SUPPLEMENTARY MATERIAL

A Decade of Global mRNA and miRNA Profiling of HPV-Positive Cell Lines and Clinical Specimens

Bogumil Kaczkowski[1], Marya Morevati[2], Maria Rossing[3, 4], Finn Cilius[3] and Bodil Norrild[2]

[1]*The Bioinformatics Centre, Department of Biology and Biomedical Research and Innovation Centre, University of Copenhagen, Ole Maaloes Vej 5, DK-2200 Copenhagen, Denmark*

[2]*Institute of Cellular and Molecular Medicine, DNA Tumour Virus Laboratory, University of Copenhagen, Panum Institute, Blegdamsvej 3, DK-2200 Copenhagen, Denmark*

[3]*Centre for Genomic Medicine, Copenhagen University Hospital, Blegdamsvej 9, DK-2100 Copenhagen, Denmark*

[4]*Department of Clinical Biochemistry, Copenhagen University Hospital, Blegdamsvej 5, DK-2100 Copenhagen, Denmark*

Supplementary Table 1. Annotation Table of the 273 Genes Referred to in the Review. The Annotation Includes Gene Description, Function, Involvement in Biological Processes and Cellular Localization

HUGO Symbol	Description	Gene function	Process	Localization
A2M	alpha-2-macroglobulin [Source:HGNC Symbol;Acc:7]	serine-type endopeptidase inhibitor activity	stem cell differentiation/blood coagulation, intrinsic pathway/negative regulation of complement activation, lectin pathway/platelet degranulation/platelet activation/regulation of small GTPase mediated signal transduction/small GTPase mediated signal transduction	cytosol/platelet alpha granule lumen/extracellular region/extracellular space
ABCA8	ATP-binding cassette, sub-family A (ABC1), member 8 [Source:HGNC Symbol;Acc:38]	ATP binding/ATPase activity, coupled to transmembrane movement of substances		integral to membrane/plasma membrane
ABL2	v-abl Abelson murine leukemia viral oncogene homolog 2 [Source:HGNC Symbol;Acc:77]	non-membrane spanning protein tyrosine kinase activity/magnesium ion binding/manganese ion binding/ATP binding	positive regulation of neuron projection development/axon guidance/signal transduction/regulation of autophagy/regulation of endocytosis/regulation of actin cytoskeleton reorganization/cellular response to retinoic acid/peptidyl-tyrosine phosphorylation/cell adhesion/positive regulation of oxidoreductase activity/regulation of cell motility/regulation of cell adhesion	actin cytoskeleton/cytosol
ADAM23	ADAM metallopeptidase domain 23 [Source:HGNC Symbol;Acc:202]	metalloendopeptidase activity/zinc ion binding/metallopeptidase activity	cell adhesion/proteolysis/central nervous system development	integral to plasma membrane/extracellular region
AKR1B10	aldo-keto reductase family 1, member B10 (aldose reductase) [Source:HGNC Symbol;Acc:382]	aldo-keto reductase (NADP) activity/indanol dehydrogenase activity/retinal dehydrogenase activity/geranylgeranyl reductase activity	daunorubicin metabolic process/digestion/cellular aldehyde metabolic process/steroid metabolic process/doxorubicin metabolic process/farnesol catabolic process	extracellular region/lysosome

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
AKR1C3	aldo-keto reductase family 1, member C3 (3-alpha hydroxysteroid dehydrogenase, type II) [Source:HGNC Symbol;Acc:386]	15-hydroxyprostaglandin-D dehydrogenase (NADP+) activity/geranylgeranyl reductase activity/dihydrotestosterone 17-beta-dehydrogenase activity/trans-1,2-dihydrobenzene-1,2-diol dehydrogenase activity/testosterone 17-beta-dehydrogenase (NAD+) activity/retinol dehydrogenase activity/oxidoreductase activity, acting on NADH or NADPH, quinone or similar compound as acceptor/ketosteroid monooxygenase activity/indanol dehydrogenase activity/retinal dehydrogenase activity/testosterone 17-beta-dehydrogenase (NADP+) activity/androsterone dehydrogenase activity/prostaglandin-F synthase activity/delta4-3-oxosteroid 5beta-reductase activity/alditol:NADP+ 1-oxidoreductase activity/phenanthrene 9,10-monooxygenase activity/androsterone dehydrogenase (A-specific) activity/prostaglandin F receptor activity/ketoreductase activity/prostaglandin D2 11-ketoreductase activity/17-alpha,20-alpha-dihydroxypregn-4-en-3-one dehydrogenase activity/bile acid binding/androsterone dehydrogenase (B-specific) activity	cellular response to prostaglandin stimulus/positive regulation of cell proliferation/progesterone metabolic process/regulation of retinoic acid receptor signaling pathway/keratinocyte differentiation/response to nutrient/positive regulation of reactive oxygen species metabolic process/retinal metabolic process/doxorubicin metabolic process/testosterone biosynthetic process/regulation of testosterone biosynthetic process/cellular response to starvation/protein import into nucleus, translocation/cellular response to corticosteroid stimulus/renal absorption/cellular response to cadmium ion/positive regulation of protein kinase B signaling cascade/cellular response to reactive oxygen species/positive regulation of endothelial cell apoptotic process/daunorubicin metabolic process/multicellular organismal macromolecule metabolic process/negative regulation of retinoic acid biosynthetic process/cellular response to jasmonic acid stimulus/cellular response to calcium ion/prostaglandin metabolic process/farnesol catabolic process/male gonad development/intestinal cholesterol absorption/cholesterol homeostasis/bile acid and bile salt transport/response to organophosphorus/protein homooligomerization/xenobiotic metabolic process/bile acid metabolic process	nucleus/cytoplasm/cytosol
ALOX15B	arachidonate 15-lipoxygenase, type B [Source:HGNC Symbol;Acc:434]	iron ion binding/lipoxygenase activity/arachidonate 15-lipoxygenase activity	leukotriene biosynthetic process/regulation of epithelial cell differentiation/induction of apoptosis/negative regulation of growth/fatty acid metabolic process/prostate gland development/negative regulation of cell migration/negative regulation of cell cycle/negative regulation of cell proliferation	intracellular/cytoplasm
ANK2	ankyrin 2, neuronal [Source:HGNC Symbol;Acc:493]		axon guidance/signal transduction	cytoskeleton/cytosol/apical plasma membrane/basolateral plasma membrane/Z disc/M band

