Human MEGoptosis Primer Library

Catalog No: HMEGOP-1
Supplier: RealTimePrimers
Lot No: XXXXX
Supplied as: solid
Stability: stable at room temperature

Background

Cell death is an important process to cell homeostasis, response to pathogens, and for the effectiveness of chemotherapeutic drugs. There are several cell death pathways that have been discovered and each are involved either in specialized cells or in response to a specific response to stress or insult. Each of these pathways is associated with a unique cell morphology and a specific set of genes. Apoptosis may be divided into the intrinsic and extrinsic pathway. The intrinsic pathway involves disruption of the mitochondrial membrane and the release of cytochrome C. The extrinsic pathway is activated from the cell surface through a family of death receptors. Autophagy is a process in which the cell can remove any unnecessary or damaged components. Ferroptosis, which is a type of cell death that is dependent upon iron and is characterized by the accumulation of lipid peroxides. Necroptosis involves receptor-interacting serine-threonine kinase 3 (RIPK3) and mixed lineage kinase domain-like (MLKL) and is manifested by morphological features of necrosis. Pyroptosis is an inflammatory form of cell death triggered by inflammasomes, which results in the cleavage of gasdermin D (GSDMD) and activation of inactive cytokines like IL-18 and IL-1β. NETosis involves the formation of neutrophil extracellular traps (NETs) consisting of modified chromatin decorated with bactericidal proteins from granules and the cytoplasm. Entosis is a cannibalistic process in which a cell invades or is engulfed by another cell. Methuosis is characterized by the accumulation of cytoplasmic vacuoles derived from macropinosomes and late endosomes, followed by metabolic failure and rupture of the plasma membrane. Parthanatos is a PARP1-dependent, caspase-independent, cell death pathway that is distinct from apoptosis, necrosis, or other known forms of cell death. Disufidoptosis, a recently defined form of metabolic-related regulated cell death, plays a role in antitumor immunity. The Megaptosis Primer Library contains primer sets that amplify the prominent genes that are associated with these pathways.

Description

Contains 374 primer sets directed against apoptosis genes and 10 housekeeping gene primer sets. Provided in a 384-well microplate (10 ul - 10 uM). Perform up to 100 PCR arrays (based on 10 ul assay volume per reaction). Just add cDNA template and SYBR green master mix.

Gene List:

- ACSF2 acyl-CoA synthetase family member 2
- ACSL1 acyl-CoA synthetase long-chain family member 1
- ACSL3 acyl-CoA synthetase long-chain family member 3
- ACSL4 acyl-CoA synthetase long-chain family member 4
- ACSL5 acyl-CoA synthetase long-chain family member 5
- ACSL6 acyl-CoA synthetase long-chain family member 6
- AIF allograft inflammatory factor 1
- AIFM1 apoptosis-inducing factor, mitochondrion-associated, 1
- AIM2 absent in melanoma 2
- AKR1B1 aldo-keto reductase family 1, member B1 (aldose reductase)
- AKR1B10 aldo-keto reductase family 1, member B10 (aldose reductase)
- AKR1C1 aldo-keto reductase family 1, member C1
- AKT1S1 AKT1 substrate 1 (proline-rich)
- ALDH1A1 aldehyde dehydrogenase 1 family, member A1
- ALOX15 arachidonate 15-lipoxygenase
- AMBRA1 Autophagy/beclin-1 regulator 1
- APOL1 Apolipoprotein L, 1
- ASAH1 N-acylsphingosine amidohydrolase (acid ceramidase) 1
- ATF4 Activating transcription factor 4
- ATG10 ATG10 autophagy related 10 homolog (S. cerevisiae)
- ATG12 ATG12 autophagy related 12 homolog (S. cerevisiae)
- ATG14 autophagy related 14
- ATG16L1 ATG16 autophagy related 16-like 1 (S. cerevisiae)
- ATG16L2 ATG16 autophagy related 16-like 2 (S. cerevisiae)
- ATG2A ATG2 autophagy related 2 homolog A (S. cerevisiae)
- ATG2B ATG2 autophagy related 2 homolog B (S. cerevisiae)

