

Supplementary Table 1. Collection of 1234 MRGs

id
ADH5
AFG1L
AIFM2
AKR1A1
AKR1B1
AKR1C4
AKR7A2
AKR7A3
ALDH2
ALDH4A1
AOC2
AOX1
ASPH
BID
C15orf48
CCNB1
CDK1
CHCHD2
CIAPIN1
COA6
COQ9
COX10
COX11
COX15
COX4I1
COX4I2
COX5A
COX5B
COX6A1
COX6A2
COX6B1
COX6C
COX7A1
COX7A2
COX7A2L
COX7A2P2
COX7B
COX7B2
COX7C

COX8A
COX8C
CYB561
CYB5A
CYB5B
CYBA
CYBB
CYC1
CYCS
CYP19A1
CYP1A2
DEGS1
DGUOK
DHDH
DHRS3
DLD
DMGDH
DNAJC15
ETFPA
ETFB
ETFDH
ETFRF1
FDX1
FDX2
GFUS
GHITM
GLDC
GLRX
GLRX2
GPD1
GPD2
GPX2
GSR
HAAO
HSD17B6
IDH3B
IDO1
IMMP2L
ISCU
LOXL2
MAOB
ME1
ME2
MIR210

MT-C01
MT-C02
MT-C03
MT-CYB
MT-ND1
MT-ND2
MT-ND3
MT-ND4
MT-ND4L
MT-ND5
MT-ND6
MTC02P12
MYBBP1A
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NCF2
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NDUFA6
NDUFA7
NDUFA8
NDUFA9
NDUFAB1
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NDUFAF2
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NDUFB10
NDUFB11
NDUFB2
NDUFB3
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NDUFB9
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NDUFS6
NDUFS7
NDUFS8
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NDUFV2
NDUFV3
NOX4
NQO2
P4HA2
PARK7
PHGDH
PINK1
POLG2
PPARGC1A
QDPR
RDH16
SC02
SDHA
SDHAF2
SDHB
SDHC
SDHD
SLC25A12
SLC25A13
SLC25A18
SLC25A22
SNCA
SRD5A1
STEAP4
SURF1
TAZ
UQCC3
UQCR10
UQCR11
UQCRB
UQCRC1
UQCRC2

UQCRFS1
UQCRFS1P1
UQCRH
UQCRHL
UQCRQ
WDR93
XDH
ATP5F1A
ATP5F1B
ATP5F1C
ATP5F1D
ATP5F1E
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ATP5MC2
ATP5MC3
ATP5ME
ATP5MF
ATP5MG
ATP5PB
ATP5PD
ATP5PF
ATP5P0
COX17
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MIR7113
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MT-ATP8
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SLC25A4
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SLC25A6
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UCP3
AC02
CS
FH
IDH2
IDH3A

IDH3G
MDH2
OGDH
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SUCLA2
SUCLG1
DLST
FAHD1
ME3
NNT
SUCLG2
ACLY
ACO1
ACOT4
GAD1
GAD2
IDH1
MDH1
ACAA1
ACADM
ACSS1
ADH1C
ADH4
ADH7
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ALDH1A1
ALDH7A1
AOC3
ARG1
ARG2
ASNS
ASS1
AUH
BCAT1
BHMT
CAD
CBS
CPS1
CTH
DBH
DDC
EHHADH
EPRS1
FAH

FARSB
FTCD
G6PC2
GCLM
GLS
GLUD1
GLUL
GOT1
GOT2
GPT2
GSS
HADH
HAL
HDC
HIBADH
HIBCH
HMGCL
HMGCS2
HNMT
IARS1
LARS2
LDHA
MAOA
MARS2
MCCC1
MMUT
MPST
OAT
ODC1
OTC
PC
PCK1
PDHA1
PDHX
PDK4
PKM
PNMT
PPM1L
PYCR1
RARS1
SDS
SMS
SRM
TAT

TD02
TH
TPH1
TPO
VARS1
WARS1
ACAA2
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ACADS
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ACADVL
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ACAT2
ACOX1
ACOX3
ACSL1
ACSL3
ACSL4
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ACSL6
ADH1A
ADH1B
ADH6
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ALDH9A1
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CPT1B
CPT1C
CPT2
CYP4A11
CYP4A22
ECHS1
ECI1
ECI2
GCDH
HADHA
HADHB
AGK
AGPAT1
AGPAT2
AGPAT3
AGPAT4
AWAT2