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
ANKRD1	ankyrin repeat domain 1 (cardiac muscle) [Source:HGNC Symbol;Acc:15819]	transcription corepressor activity/DNA binding/RNA polymerase II transcription coactivator activity	sarcomere organization/cellular response to mechanical stimulus/positive regulation of protein secretion/cellular response to drug/cardiac muscle tissue morphogenesis/cellular response to transforming growth factor beta stimulus/cellular response to interleukin-1/positive regulation of DNA damage response, signal transduction by p53 class mediator/cellular response to lipopolysaccharide/positive regulation of apoptotic process/cellular lipid metabolic process/small molecule metabolic process/negative regulation of DNA biosynthetic process/cellular response to tumor necrosis factor/response to muscle stretch	nucleoplasm/transcription factor complex/I band/cytosol
ANKRD11	ankyrin repeat domain 11 [Source:HGNC Symbol;Acc:21316]			nucleus
AOAH	acyloxyacyl hydrolase (neutrophil) [Source:HGNC Symbol;Acc:548]	lipoprotein lipase activity/acyloxyacyl hydrolase activity	lipid metabolic process/inflammatory response/negative regulation of inflammatory response/lipopolysaccharide metabolic process	extracellular region
APOD	apolipoprotein D [Source:HGNC Symbol;Acc:612]	small molecule binding/cholesterol binding/lipid transporter activity	negative regulation of cytokine production involved in inflammatory response/glucose metabolic process/negative regulation of T cell migration/aging/tissue regeneration/negative regulation of smooth muscle cell-matrix adhesion/response to drug/negative regulation of monocyte chemotactic protein-1 production/negative regulation of lipoprotein lipid oxidation/peripheral nervous system axon regeneration/negative regulation of focal adhesion assembly/negative regulation of platelet-derived growth factor receptor signaling pathway/lipid metabolic process/angiogenesis/brain development/response to reactive oxygen species/negative regulation of protein import into nucleus/negative regulation of smooth muscle cell proliferation	cytosolic ribosome/perinuclear region of cytoplasm/extracellular space/endoplasmic reticulum/dendrite/neuronal cell body
AQP9	aquaporin 9 [Source:HGNC Symbol;Acc:643]	pyrimidine base transmembrane transporter activity/carboxylic acid transmembrane transporter activity/porin activity/purine base transmembrane transporter activity/glycerol channel activity/water channel activity/amine transmembrane transporter activity	cellular response to cAMP/immune response/metabolic process/excretion/response to osmotic stress/water homeostasis/response to mercury ion/canalicular bile acid transport	integral to plasma membrane/microsome/intracellular membrane-bounded organelle/basolateral plasma membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
AR	androgen receptor [Source:HGNC Symbol;Acc:644]	androgen receptor activity/androgen binding/sequence-specific DNA binding/transcription regulatory region DNA binding/zinc ion binding/chromatin binding	positive regulation of phosphorylation/negative regulation of apoptotic process/positive regulation of transcription from RNA polymerase III promoter/activation of prostate induction by androgen receptor signaling pathway/positive regulation of insulin-like growth factor receptor signaling pathway/prostate gland epithelium morphogenesis/positive regulation of NF-kappaB transcription factor activity/morphogenesis of an epithelial fold/epithelial cell differentiation involved in prostate gland development/negative regulation of epithelial cell proliferation/positive regulation of cell proliferation/male somatic sex determination/regulation of catalytic activity/mammary gland alveolus development/transcription initiation from RNA polymerase II promoter/cell-cell signaling/sex differentiation/male gonad development/negative regulation of integrin biosynthetic process/tertiary branching involved in mammary gland duct morphogenesis/cell death/cell growth/cell proliferation/in utero embryonic development/positive regulation of intracellular estrogen receptor signaling pathway/response to insulin stimulus/lateral sprouting involved in mammary gland duct morphogenesis/positive regulation of transcription from RNA polymerase II promoter/regulation of prostatic bud formation/prostate gland growth/male genitalia morphogenesis/transport/regulation of establishment of protein localization in plasma membrane/organ formation/positive regulation of MAPK cascade/positive regulation of integrin biosynthetic process/prostate gland development/regulation of developmental growth	dendrite/nuclear chromatin/nucleoplasm/axon/cytoplasm
AREG	amphiregulin [Source:HGNC Symbol;Acc:651]		cell-cell signaling/positive regulation of DNA replication/epidermal growth factor receptor signaling pathway/G-protein coupled receptor signaling pathway/cell proliferation	extracellular space/cell surface/integral to membrane
ARID4A	AT rich interactive domain 4A (RBP1-like) [Source:HGNC Symbol;Acc:9885]	sequence-specific DNA binding transcription factor activity/DNA binding	transcription from RNA polymerase II promoter/negative regulation of transcription, DNA-dependent	transcriptional repressor complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
ASPM	asp (abnormal spindle) homolog, microcephaly associated (Drosophila) [Source:HGNC Symbol;Acc:19048]		maintenance of centrosome location/negative regulation of neuron differentiation/mitosis/forebrain neuroblast division/negative regulation of asymmetric cell division	nucleus/cytoplasm/spindle pole
ATP8A2	ATPase, aminophospholipid transporter, class I, type 8A, member 2 [Source:HGNC Symbol;Acc:13533]	magnesium ion binding/phospholipid-translocating ATPase activity/ATP binding/ATPase activity, coupled to transmembrane movement of ions, phosphorylative mechanism	cation transport/negative regulation of cell proliferation	integral to membrane
AURKB	aurora kinase B [Source:HGNC Symbol;Acc:11390]	metal ion binding/protein serine/threonine/tyrosine kinase activity/protein serine/threonine kinase activity/ATP binding	aging/protein localization to kinetochore/spindle midzone assembly involved in mitosis/mitotic prometaphase/attachment of spindle microtubules to kinetochore/anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/cytokinesis/negative regulation of B cell apoptotic process/regulation of chromosome segregation/positive regulation of cell cycle cytokinesis/protein autophosphorylation/negative regulation of transcription from RNA polymerase II promoter/cell proliferation/histone modification/cellular response to UV	condensed nuclear chromosome, centromeric region/cytosol/chromosome passenger complex/spindle/midbody
BCL11A	B-cell CLL/lymphoma 11A (zinc finger protein) [Source:HGNC Symbol;Acc:13221]	transcription corepressor activity/nucleic acid binding/zinc ion binding	negative regulation of protein homooligomerization/T cell differentiation/B cell differentiation/protein sumoylation/positive regulation of collateral sprouting/regulation of dendrite development/negative regulation of gene expression/positive regulation of transcription from RNA polymerase II promoter/negative regulation of dendrite development/transcription, DNA-dependent/positive regulation of neuron projection development/hemopoiesis/regulation of transcription, DNA-dependent/negative regulation of axon extension/negative regulation of collateral sprouting	cytoplasm/nucleus