- ATG3 ATG3 autophagy related 3 homolog (S. cerevisiae)
- ATG4A ATG4 autophagy related 4 homolog A (S. cerevisiae)
- ATG4B ATG4 autophagy related 4 homolog B (S. cerevisiae)
- ATG4C ATG4 autophagy related 4 homolog C (S. cerevisiae)
- ATG4D ATG4 autophagy related 4 homolog D (S. cerevisiae)
- ATG5 autophagy related 5
- ATG7 autophagy related 7
- ATG9A ATG9 autophagy related 9 homolog A (S. cerevisiae)
- ATP5G3 ATP synthase, H+ transporting, mitochondrial Fo complex, subunit C3 (subunit 9)
- AZU1 azurocidin 1
- BAD BCL2-associated agonist of cell death
- BAK1 BCL2-antagonist/killer 1
- BARKOR BARKOR (KIAA0831)
- BAX BCL2-associated X protein
- BBC3 BCL2 binding component 3
- BCL2 B-cell CLL/lymphoma 2
- BCL2L1 BCL2-like 1
- BCL2L11 BCL2-like 11
- BECLIN1 Beclin1
- BECN1 beclin 1, autophagy related
- BECN1L1 Becn1L1
- BID BH3 interacting domain death agonist
- BIK BCL2-interacting killer (apoptosis-inducing)
- BIRC2 baculoviral IAP repeat containing 2
- BIRC3 baculoviral IAP repeat containing 3
- BIRC4 baculoviral IAP repeat containing 4
- BIRC5 Effector cell peptidase receptor 1
- BIRC7 baculoviral IAP repeat containing 7
- BMF Bcl2 modifying factor
- BNIP3 BCL2/adenovirus E1B 19kDa interacting protein 3
- BNIP3L BCL2/adenovirus E1B 19kDa interacting protein 3-like
- BOK BCL2-related ovarian killer
- BRAF B-Raf proto-oncogene, serine/threonine kinase
- BRCA2 breast cancer 2, early onset
- CAPN1 calpain 1, (mu/I) large subunit
- CAPN2 calpain 2, (m/II) large subunit
- CARDH
- CARS1 cysteinyl-TRNA Synthetase 1
- CASP1 caspase 1, apoptosis-related cysteine peptidase
- CASP10 caspase 10, apoptosis-related cysteine peptidase
- CASP12 caspase 12, apoptosis-related cysteine peptidase
- CASP14 caspase 14, apoptosis-related cysteine peptidase
- CASP16 caspase 16, apoptosis-related cysteine peptidase (putative)
- CASP2 caspase 2, apoptosis-related cysteine peptidase
- CASP3 caspase 3, apoptosis-related cysteine peptidase
- CASP4 caspase 4, apoptosis-related cysteine peptidase
- CASP5 caspase 5, apoptosis-related cysteine peptidase
- CASP6 caspase 6, apoptosis-related cysteine peptidase
- CASP7 caspase 7, apoptosis-related cysteine peptidase
- CASP8 caspase 8, apoptosis-related cysteine peptidase
- CASP9 caspase 9, apoptosis-related cysteine peptidase
- CAT catalase
- CD14 CD14 molecule
- CD24 CD24 molecule
- CD27 CD27 molecule
- CD28 CD28 molecule
- CD40 CD40 molecule, TNF receptor superfamily member 5
- CD70 CD70 molecule
- CDH1 cadherin 1, type 1, E-cadherin (epithelial)
- CDH3 cadherin 3, type 1, P-cadherin (placental)
- CFLAR CASP8 and FADD-like apoptosis regulator
- CHAC1 ChaC glutathione-specific gamma-glutamylcyclotransferase 1
- CISD1 CDGSH iron sulfur domain 1
- CLEC9A C-type lectin domain family 9, member A
- CP ceruloplasmin (ferroxidase)
- CS citrate synthase
- CTSG cathepsin G
- CYBA cytochrome b-245, alpha polypeptide
- CYBB cytochrome b-245, beta polypeptide
- CYCS cytochrome c, somatic
- CYLD cylindromatosis (turban tumor syndrome)
- DDIT3 DNA-damage-inducible transcript 3
- DIABLO diablo, IAP-binding mitochondrial protein
- DMT1 dementia, familial nonspecific
- DRAM Damage-regulated autophagy modulator
- DUOX1 dual oxidase 1
- DUOX2 dual oxidase 2
- EIF4EBP1 Eukaryotic translation initiation factor 4E binding protein 1
- EIF4EBP2 Eukaryotic translation initiation factor 4E binding protein 2
- EIF4G1 Eukaryotic translation initiation factor 4 gamma, 1
- ELANE elastase, neutrophil expressed
- EMC2 ER membrane protein complex subunit 2
- ENDOG endonuclease G
- EPRS glutamyl-prolyl-tRNA synthetase
- EPS15L1 Epidermal growth factor receptor pathway substrate 15-like 1
- FADD Fas (TNFRSF6)-associated via death domain
- FANCD2 Fanconi anemia, complementation group D2