CEL
DGAT1
DGAT2
DGKA
DGKB
DGKD
DGKE
DGKG
DGKH
DGKI
DGKQ
DGKZ
GK
GK2
GLA
GLYCTK
GPAM
GPAT2
GPAT3
GPAT4
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LIPF
LIPG
LPL
MBOAT1
MBOAT2
MGLL
PLPP1
PLPP2
PLPP3
PNLIP
PNLIPRP1
PNLIPRP2
PNPLA3
TKFC
ACHE
ADPRM
CDIPT
CDS1
CDS2
CHAT
CHKA
CHKB

CHPT1
CRLS1
ETNK1
ETNK2
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GPD1L
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LCAT
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LPCAT2
LPCAT3
LPCAT4
LPGAT1
LYPLA1
LYPLA2
MBOAT7
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PCYT1B
PCYT2
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PGS1
PHOSPHO1
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PLA2G12B
PLA2G15
PLA2G1B
PLA2G2A
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PLA2G2F
PLA2G3
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PLA2G6
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PLD2
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PTDSS2
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ACSM6
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ALOX15B
ALOX5
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ALOXE3
AMACR
AWAT1
CBR1
CBR4
CRAT
CROT
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CYP2C8

CYP2C9
CYP2J2
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CYP4F2
CYP4F22
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CYP4F8
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DECR2
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DPEP3
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ELOVL4
ELOVL5
ELOVL6
ELOVL7
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FAAH2
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GGT1
GGT5
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GPX4
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LTC4S
MAPKAPK2
MCAT
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MECR
MID1IP1
MLYCD
MMAA
MORC2
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NUDT7
OLAH
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PCCB
PCTP
PECR
PHYH
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PON2
PON3
PPARD
PPT1
PPT2
PRKAA2
PRKAB2
PRKAG2
PRXL2B
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PTGES
PTGES2
PTGES3
PTGIS
PTGR1
PTGR2
PTGS1
PTGS2
RXRA
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SCD5
SCP2
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TECRL
THEM4
THEM5
THRSP
ABHD5
AGMO
CAV1
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FABP2
FABP3
FABP4
FABP5
FABP6
FABP7
FABP9
GK3P
LIPE
LPIN1
LPIN2
LPIN3
MOGAT1
MOGAT2
MOGAT3
PLIN1
PLIN3
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PNPLA5
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PPP1CB
PPP1CC
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PRKACB
PRKACG
AACS
ABCA1
ABCB11

ABCB4
ABCC3
ABHD3
ABHD4
ACER1
ACER2
ACER3
ACP6
ACSS3
AGPAT5
AGPS
AGT
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AHRR
AKR1B15
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AKR1D1
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ANKRD1
APOA1
APOA2
APOA5
ARF1
ARF3
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ARNT2
ARNTL
ARSA
ARSB
ARSD
ARSF
ARSG
ARSH
ARSI
ARSJ
ARSK
ARSL
ARV1

ASAH1
ASAH2
B3GALNT1
B4GALNT1
BAAT
BCHE
BDH1
BDH2
BMX
CARM1
CCNC
CD36
CDK19
CDK8
CEPT1
CERK
CERS1
CERS2
CERS3
CERS4
CERS5
CERS6
CERT1
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CH25H
CHD9
CIDEA
CIDEC
CLOCK
CPNE1
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CPNE6
CPNE7
CPTP
CREBBP
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CSNK2A1
CSNK2A2
CSNK2B
CTSA
CUBN
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CYP11B1
CYP11B2

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CYP27B1
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CYP7B1
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ENPP7
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ESYT2
ESYT3
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FDXR
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FITM1
FITM2
GOS2
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GDPD5
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GPCPD1
GPS2
GRHL1
GSTM4
HDAC3
HELZ2
HEXA
HEXB
HILPDA
HMGCLL1
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INPP5K