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
BCL2	B-cell CLL/lymphoma 2 [Source:HGNC Symbol;Acc:990]	sequence-specific DNA binding/channel activity	response to ethanol/negative regulation of retinal cell programmed cell death/regulation of cell-matrix adhesion/protein polyubiquitination/positive regulation of cell growth/regulation of calcium ion transport/regulation of mitochondrial membrane permeability/cellular response to organic substance/developmental growth/regulation of glycoprotein biosynthetic process/thymus development/response to radiation/protein dephosphorylation/actin filament organization/behavioral fear response/negative regulation of osteoblast proliferation/peptidyl-threonine phosphorylation/negative regulation of mitotic cell cycle/homeostasis of number of cells within a tissue/ossification/response to gamma radiation/response to UV-B/positive regulation of smooth muscle cell migration/nucleotide-binding domain, leucine rich repeat containing receptor signaling pathway/regulation of transmembrane transporter activity/cellular calcium ion homeostasis/ovarian follicle development/response to heat/positive regulation of B cell proliferation/peptidyl-serine phosphorylation/regulation of nitrogen utilization/oligodendrocyte differentiation/response to aluminum ion/axon regeneration/response to corticosterone stimulus/renal system process/B cell lineage commitment/CD8-positive, alpha-beta T cell lineage commitment/B cell proliferation/melanin metabolic process/response to estrogen stimulus/organ morphogenesis/reactive oxygen species metabolic process/response to toxin/post-embryonic development/response to folic acid/response to nicotine/defense response to virus/induction of apoptosis by intracellular signals/B cell receptor signaling pathway/response to iron ion/activation of pro-apoptotic gene products/digestive tract morphogenesis/cell-cell adhesion/negative regulation of mitochondrial depolarization/cell aging/apoptosis in response to endoplasmic reticulum stress/positive regulation of neuron maturation/anti-apoptosis/positive regulation of	myelin sheath/mitochondrial outer membrane/microsome/endoplasmic reticulum/endoplasmic reticulum membrane/cytosol/nuclear membrane/pore complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
BCL2			skeletal muscle fiber development/melanocyte differentiation/positive regulation of catalytic activity/spleen development/female pregnancy/lymphoid progenitor cell differentiation/regulation of protein homodimerization activity/response to DNA damage stimulus/response to drug/regulation of mitochondrial membrane potential/glomerulus development/cochlear nucleus development/regulation of protein stability/negative regulation of myeloid cell apoptotic process/ear development/focal adhesion assembly/metanephros development/oocyte development/negative regulation of cellular pH reduction/negative regulation of cell growth/organ growth/response to hydrogen peroxide/response to cytokine stimulus/innate immune response/pigment granule organization/B cell homeostasis/positive regulation of multicellular organism growth/regulation of protein heterodimerization activity/T cell homeostasis/response to copper ion/cell growth/response to hypoxia/branching involved in ureteric bud morphogenesis/response to L-ascorbic acid/humoral immune response/negative regulation of neuron apoptotic process/regulation of protein localization/release of cytochrome c from mitochondria/neuron apoptotic process/response to insulin stimulus/mesenchymal cell development/negative regulation of apoptotic signaling pathway/negative regulation of cell migration/G1/S transition of mitotic cell cycle/T cell differentiation in thymus/glial cell apoptotic process/male gonad development/positive regulation of melanocyte differentiation/negative regulation of ossification/response to caffeine/gland morphogenesis	
BIRC5	baculoviral IAP repeat containing 5 [Source:HGNC Symbol;Acc:593]	cofactor binding/cysteine-type endopeptidase inhibitor activity/cobalt ion binding/metal ion binding/zinc ion binding/cysteine-type endopeptidase inhibitor activity involved in apoptotic process	establishment of chromosome localization/G2/M transition of mitotic cell cycle/protein complex localization/negative regulation of transcription, DNA-dependent/chromosome segregation/transcription, DNA-dependent/mitosis/positive regulation of exit from mitosis/positive regulation of cell proliferation/positive regulation of mitotic cell cycle/cell division/apoptotic process/anti-apoptosis/mitotic prometaphase/ spindle checkpoint/regulation of apoptotic process/ cytokinesis/protein phosphorylation	chromosome passenger complex/interphase microtubule organizing center/nuclear chromosome/spindle microtubule/centriole/cytoplasm/chromosome, centromeric region/microtubule/condensed chromosome kinetochore/cytosol/spindle/cytoplasmic microtubule/midbody