- FAS Fas cell surface death receptor
- FASLG Fas ligand (TNF superfamily, member 6)
- FKBP15 FK506 binding protein 15, 133kDa
- FMN1 formin 1
- FRAP1 FK506 binding protein 12-rapamycin associated protein 1
- FRS2 Fibroblast growth factor receptor substrate 2
- FRS3 Fibroblast growth factor receptor substrate 3
- FTH1 ferritin, heavy polypeptide 1
- FTL ferritin, light polypeptide
- FTMT ferritin mitochondrial
- G6PD glucose-6-phosphate dehydrogenase
- GABARAP GABA(A) receptor-associated protein
- GABARAPL1 GABA(A) receptor-associated protein like 1
- GABARAPL2 GABA(A) receptor-associated protein-like 2
- GBL G protein beta subunit-like
- GCLC glutamate-cysteine ligase, catalytic subunit
- GCLM glutamate-cysteine ligase, modifier subunit
- GFI1B Growth factor independent 1B transcription repressor
- GLS2 glutaminase 2 (liver, mitochondrial)
- GLS2 glutaminase 2 (liver, mitochondrial)
- GLUD1 glutamate dehydrogenase 1
- GLUL glutamate-ammonia ligase
- GNAI3 Guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 3
- GOT1 glutamic-oxaloacetic transaminase 1, soluble
- GOT1 glutamic-oxaloacetic transaminase 1, soluble
- GPSM1 G-protein signaling modulator 1 (AGS3-like, C. elegans)
- GPSM2 G-protein signaling modulator 2 (AGS3-like, C. elegans)
- GPSM3 G-protein signaling modulator 3 (AGS3-like, C. elegans)
- GPX1 glutathione peroxidase 1
- GPX2 glutathione peroxidase 2
- GPX3 glutathione peroxidase 3
- GPX4 glutathione peroxidase 4
- GPX5 glutathione peroxidase 5
- GPX6 glutathione peroxidase 6
- GSDMC gasdermin C
- GSDMD gasdermin D
- GSDME gasdermin E
- GSS glutathione synthetase
- GSTA1 glutathione S-transferase alpha 1
- GSTP1 glutathione S-transferase pi 1
- HAMP hepcidin antimicrobial peptide
- HARS histidyl-tRNA synthetase
- HEPH hephaestin
- HFE homeostatic Iron Regulator
- HIF1A Hypoxia inducible factor 1, alpha
- HMGB1 high mobility group box 1
- HMGN1 high mobility group nucleosome binding domain 1
- HMOX1 heme oxygenase 1
- HMOX2 heme oxygenase 2
- HRAS Harvey rat sarcoma viral oncogene homolog
- HRK harakiri, BCL2 interacting protein
- HSF1 heat shock transcription factor 1
- HSP90AA1 heat shock protein 90kDa alpha (cytosolic), class A member 1
- HSP90B1 heat shock protein 90kDa beta (Grp94), member 1
- HSPA1A heat shock 70kDa protein 1A
- HSPA1B heat shock 70kDa protein 1B
- HSPA4 heat shock 70kDa protein 4
- HSPA5 Heat shock 70kDa protein 5
- HSPB1 heat shock 27kDa protein 1
- HTRA2 HtrA serine peptidase 2
- IFI16 interferon, gamma-inducible protein 16
- IKBKG inhibitor of kappa light polypeptide gene enhancer in B- cells, kinase gamma
- IL18 interleukin 18
- IL1A interleukin 1, alpha
- IL1B interleukin 1, beta
- IL1R1 interleukin 1 receptor, type I
- IL1RAP interleukin 1 receptor accessory protein
- IL33 interleukin 33
- IREB2 iron-responsive element binding protein 2
- IRF1 interferon regulatory factor 1
- KAT5 K(lysine) acetyltransferase 5
- KEAP1 kelch-like ECH-associated protein 1
- KRAS Kirsten rat sarcoma viral oncogene homolog
- LAMP1 lysosomal-associated membrane protein 1
- LAMP2 Lysosomal-associated membrane protein 2
- LAMP3 Lysosomal-associated membrane protein 3
- LETM1 Leucine zipper-EF-hand containing transmembrane protein 1
- LETM2 Leucine zipper-EF-hand containing transmembrane protein 2
- LOX lysyl oxidase
- LPCAT3 lysophosphatidylcholine acyltransferase 3
- LRP1 low density lipoprotein receptor-related protein 1
- MAP1LC3A microtubule Associated Protein 1 Light Chain 3 Alpha
- MAP1LC3B Microtubule-associated protein 1 light chain 3 beta
- MAP1LC3B2 Microtubule-associated protein 1 light chain 3 beta 2
- MAP1LC3C Microtubule-associated protein 1 light chain 3 gamma
- MAP3K7 mitogen-activated protein kinase kinase kinase 7
- MAPK1 mitogen-activated protein kinase 1
- MAPK3 mitogen-activated protein kinase 3
- MAPK8 mitogen-activated protein kinase 8
- MCL1 Myeloid cell leukemia sequence 1 (BCL2-related)
- METTL3 methyltransferase like 3
- MFN1 mitofusin 1
- MFN2 mitofusin 2
- MIF macrophage Migration Inhibitory Factor
- MLKL mixed lineage kinase domain-like

