FABP5	Lipid
FABP3	Lipid
FABP2	Lipid
FABP1	Lipid
FASN	Lipid
FDFT1	Lipid
FGF21	Lipid
ALOX5AP	Lipid
FDPS	Lipid
CIDEC	Lipid
FURIN	Lipid
KDSR	Lipid
FYN	Lipid
PIKFYVE	Lipid
G0S2	Lipid
GALC	Lipid
GGPS1	Lipid
GGT1	Lipid
GGT5	Lipid
GK2	Lipid
GBA	Lipid
CGA	Lipid
GLIPR1	Lipid
GK	Lipid
GLTP	Lipid
GPD1	Lipid
GPD2	Lipid

PNPLA4	Lipid
GPX1	Lipid
GPX2	Lipid
GPX4	Lipid
TECR	Lipid
HAO2	Lipid
HADH	Lipid
ALAS1	Lipid
HEXA	Lipid
HEXB	Lipid
HMGCS2	Lipid
HMGCS1	Lipid
HACL1	Lipid
HRASLS5	Lipid
HRASLS	Lipid
HRASLS2	Lipid
PLA2G16	Lipid
EPHX2	Lipid
IDH1	Lipid
IDI1	Lipid
IDI2	Lipid
FABP6	Lipid
KPNB1	Lipid
INSIG1	Lipid
PRKACA	Lipid
PRKACB	Lipid
PRKACG	Lipid
CSNK1G2	Lipid
CSNK2A2	Lipid

CSNK2B	Lipid
GPCPD1	Lipid
CHKB	Lipid
CHKA	Lipid
MVK	Lipid
PRKD1	Lipid
PRKD3	Lipid
PRKD2	Lipid
PTGR1	Lipid
LTC4S	Lipid
LCAT	Lipid
SPTLC1	Lipid
SPTLC2	Lipid
ACSL1	Lipid
ACSL3	Lipid
ACSL4	Lipid
ACSL5	Lipid
ACSL6	Lipid
LDLR	Lipid
VLDLR	Lipid
LIPA	Lipid
PNLIPRP1	Lipid
LIPG	Lipid
LIPF	Lipid
LIPC	Lipid
LPL	Lipid
PNLIP	Lipid
LIPE	Lipid
LTA4H	Lipid

ALOX15	Lipid
ALOX5	Lipid
ALOX12	Lipid
ALOX12B	Lipid
LPIN1	Lipid
LPIN2	Lipid
LPIN3	Lipid
LHB	Lipid
ALOX15B	Lipid
DMGDH	Lipid
ME1	Lipid
SLC25A20	Lipid
DPEP1	Lipid
ABCB4	Lipid
MED6	Lipid
STARD3NL	Lipid
MAPKAPK2	Lipid
STARD3	Lipid
ABCC1	Lipid
ABCC3	Lipid
MBTPS1	Lipid
MBTPS2	Lipid
MTM1	Lipid
MTTP	Lipid
MTMR1	Lipid
MTMR2	Lipid
MTMR3	Lipid
MTMR6	Lipid
MTMR7	Lipid

MUT	Lipid
NCOA2	Lipid
NEU1	Lipid
NEU2	Lipid
NEU3	Lipid
TRIB3	Lipid
SCP2	Lipid
NPAS2	Lipid
NPC1	Lipid
NPC2	Lipid
NR1D1	Lipid
NRF1	Lipid
NR1H2	Lipid
NSDHL	Lipid
SMPD2	Lipid
SLC10A2	Lipid
SLC10A1	Lipid
CROT	Lipid
OSBPL1A	Lipid
OSBPL2	Lipid
OSBPL3	Lipid
OSBPL5	Lipid
OSBPL6	Lipid
OSBPL7	Lipid
OSBPL8	Lipid
OSBPL9	Lipid
OSBPL10	Lipid
OSBP	Lipid
PIK3CA	Lipid

PIK3CB	Lipid
PIK3CD	Lipid
PIK3CG	Lipid
EP300	Lipid
PIK3R3	Lipid
PIK3R1	Lipid
PIK3R2	Lipid
PLA2G1B	Lipid
PLA2G3	Lipid
PLA2G4A	Lipid
PLA2G5	Lipid
PLA2G6	Lipid
PLA2G2A	Lipid
PLA2G2D	Lipid
PLA2G2E	Lipid
PLA2G2F	Lipid
PLA2G10	Lipid
PLA2G12A	Lipid
PHYH	Lipid
PCCA	Lipid
PCCB	Lipid
PCSK5	Lipid
STARD10	Lipid
PCYT2	Lipid
P4HB	Lipid
PEMT	Lipid
HPGDS	Lipid
HPGD	Lipid
PTGS1	Lipid