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
BNIP3	BCL2/adenovirus E1B 19kDa interacting protein 3 [Source:HGNC Symbol;Acc:1084]		positive regulation of protein complex disassembly/autophagic cell death/chromatin remodeling/positive regulation of release of cytochrome c from mitochondria/mitochondrial protein catabolic process/induction of apoptosis by intracellular signals/defense response to virus/brown fat cell differentiation/mitochondrial fragmentation involved in apoptosis/neuron apoptotic process/regulation of mitochondrial membrane permeability/interspecies interaction between organisms/negative regulation of mitochondrial fusion/cellular response to cobalt ion/cellular response to mechanical stimulus/negative regulation of survival gene product expression/reactive oxygen species metabolic process/cellular response to hydrogen peroxide/negative regulation of membrane potential/cellular response to hypoxia/response to hyperoxia/positive regulation of mitochondrial fission/induction of apoptosis/apoptotic DNA fragmentation	nucleoplasm/nuclear envelope/dendrite/integral to mitochondrial outer membrane
BUB1	budding uninhibited by benzimidazoles 1 homolog (yeast) [Source:HGNC Symbol;Acc:1148]	protein serine/threonine kinase activity/protein kinase activity/ATP binding	apoptotic process/chromosome segregation/regulation of sister chromatid cohesion/cell division/interspecies interaction between organisms/cell proliferation/mitotic prometaphase/mitotic cell cycle spindle assembly checkpoint	condensed chromosome kinetochore/condensed nuclear chromosome, centromeric region/cytosol
C3	complement component 3 [Source:HGNC Symbol;Acc:1318]	endopeptidase inhibitor activity	inflammatory response/positive regulation vascular endothelial growth factor production/positive regulation of phagocytosis/G-protein coupled receptor signaling pathway/positive regulation of type IIa hypersensitivity/complement activation, alternative pathway/positive regulation of angiogenesis/positive regulation of activation of membrane attack complex/complement activation, classical pathway/negative regulation of endopeptidase activity/regulation of complement activation	extracellular space/plasma membrane/extracellular region
CALB1	calbindin 1, 28kDa [Source:HGNC Symbol;Acc:1434]	calcium ion binding/vitamin D binding	metanephric distal convoluted tubule development/cellular response to organic substance/regulation of synaptic plasticity/metanephric ureteric bud development/retina layer formation/learning or memory/locomotory behavior/metanephric connecting tubule development/metanephric collecting duct development	neuronal cell body/cytosol/nucleus/dendrite/axon