- MPO myeloperoxidase
- NAIP NLR family, apoptosis inhibitory protein
- NCOA4 nuclear receptor coactivator 4
- NFE2L2 nuclear factor, erythroid 2-like 2
- NFKB1 nuclear factor of kappa light polypeptide gene enhancer in B-cells 1
- NKX2-5 NK2 Homeobox 5
- NLRC4 NLR family, CARD domain containing 4
- NLRP1 NLR family, pyrin domain containing 1
- NLRP3 NLR family, pyrin domain containing 3
- NLRP6 NLR family, pyrin domain containing 6
- NOX1 NADPH oxidase 1
- NOX1 NADPH oxidase 1
- NOX2 Data not found
- NOX3 NADPH Oxidase 3
- NOX4 NADPH Oxidase 4
- NOX5 NADPH oxidase, EF-hand calcium binding domain 5
- NQO1 NAD(P)H dehydrogenase, quinone 1
- NRAS neuroblastoma RAS viral (v-ras) oncogene homolog
- P2RX1 purinergic receptor P2X, ligand gated ion channel, 1
- P2RX2 purinergic receptor P2X, ligand gated ion channel, 2
- P2RX3 purinergic receptor P2X, ligand gated ion channel, 3
- P2RX4 purinergic receptor P2X, ligand gated ion channel, 4
- P2RX5 purinergic receptor P2X, ligand gated ion channel, 5
- P2RX6 purinergic receptor P2X, ligand gated ion channel, 6
- P2RX7 purinergic receptor P2X, ligand gated ion channel, 7
- PADI4 peptidyl Arginine Deiminase 4
- PANX1 pannexin 1
- PANX2 pannexin 2
- PAR PAR protein
- PARG poly (ADP-ribose) glycohydrolase
- PARP1 poly (ADP-ribose) polymerase 1
- PARP2 poly (ADP-ribose) polymerase 2
- PCBP1 poly(rC) binding protein 1
- PCBP2 poly(rC) binding protein 2
- PIK3C3 Phosphoinositide-3-kinase, class 3
- PIK3R4 Phosphoinositide-3-kinase, regulatory subunit 4
- PPARG peroxisome proliferator-activated receptor gamma
- PPID peptidylprolyl isomerase D
- PPIF peptidylprolyl isomerase F
- PPM1K Protein phosphatase 1K (PP2C domain containing)
- PRDX6 peroxiredoxin 6
- PRNP prion protein
- PSEN1 presenilin 1
- PSMG2 Proteasome (prosome, macropain) assembly chaperone 2
- PTGES2 prostaglandin E synthase 2
- PYGL phosphorylase, glycogen, liver
- RAB5A RAB5A, Member RAS Oncogene Family
- RAB7A RAB7A, Member RAS Oncogene Family
- RAPTOR Raptor
- RASD1 RAS, dexamethasone-induced 1
- RB1CC1 RB1-inducible coiled-coil 1
- REL v-rel avian reticuloendotheliosis viral oncogene homolog
- RELA v-rel avian reticuloendotheliosis viral oncogene homolog A
- RELT RELT tumor necrosis factor receptor
- RFK riboflavin kinase
- RGS19 Regulator of G-protein signaling 19
- RHOA ras homolog family member A
- RICTOR Rapamycin-insensitive companion of mTOR
- RIPK1 receptor (TNFRSF)-interacting serine-threonine kinase 1
- RIPK2 receptor-interacting serine-threonine kinase 2
- RIPK3 receptor-interacting serine-threonine kinase 3
- RIPK4 receptor-interacting serine-threonine kinase 4
- RPL8 ribosomal protein L8
- S100B S100 calcium binding protein B
- SAT1 spermidine/spermine N1-acetyltransferase 1
- SAT2 spermidine/spermine N1-acetyltransferase family member 2
- SEC16A SEC16 homolog A (S. cerevisiae)
- SEC16B SEC16 homolog B (S. cerevisiae)
- SEC23A Sec23 homolog A (S. cerevisiae)
- SEC23B Sec23 homolog B (S. cerevisiae)
- SEC24A SEC24 related gene family, member A (S. cerevisiae)
- SEC24B SEC24 related gene family, member B (S. cerevisiae)
- SEC24C SEC24 related gene family, member C (S. cerevisiae)
- SEC24D SEC24 related gene family, member D (S. cerevisiae)
- SH3GLB1 SH3-domain GRB2-like endophilin B1
- SH3GLB2 SH3-domain GRB2-like endophilin B2
- SLC11A2 solute carrier family 11 (proton-coupled divalent metal ion transporter), member 2
- SLC1A5 solute carrier family 1 (neutral amino acid transporter), member 5
- SLC39A14 solute carrier family 39 (zinc transporter), member 14
- SLC39A8 solute carrier family 39 (zinc transporter), member 8
- SLC3A2 solute carrier family 3 (amino acid transporter heavy chain), member 2
- SLC40A1 solute carrier family 40 (iron-regulated transporter), member 1
- SLC7A11 solute carrier family 7 (anionic amino acid transporter light chain, xc- system), member 11
- SMPD1 sphingomyelin phosphodiesterase 1, acid lysosomal