PTGS2	Lipid
PTGDS	Lipid
PI4KA	Lipid
PIP4K2A	Lipid
CDIPT	Lipid
PIK3C2B	Lipid
PIK3C2G	Lipid
AGPAT1	Lipid
AGPAT2	Lipid
AGPAT3	Lipid
AGPAT4	Lipid
AGPAT5	Lipid
PLD2	Lipid
PLIN1	Lipid
GPAM	Lipid
PLTP	Lipid
SLC25A17	Lipid
PMVK	Lipid
ACOT13	Lipid
PON1	Lipid
PON2	Lipid
PON3	Lipid
PPP1CA	Lipid
PPP1CB	Lipid
PPP1CC	Lipid
PPARA	Lipid
PPARD	Lipid
ALPI	Lipid
PCTP	Lipid

PITPNB	Lipid
PPT1	Lipid
PPT2	Lipid
CTSA	Lipid
PTDSS1	Lipid
ACOT8	Lipid
ACOT2	Lipid
PTEN	Lipid
PTGES	Lipid
PTGIS	Lipid
PTPN13	Lipid
RAB14	Lipid
RAB5A	Lipid
RELN	Lipid
RGL1	Lipid
RORA	Lipid
RXRA	Lipid
SLCO1A2	Lipid
SLCO1B1	Lipid
SLCO1B3	Lipid
SEC23A	Lipid
SEC24A	Lipid
SEC24B	Lipid
SEC24C	Lipid
SEC24D	Lipid
SRD5A1	Lipid
GM2A	Lipid
PSAP	Lipid
SAR1B	Lipid

SCAP	Lipid
OXCT1	Lipid
FHL2	Lipid
SOAT1	Lipid
SOAT2	Lipid
SP1	Lipid
SPHK1	Lipid
SPHK2	Lipid
MED21	Lipid
SREBF2	Lipid
STAR	Lipid
STARD4	Lipid
STARD5	Lipid
STARD6	Lipid
STARD7	Lipid
STS	Lipid
SULT2A1	Lipid
MED22	Lipid
SYNJ1	Lipid
SYNJ2	Lipid
MED24	Lipid
THRAP3	Lipid
MED12	Lipid
MED13	Lipid
TBL1XR1	Lipid
TBL1X	Lipid
TEAD1	Lipid
TEAD2	Lipid
TEAD3	Lipid

TEAD4	Lipid
PTGES3	Lipid
TAZ	Lipid
TBXAS1	Lipid
ACOT11	Lipid
THRSP	Lipid
ACAA1	Lipid
ACAT1	Lipid
ACAA2	Lipid
PLIN3	Lipid
RARRES3	Lipid
TPTE	Lipid
TNFRSF21	Lipid
TXNRD1	Lipid
SLC25A1	Lipid
VAPA	Lipid
VAPB	Lipid
HDLBP	Lipid
SLC27A2	Lipid
LPGAT1	Lipid
FIG4	Lipid
YAP1	Lipid
ZDHHC8	Lipid
CDK8	Lipid
RAN	Lipid
RAB4A	Lipid
PLD1	Lipid
LBR	Lipid
MCEE	Lipid

HMGCL	Lipid
PNPLA3	Lipid
AMN	Lipid
CERK	Lipid
TMEM55B	Lipid
CRLS1	Lipid
DDHD1	Lipid
MMAA	Lipid
PI4KB	Lipid
INPP5J	Lipid
PCSK9	Lipid
EPT1	Lipid
SGPL1	Lipid
SH3KBP1	Lipid
INPP5K	Lipid
SIN3A	Lipid
SIN3B	Lipid
MED31	Lipid
SGPP1	Lipid
SGPP2	Lipid
SCARB1	Lipid
SUMF1	Lipid
SUMF2	Lipid
MED20	Lipid
HSD3B7	Lipid
B3GALNT1	Lipid
ARNTL	Lipid
BMP1	Lipid
COL4A3BP	Lipid