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CAV1	caveolin 1, caveolae protein, 22kDa [Source:HGNC Symbol;Acc:1527]	structural molecule activity/cholesterol binding/peptidase activator activity	induction of apoptosis by extracellular signals/negative regulation of protein binding/negative regulation of tyrosine phosphorylation of Stat5 protein/positive regulation of intrinsic apoptotic signaling pathway/cholesterol homeostasis/regulation of blood coagulation/response to drug/protein homooligomerization/negative regulation of endothelial cell proliferation/positive regulation of peptidyl-serine phosphorylation/maintenance of protein location in cell/negative regulation of canonical Wnt receptor signaling pathway/response to gamma radiation/positive regulation of anti-apoptosis/inactivation of MAPK activity/response to nutrient/cholesterol transport/blood coagulation/interspecies interaction between organisms/response to mechanical stimulus/calcium ion transport/vasoconstriction/positiv e regulation of endocytosis/vesicle organization/caveolin-mediated endocytosis/response to progesterone stimulus/negative regulation of nitric oxide biosynthetic process/negative regulation of epithelial cell differentiation/cytosolic calcium ion homeostasis/negative regulation of BMP signaling pathway/nitric oxide metabolic process/leukocyte migration/response to hypoxia/negative regulation of JAK-STAT cascade/triglyceride metabolic process/positive regulation of metalloenzyme activity/lactation/positive regulation of canonical Wnt receptor signaling pathway/cellular response to hyperoxia/receptor internalization involved in canonical Wnt receptor signaling pathway/skeletal muscle tissue development/membrane depolarization/regulation of fatty acid metabolic process/T cell costimulation/nitric oxide homeostasis/positive regulation of calcium ion transport into cytosol/MAPK cascade/regulation of nitric-oxide synthase activity/response to calcium ion/cellular response to starvation/positive regulation of vasoconstriction/regulation of smooth muscle contraction/response to estrogen stimulus/caveola assembly/negative regulation of	Golgi membrane/integral to plasma membrane/lipid particle/apical plasma membrane/endoplasmic reticulum/acrosomal membrane/endocytic vesicle membrane/protein complex/caveola/cytosol/solubl e fraction/cell cortex/perinuclear region of cytoplasm/basolateral plasma membrane/flagellum/cell surface/focal adhesion/basal plasma membrane/endosome/integral to membrane of membrane fraction/mitochondrion

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CAV1			cytokine-mediated signaling pathway/response to glucocorticoid stimulus/lipid storage/microtubule polymerization/negative regulation of transcription from RNA polymerase II promoter/mammary gland involution/positive regulation of extrinsic apoptotic signaling pathway/positive regulation of microtubule polymerization/cholesterol efflux/vasculogenesis/negative regulation of peptidyl-serine phosphorylation	
CCL20	chemokine (C-C motif) ligand 20 [Source:HGNC Symbol;Acc:10619]		cell-cell signaling/immune response/chemokinesis/defense response to bacterium/chemotaxis/signal transduction/inflammatory response	extracellular space
CCNA2	cyclin A2 [Source:HGNC Symbol;Acc:1578]		positive regulation of transcription, DNA-dependent/mitotic cell cycle G2/M transition DNA damage checkpoint/regulation of cyclin-dependent protein kinase activity/cell division/Ras protein signal transduction/mitosis	nucleoplasm/female pronucleus/cytoplasm/male pronucleus
CCNB1	cyclin B1 [Source:HGNC Symbol;Acc:1579]	histone kinase activity	positive regulation of cardiac muscle cell proliferation/positive regulation of attachment of spindle microtubules to kinetochore/G1/S transition of mitotic cell cycle/protein complex assembly/ cellular response to hypoxia/ regulation of chromosome condensation/mitotic cell cycle spindle checkpoint/cellular response to fatty acid/response to drug/spermatogenesis/negative regulation of gene expression/ positive regulation of histone phosphorylation/G2/M transition of mitotic cell cycle/anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/digestive tract development/oocyte maturation/negative regulation of protein phosphorylation/tissue regeneration/cellular response to organic cyclic compound/in utero embryonic development/positive regulation of mitotic cell cycle/mitotic metaphase plate congression/positive regulation of mRNA 3'-end processing/cellular response to iron(III) ion/response to DDT/response to mechanical stimulus/positive regulation of ubiquitin-protein ligase activity involved in mitotic cell cycle/regulation of cyclin-dependent protein kinase activity/cell division/mitotic prometaphase/ventricular cardiac muscle cell development/mitotic spindle stabilization	nucleoplasm/cytosol/soluble fraction/condensed nuclear chromosome outer kinetochore/spindle pole/centrosome/membrane fraction