- SMPD2 sphingomyelin phosphodiesterase 2, neutral membrane (neutral sphingomyelinase)
- SNX30 Sorting nexin family member 30
- SOD1 superoxide dismutase 1, soluble
- SOD2 superoxide dismutase 2, mitochondrial
- SOD3 superoxide dismutase 3, extracellular
- SQSTM1 Sequestosome 1
- STEAP3 STEAP family member 3, metalloreductase
- STIM1 stromal interaction molecule 1
- TAB1 TGF-beta activated kinase 1/MAP3K7 binding protein 1
- TAB2 TGF-beta activated kinase 1/MAP3K7 binding protein 2
- TF transferrin
- TFEB transcription factor EB
- TFR2 Transferrin Receptor 2
- TFRC transferrin receptor
- TLR2 toll-like receptor 2
- TLR3 toll-like receptor 3
- TLR3 toll-like receptor 3
- TLR4 toll-like receptor 4
- TMEM173 transmembrane protein 173
- TNF tumor necrosis factor
- TNFAIP3 tumor necrosis factor, alpha-induced protein 3
- TNFAIP3 Tumor necrosis factor, alpha-induced protein 3
- TNFRSF10A tumor necrosis factor receptor superfamily, member 10a
- TNFRSF10B Tumor necrosis factor receptor superfamily, member 10b
- TNFRSF10C Tumor necrosis factor receptor superfamily, member 10c, decoy without an intracellular domain
- TNFRSF10D Tumor necrosis factor receptor superfamily, member 10d, decoy with truncated death domain
- TNFRSF11A Tumor necrosis factor receptor superfamily, member 11a, NFKB activator
- TNFRSF11B Tumor necrosis factor receptor superfamily, member 11b
- TNFRSF12A Tumor necrosis factor receptor superfamily, member 12A
- TNFRSF13B Tumor necrosis factor receptor superfamily, member 13B
- TNFRSF13C Tumor necrosis factor receptor superfamily, member 13C
- TNFRSF14 Tumor necrosis factor receptor superfamily, member 14 (herpesvirus entry mediator)
- TNFRSF17 Tumor necrosis factor receptor superfamily, member 17
- TNFRSF18 Tumor necrosis factor receptor superfamily, member 18
- TNFRSF19 Tumor necrosis factor receptor superfamily, member 19
- TNFRSF1A tumor necrosis factor receptor superfamily, member 1A
- TNFRSF1B tumor necrosis factor receptor superfamily, member 1B
- TNFRSF21 Tumor necrosis factor receptor superfamily, member 21
- TNFRSF25 tumor necrosis factor receptor superfamily, member 25
- TNFRSF25 Tumor necrosis factor receptor superfamily, member 25
- TNFRSF4 Tumor necrosis factor receptor superfamily, member 4
- TNFRSF6B Tumor necrosis factor receptor superfamily, member 6b, decoy