CHDH	Lipid
ACOT1	Lipid
ALDH3A2	Lipid
MCAT	Lipid
HMGCR	Lipid
INPP5E	Lipid
MGLL	Lipid
MYLIP	Lipid
PLA2G4C	Lipid
PIP4K2B	Lipid
PLEKHA1	Lipid
PLEKHA2	Lipid
PLEKHA3	Lipid
PLEKHA4	Lipid
PLEKHA5	Lipid
PLEKHA6	Lipid
PPARGC1A	Lipid
PTDSS2	Lipid
ACOT4	Lipid
RUFY1	Lipid
SARDH	Lipid
OLAH	Lipid
SGMS1	Lipid
SGMS2	Lipid
SREBF1	Lipid
ACAT2	Lipid
BAAT	Lipid
THEM4	Lipid
LDLRAP1	Lipid

APOA5	Lipid
PIK3C3	Lipid
PIK3R4	Lipid
CH25H	Lipid
SLC27A5	Lipid
TGS1	Lipid
CSNK2A1	Lipid
CYP4F22	Lipid
MED25	Lipid
MED14	Lipid
MED30	Lipid
MED4	Lipid
AACS	Lipid
ABHD3	Lipid
ABHD4	Lipid
ABHD5	Lipid
ACBD4	Lipid
ACBD5	Lipid
ACBD6	Lipid
ACBD7	Lipid
ACSBG1	Lipid
ACSBG2	Lipid
ACAD10	Lipid
ACAD11	Lipid
ACOT6	Lipid
ACOXL	Lipid
ACSF2	Lipid
ACSF3	Lipid
ACSM3	Lipid

ACSS3	Lipid
NCEH1	Lipid
AGK	Lipid
ANKRD1	Lipid
ARSG	Lipid
ARSH	Lipid
ARSI	Lipid
ARSJ	Lipid
ARSK	Lipid
ARV1	Lipid
ACER2	Lipid
ASAH2	Lipid
ACER1	Lipid
AWAT1	Lipid
AWAT2	Lipid
BDH2	Lipid
CARM1	Lipid
CBR4	Lipid
CDK19	Lipid
CEPT1	Lipid
CHD9	Lipid
CHPT1	Lipid
COQ2	Lipid
COQ5	Lipid
COQ9	Lipid
CREB3L3	Lipid
SLC44A1	Lipid
SLC44A2	Lipid
SLC44A3	Lipid

SLC44A4	Lipid
SLC44A5	Lipid
CUBN	Lipid
DDHD2	Lipid
DECR2	Lipid
DEGS1	Lipid
DEGS2	Lipid
DGAT2L6	Lipid
DGAT2	Lipid
HSD17B11	Lipid
HSD17B12	Lipid
HSD17B13	Lipid
HSD17B14	Lipid
PDSS2	Lipid
DPEP2	Lipid
DPEP3	Lipid
PDSS1	Lipid
ELOVL5	Lipid
ELOVL6	Lipid
ELOVL7	Lipid
ENPP6	Lipid
ENPP7	Lipid
CES3	Lipid
ESYT1	Lipid
ESYT2	Lipid
ESYT3	Lipid
FAAH2	Lipid
FABP9	Lipid
FAR1	Lipid

FAR2	Lipid
FADS1	Lipid
FADS2	Lipid
GBA2	Lipid
GDE1	Lipid
GDPD1	Lipid
GDPD3	Lipid
GDPD5	Lipid
GLB1L	Lipid
GLTPD1	Lipid
GPD1L	Lipid
GRHL1	Lipid
GPIHBP1	Lipid
INPP4A	Lipid
INPP4B	Lipid
INSIG2	Lipid
LIPH	Lipid
LIP1	Lipid
LIPJ	Lipid
LIPK	Lipid
LIPM	Lipid
LIPN	Lipid
PNLIPRP3	Lipid
LMF1	Lipid
LMF2	Lipid
LSR	Lipid
LCLAT1	Lipid
MBOAT1	Lipid
MBOAT2	Lipid

LPCAT3	Lipid
MBOAT7	Lipid
MED13L	Lipid
MED10	Lipid
MED11	Lipid
MED18	Lipid
MED19	Lipid
MED28	Lipid
MED29	Lipid
MED9	Lipid
MFSD2A	Lipid
MOGAT1	Lipid
MOGAT2	Lipid
MOGAT3	Lipid
MTF1	Lipid
MTMR4	Lipid
MTMR14	Lipid
NPC1L1	Lipid
SMPD3	Lipid
SMPD4	Lipid
NUDT19	Lipid
NUDT7	Lipid
ORMDL1	Lipid
ORMDL2	Lipid
ORMDL3	Lipid
PIK3C2A	Lipid
PI4K2A	Lipid
PI4K2B	Lipid
PLA2G4D	Lipid