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CCNB2	cyclin B2 [Source:HGNC Symbol;Acc:1580]		cell division/thymus development/regulation of cyclin-dependent protein kinase activity/cell cycle checkpoint/T cell homeostasis/in utero embryonic development/G2/M transition of mitotic cell cycle/regulation of G2/M transition of mitotic cell cycle/growth/mitosis	cytosol/nucleus/membrane fraction/centrosome
CCNE1	cyclin E1 [Source:HGNC Symbol;Acc:1589]	cyclin-dependent protein kinase regulator activity/transcription coactivator activity/kinase activity	DNA-dependent DNA replication initiation/regulation of cyclin-dependent protein kinase activity/organ regeneration/response to purine-containing compound/cellular response to nutrient/positive regulation of cell differentiation/response to cytokine stimulus/regulation of transcription involved in G1/S phase of mitotic cell cycle/response to organic nitrogen/liver development/androgen receptor signaling pathway/antral ovarian follicle growth/response to drug/response to estradiol stimulus/positive regulation of transcription, DNA-dependent/response to corticosterone stimulus/protein phosphorylation/response to ethanol/cell division/Wnt receptor signaling pathway/response to methylmercury/response to vitamin E/response to progesterone stimulus	cytosol/cyclin-dependent protein kinase holoenzyme complex/centrosome/nucleoplasm
CD24				
CDA	cytidine deaminase [Source:HGNC Symbol;Acc:1712]	cytidine deaminase activity/zinc ion binding/nucleoside binding	cellular response to external biotic stimulus/cytosine metabolic process/pyrimidine nucleoside salvage/response to cycloheximide/negative regulation of nucleotide metabolic process/protein homotetramerization/negative regulation of cell growth/cell surface receptor signaling pathway	extracellular region/cytosol
CDC20	cell division cycle 20 homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:1723]		activation of anaphase-promoting complex activity/cell division/positive regulation of synaptic plasticity/positive regulation of cell proliferation/positive regulation of ubiquitin-protein ligase activity involved in mitotic cell cycle/positive regulation of synapse maturation/negative regulation of ubiquitin-protein ligase activity involved in mitotic cell cycle/anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/regulation of dendrite development/mitotic cell cycle spindle assembly checkpoint/mitotic prometaphase/protein ubiquitination	spindle pole/nucleoplasm/cytosol/protein complex/centrosome/perinuclear region of cytoplasm/spindle

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CDC25A	cell division cycle 25 homolog A (S. pombe) [Source:HGNC Symbol;Acc:1725]	protein tyrosine phosphatase activity	cellular response to UV/G1/S transition of mitotic cell cycle/cell cycle checkpoint/cell proliferation/G2/M transition of mitotic cell cycle/DNA replication/peptidyl-tyrosine dephosphorylation/regulation of cyclin-dependent protein kinase activity/S phase of mitotic cell cycle/mitosis/cell division	nucleoplasm/cytosol
CDC25B	cell division cycle 25 homolog B (S. pombe) [Source:HGNC Symbol;Acc:1726]	protein tyrosine phosphatase activity	positive regulation of protein kinase activity/oocyte maturation/positive regulation of mitotic cell cycle/cell division/G2/M transition of mitotic cell cycle/positive regulation of cell cycle cytokinesis/positive regulation of cell proliferation/mitosis/protein phosphorylation/female meiosis I	spindle pole/cytosol/centrosome/nucleoplasm
CDC25C	cell division cycle 25 homolog C (S. pombe) [Source:HGNC Symbol;Acc:1727]	protein tyrosine phosphatase activity	regulation of cyclin-dependent protein kinase activity/interspecies interaction between organisms/cell division/cell cycle checkpoint/G2/M transition of mitotic cell cycle/regulation of mitosis/DNA replication/cell proliferation/M phase of mitotic cell cycle/traversing start control point of mitotic cell cycle/mitosis	nucleoplasm/cytosol
CDC42EP3	CDC42 effector protein (Rho GTPase binding) 3 [Source:HGNC Symbol;Acc:16943]		regulation of cell shape/signal transduction	endomembrane system/actin cytoskeleton/membrane/cytoplasm
CDC6	cell division cycle 6 homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:1744]	chromatin binding/ATP binding/nucleoside-triphosphatase activity/nucleotide binding	positive regulation of cell cycle cytokinesis/regulation of mitotic anaphase/mitosis/traversing start control point of mitotic cell cycle/S phase of mitotic cell cycle/regulation of cyclin-dependent protein kinase activity/negative regulation of cell proliferation/M/G1 transition of mitotic cell cycle/cell division/DNA replication checkpoint/DNA replication/negative regulation of DNA replication/positive regulation of chromosome segregation/regulation of transcription involved in G1/S phase of mitotic cell cycle	spindle midzone/spindle pole/cytosol/nucleoplasm
CDC7	cell division cycle 7 homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:1745]	kinase activity/protein serine/threonine kinase activity/ATP binding/metal ion binding	cell cycle checkpoint/M/G1 transition of mitotic cell cycle/regulation of S phase/G1/S transition of mitotic cell cycle/positive regulation of cell proliferation/cell division/DNA replication	nucleoplasm/cytoplasm
CDCA3	cell division cycle associated 3 [Source:HGNC Symbol;Acc:14624]		cell division/mitosis/protein ubiquitination	cytosol