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MED9
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MTMR7
MTMR8
MTMR9
MVD
MVK
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NCOA2
NCOA3
NCOA6
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NCOR2
NEU1
NEU2
NEU3
NEU4
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NFYB
NFYC
NPAS2
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NR1H2
NR1H3
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NRF1
NSDHL
OCRL
ORMDL1
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ORMDL3
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OSBPL1A
OSBPL2
OSBPL3
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OSBPL6
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OSBPL8
OSBPL9
OXCT1
OXCT2
PDCD6-AHRR
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PIK3C2B
PIK3C2G
PIK3C3
PIK3CA
PIK3CB
PIK3CD
PIK3CG
PIK3R1
PIK3R2
PIK3R3
PIK3R4
PIK3R5
PIK3R6
PIKFYVE
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PITPNM3
PLA1A

PLA2G4C
PLA2G4D
PLA2G4F
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PLAAT3
PLAAT4
PLAAT5
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PLD6
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PLEKHA4
PLEKHA5
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PNPLA7
PNPLA8
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PPARA
PPARG
PPARGC1B
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PRKD2
PRKD3
PSAP
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RGL1

RORA
RUFY1
RXRB
SACM1L
SAMD8
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SCAP
SEC23A
SEC24A
SEC24B
SEC24C
SEC24D
SELEN01
SERPINA6
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SGMS2
SGPL1
SGPP1
SGPP2
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SPHK2

SPNS2
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SPTSSB
SQLE
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SRD5A3
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STARD3
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STARD4
STARD5
STARD6
STARD7
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SUMF1
SUMF2
SUM02
SYNJ1
SYNJ2
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THRAP3
TIAM2
TM7SF2
TMEM86B
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TNFAIP8L1
TNFAIP8L2
TNFAIP8L3
TNFRSF21
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TPTE2
TRIB3
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TSP0AP1
TXNRD1

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VAPB
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ADSL
AHCYL2
ALG3
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BYSL
CABYR
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CDC45
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DDX21
DLEU2
DONSON
E2F1
GMNN
GPSM2
HDAC2
HLCS
HPRT1
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IFRD2
ILF3
KCNN4
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MDC1
MDM1
METAP1
MRT04
NCAPD2
NME1
NME2
NUP155
NUP205
NUP50
NUP88

ORC1
PADI3
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PLK4
PMCHL1
POLA1
PRPF38A
PRPS2
RAB6B
RFPL3S
RRM1
RRM2
SAC3D1
SEMA4B
SLC25A37
SLC30A10
SNRPA
SPEF2
SRPK1
UCK2
UTP18
ZBTB5
ZIC2
ZNF490
ZNF706
ADA
ADAL
ADK
ADSS1
ADSS2
AGXT2
AK1
AK2
AK4
AK5
AK6
AK7
AK8
AK9
AMPD1
AMPD2
AMPD3
APRT
ATIC

CDA
CMPK1
CTPS1
CTPS2
DCK
DCTD
DCTPP1
DHODH
DNPH1
DPYD
DPYS
DTYMK
DUT
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ENTPD2
ENTPD3
ENTPD4
ENTPD5
ENTPD6
ENTPD7
ENTPD8
GART
GDA
GMPR
GMPR2
GMPS
GUK1
IMPDH1
IMPDH2
ITPA
LHPP
NME3
NME4
NT5C
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NT5C1B
NT5C2
NT5C3A
NT5E
NT5M
NUDT1
NUDT13
NUDT15
NUDT16

NUDT18
NUDT5
NUDT9
PAICS
PFAS
PNP
PPAT
PUDP
RRM2B
SAMHD1
TK1
TK2
TXN
TYMP
TYMS
UCK1
UCKL1
UMPS
UPB1
UPP1
UPP2
AHCY
ALDH1L1
AMT
CHDH
DHFR
DNMT1
DNMT3A
DNMT3B
FOLH1
FOLH1B
MAT1A
MAT2B
MIR6778
MTFMT
MTHFD1
MTHFD1L
MTHFD2
MTHFR
MTHFS
MTR
MTRR
SHMT1
SHMT2

TCN2

OAZ1

POLB

POLD1

POLG

PRPS1

SAT1

MRGs, mitochondrial metabolism-related genes