PLA2G4E	Lipid
PLA2G4F	Lipid
LPCAT1	Lipid
LPCAT2	Lipid
PECR	Lipid
PTGES2	Lipid
PHOSPHO1	Lipid
PIK3R5	Lipid
PIK3R6	Lipid
PIP4K2C	Lipid
PIP5K1A	Lipid
PIP5K1B	Lipid
PIP5K1C	Lipid
PITPNM1	Lipid
PITPNM2	Lipid
PITPNM3	Lipid
PLEKHA8	Lipid
PLA1A	Lipid
PLA2R1	Lipid
PLB1	Lipid
PLBD1	Lipid
AGPAT6	Lipid
LPCAT4	Lipid
AGPAT9	Lipid
PLD3	Lipid
PLD4	Lipid
PNPLA2	Lipid
PNPLA5	Lipid
PNPLA6	Lipid

PNPLA7	Lipid
PNPLA8	Lipid
GPAT2	Lipid
ACP6	Lipid
PPM1L	Lipid
PPARGC1B	Lipid
PTPLAD1	Lipid
PTPLAD2	Lipid
PTPMT1	Lipid
PEX11A	Lipid
SLC27A1	Lipid
SLC27A3	Lipid
TECRL	Lipid
SRD5A3	Lipid
SACM1L	Lipid
SCD5	Lipid
INPP5D	Lipid
INPPL1	Lipid
SMARCD3	Lipid
TNFAIP8	Lipid
THEM5	Lipid
TMEM86B	Lipid
TNFAIP8L1	Lipid
TNFAIP8L2	Lipid
TPTE2	Lipid
FITM1	Lipid
VAC14	Lipid
WWTR1	Lipid
PLD6	Lipid

PTGR2	Lipid
CHAT	Lipid
C10orf129	Lipid
AHRR	Lipid
FAM120B	Lipid
HMGCLL1	Lipid
PGS1	Lipid
INPP5F	Lipid
TNFAIP8L3	Lipid
NCOA6	Lipid
CYP4A22	Lipid
FABP12	Lipid
PTPLA	Lipid
PTPLB	Lipid
HDAC3	Lipid
NCOR1	Lipid
MED26	Lipid
CLTA	Lipid
NFYA	Lipid
PCSK6	Lipid
PPARG	Lipid
ABCG1	Lipid
HSD17B7	Lipid
CLTC	Lipid
OCRL	Lipid
ACACA	Lipid
NR1H3	Lipid
NFYC	Lipid
MED1	Lipid

NCOA1	Lipid
MED27	Lipid
CYP2U1	Lipid
TIAM2	Lipid
MED8	Lipid
NR1H4	Lipid
MED15	Lipid
MED23	Lipid
MED16	Lipid
NCOR2	Lipid
NCOA3	Lipid
PISD	Lipid
NEU4	Lipid
AKR1B15	Lipid

Supplementary Table 2 Primers for real-time PCR

Genes	Primers
β -actin-F	CTGGCACCACACCTTCTACAATGA
β -actin-R	GGATAGCACAGCCTGGATAGCAA
LCAT-F	TGGCTCCTCAATGTGCTCTTCC
LCAT-R	AAGTCCTCTGTCTTGCGGTAGC
DNMT1-F	CGGCAGACCATCAGGCATTCTAC
DNMT1-R	CGTTCTCCTTGTCTTCTCTGTCATCC
DNMT3A-F	ACCCTGCGGTGATCTCCAAGT
DNMT3A-R	TTCCACTGCTCTTGAGGCTTCAG
DNMT3B-F	TGACTTGGTGATTGGCGGAAGC
DNMT3B-R	GCGTGAGTAATTCAGCAGGTGGTAA

Supplementary Table 3 Multivariate logistic analysis

Variable	β	Odds ratio(95CI)	P-value
Gender	0.017	1.018 (0.400-2.667)	0.971
Age	-0.012	0.988 (0.957-1.019)	0.441
HBV viral status	0.102	1.107 (0.565-2.162)	0.764
ALT	0.412	1.510 (0.768-3.000)	0.234
Tumor size	-0.233	0.791 (0.358-1.710)	0.554
Multinodular	-0.059	0.943 (0.362-2.433)	0.903
Cirrhosis	-0.088	0.915 (0.292-2.993)	0.880
TNM stage	0.850	2.340 (1.282-4.421)	0.007**
BCLC stage	-0.206	0.814 (0.456-1.439)	0.47940
AFP	1.080	2.944 (1.527-5.798)	0.001**
LCAT	-1.557	0.211 (0.110-0.395)	1.83e-06***