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CDCA5	cell division cycle associated 5 [Source:HGNC Symbol;Acc:14626]	chromatin binding	regulation of cohesin localization to chromatin/cell division/mitotic sister chromatid cohesion/mitotic chromosome condensation/mitotic metaphase plate congression/ double-strand break repair/G1/S transition of mitotic cell cycle	cytoplasm/nuclear chromatin/plasma membrane/cohesin complex
CDCA7	cell division cycle associated 7 [Source:HGNC Symbol;Acc:14628]		regulation of cell proliferation/transcription, DNA-dependent/regulation of transcription, DNA-dependent	nucleus
CDKN2A	cyclin-dependent kinase inhibitor 2A [Source:HGNC Symbol;Acc:1787]	cyclin-dependent protein kinase inhibitor activity/DNA binding/ubiquitin-protein ligase inhibitor activity	negative regulation of cell growth/cell cycle arrest/negative regulation of cell-matrix adhesion/negative regulation of transcription, DNA-dependent/G1 phase of mitotic cell cycle/negative regulation of NF-kappaB transcription factor activity/positive regulation of smooth muscle cell apoptotic process/induction of apoptosis/positive regulation of macrophage apoptotic process/negative regulation of cyclin-dependent protein kinase activity/positive regulation of cellular senescence/senescence-associated heterochromatin focus assembly/negative regulation of cell proliferation/G1/S transition of mitotic cell cycle/cell cycle checkpoint/replicative senescence/Ras protein signal transduction/regulation of protein export from nucleus/cellular senescence/transcription, DNA-dependent/somatic stem cell division/apoptotic DNA fragmentation/positive regulation of DNA damage response, signal transduction by p53 class mediator/negative regulation of ubiquitin-protein ligase activity/positive regulation of cell cycle arrest/regulation of G2/M transition of mitotic cell cycle/protein stabilization/protein destabilization/rRNA processing/ apoptotic mitochondrial changes/ activation of cysteine-type endopeptidase activity involved in apoptotic process/protein K63-linked ubiquitination/positive regulation of protein sumoylation/ negative regulation of immature T cell proliferation in thymus/ negative regulation of protein kinase activity/negative regulation of B cell proliferation/positive regulation of transcription from RNA polymerase II promoter	nucleus/senescence-associated heterochromatin focus/cytosol/protein complex/nucleolus/nucleoplasm
CDKN2C	cyclin-dependent kinase inhibitor 2C (p18, inhibits CDK4) [Source:HGNC Symbol;Acc:1789]	cyclin-dependent protein kinase inhibitor activity	negative regulation of cell proliferation/G1 phase of mitotic cell cycle/G1/S transition of mitotic cell cycle/induction of apoptosis/regulation of cyclin-dependent protein kinase activity/negative regulation of cell growth/oligodendrocyte differentiation/cell cycle arrest	nucleus/cytosol

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CDKN3	cyclin-dependent kinase inhibitor 3 [Source:HGNC Symbol;Acc:1791]	protein serine/threonine phosphatase activity/protein tyrosine phosphatase activity/protein tyrosine/serine/threonine phosphatase activity	cell cycle arrest/negative regulation of cell proliferation /G1/S transition of mitotic cell cycle/regulation of cyclin-dependent protein kinase activity	perinuclear region of cytoplasm
CDSN	corneodesmosin [Source:HGNC Symbol;Acc:1802]		keratinocyte differentiation/skin morphogenesis/cell-cell adhesion	extracellular region/desmosome/cornified envelope
CDT1	chromatin licensing and DNA replication factor 1 [Source:HGNC Symbol;Acc:24576]	DNA binding	M/G1 transition of mitotic cell cycle/regulation of transcription involved in G1/S phase of mitotic cell cycle/S phase of mitotic cell cycle/DNA replication checkpoint/DNA replication/regulation of S phase of mitotic cell cycle/regulation of DNA-dependent DNA replication initiation	cytosol/nucleoplasm
CENPA	centromere protein A [Source:HGNC Symbol;Acc:1851]	DNA binding/chromatin binding	interspecies interaction between organisms/protein localization to chromosome, centromeric region/mitotic prometaphase/establishment of mitotic spindle orientation/CenH3-containing nucleosome assembly at centromere/kinetochore assembly	condensed chromosome inner kinetochore/condensed nuclear chromosome kinetochore/cytosol/nucleoplasm/nucleosome
CENPE	centromere protein E, 312kDa [Source:HGNC Symbol;Acc:1856]	kinetochore binding/microtubule motor activity/ATP binding	mitotic metaphase plate congression/mitotic metaphase/mitotic prometaphase/cell division/blood coagulation/kinetochore assembly/mitotic chromosome movement towards spindle pole/positive regulation of protein kinase activity/multicellular organismal development	nucleus/condensed chromosome, centromeric region/condensed chromosome kinetochore/cytosol/kinetochore/spindle/microtubule
CENPF	centromere protein F, 350/400kDa (mitosin) [Source:HGNC Symbol;Acc:1857]			
CENPK	centromere protein K [Source:HGNC Symbol;Acc:29479]		CenH3-containing nucleosome assembly at centromere/mitotic prometaphase	cytosol/condensed chromosome kinetochore/nucleoplasm
CFD	complement factor D (adipsin) [Source:HGNC Symbol;Acc:2771]	serine-type endopeptidase activity	complement activation, alternative pathway/platelet activation/platelet degranulation/proteolysis/Notch signaling pathway	extracellular region/extracellular space/platelet alpha granule lumen
CFL2	cofilin 2 (muscle) [Source:HGNC Symbol;Acc:1875]			nuclear matrix/cytoplasm/cytoskeleton