- TNFRSF8 Tumor necrosis factor receptor superfamily, member 8
- TNFRSF9 Tumor necrosis factor receptor superfamily, member 9
- TNFSF10 tumor necrosis factor (ligand) superfamily, member 10
- TNFSF11 Tumor necrosis factor (ligand) superfamily, member 11
- TNFSF12 tumor necrosis factor (ligand) superfamily, member 12
- TNFSF13 Tumor necrosis factor (ligand) superfamily, member 13
- TNFSF13B Tumor necrosis factor (ligand) superfamily, member 13b
- TNFSF14 Tumor necrosis factor (ligand) superfamily, member 14
- TNFSF15 Tumor necrosis factor (ligand) superfamily, member 15
- TNFSF18 Tumor necrosis factor (ligand) superfamily, member 18
- TNFSF4 Tumor necrosis factor (ligand) superfamily, member 4
- TNFSF8 Tumor necrosis factor (ligand) superfamily, member 8
- TNFSF9 Tumor necrosis factor (ligand) superfamily, member 9
- TOMM20 translocase of outer mitochondrial membrane 20 homolog (yeast)
- TOMM22 translocase of outer mitochondrial membrane 22 homolog (yeast)
- TOMM40 translocase of outer mitochondrial membrane 40 homolog (yeast)
- TP53 tumor protein p53
- TP73 Tumor protein p73
- TPR Translocated promoter region (to activated MET oncogene)
- TRADD TNFRSF1A-associated via death domain
- TRAF1 TNF receptor-associated factor 1
- TRAF2 TNF receptor-associated factor 2
- TRAF3 TNF receptor-associated factor 3
- TRAF5 TNF receptor-associated factor 5
- TRIM69 tripartite motif containing 69
- TXN thioredoxin
- TXN2 thioredoxin 2
- TXNRD1 thioredoxin reductase 1
- ULK1 Unc-51-like kinase 1 (C. elegans)
- ULK2 Unc-51-like kinase 2 (C. elegans)
- ULK3 Unc-51-like kinase 3 (C. elegans)
- ULK4 Unc-51-like kinase 4 (C. elegans)

- USP21 ubiquitin specific peptidase 21
- UVRAG UV radiation resistance associated gene
- VDAC2 voltage-dependent anion channel 2
- VDAC3 voltage-dependent anion channel 3
- WDR45L WDR45-like
- WIPI1 WD repeat domain, phosphoinositide interacting 1
- WIPI2 WD repeat domain, phosphoinositide interacting 2
- ACTB Actin, beta
- B2M Beta-2-microglobulin
- GAPD Glyceraldehyde-3-phosphate dehydrogenase
- GUSB Glucuronidase, beta
- HPRT1 Hypoxanthine phosphoribosyltransferase 1
- PGK Phosphoglycerate kinase 1
- PPIA Peptidylprolyl isomerase A
- RPL13A Ribosomal protein L13a
- TBP TATA-Box Binding Protein
- TFRC Transferrin Receptor