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CHEK1	checkpoint kinase 1 [Source:HGNC Symbol;Acc:1925]	ATP binding/histone kinase activity (H3-T11 specific)	DNA repair/cell cycle/chromatin-mediated maintenance of transcription/regulation of mitotic centrosome separation/G2/M transition DNA damage checkpoint/regulation of transcription from RNA polymerase II promoter in response to UV-induced DNA damage/ regulation of double-strand break repair via homologous recombination/cellular response to mechanical stimulus/DNA replication/negative regulation of mitosis/replicative senescence/ regulation of histone H3-K9 acetylation/DNA damage induced protein phosphorylation	chromatin/centrosome/nucleoplasm/cytosol/condensed nuclear chromosome
CKAP2	cytoskeleton associated protein 2 [Source:HGNC Symbol;Acc:1990]		positive regulation of transcription from RNA polymerase II promoter/ apoptotic process/cytokinesis after mitosis	cytoplasmic microtubule/spindle pole/centrosome
CKS1B	CDC28 protein kinase regulatory subunit 1B [Source:HGNC Symbol;Acc:19083]	cyclin-dependent protein kinase regulator activity	cell proliferation/cell division/ regulation of cyclin-dependent protein kinase activity/G1 phase of mitotic cell cycle/G1/S transition of mitotic cell cycle/S phase of mitotic cell cycle	nucleoplasm
CKS2	CDC28 protein kinase regulatory subunit 2 [Source:HGNC Symbol;Acc:2000]	cyclin-dependent protein kinase regulator activity	regulation of cyclin-dependent protein kinase activity/cell division/spindle organization/ phosphatidylinositol-mediated signaling/cell proliferation/meiosis I	
CLEC3B	C-type lectin domain family 3, member B [Source:HGNC Symbol;Acc:11891]	heparin binding/calcium ion binding	bone mineralization/skeletal system development/positive regulation of plasminogen activation/cellular response to transforming growth factor beta stimulus	granular component/cytoplasm/extracellular space
CLU	clusterin [Source:HGNC Symbol;Acc:2095]		response to misfolded protein/positive regulation of cell proliferation/anti-apoptosis/innate immune response/positive regulation of protein ubiquitination involved in ubiquitin-dependent protein catabolic process/negative regulation of protein homooligomerization/ endocrine pancreas development/ induction of apoptosis by intracellular signals/positive regulation of proteasomal ubiquitin-dependent protein catabolic process/positive regulation of cell differentiation/neuron projection morphogenesis/protein stabilization/positive regulation of NF-kappaB transcription factor activity/platelet activation/cellular response to growth factor stimulus/ response to virus/complement activation, classical pathway/ complement activation/reverse cholesterol transport/positive regulation of intrinsic apoptotic signaling pathway/chaperone-mediated protein folding/lipid metabolic process/platelet degranulation/negative regulation of apoptotic process/response to oxidative stress/release of cytochrome c from mitochondria	growth cone/chromaffin granule/nucleus/endoplasmic reticulum/microsome/spherical high-density lipoprotein particle/cytosol/platelet alpha granule lumen/mitochondrion/aggresome/mitochondrial membrane/perinuclear region of cytoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CPA4	carboxypeptidase A4 [Source:HGNC Symbol;Acc:15740]	metallocarboxypeptidase activity/zinc ion binding	proteolysis/histone acetylation	extracellular region
CST2	cystatin SA [Source:HGNC Symbol;Acc:2474]	cysteine-type endopeptidase inhibitor activity		extracellular region
CTGF	connective tissue growth factor [Source:HGNC Symbol;Acc:2500]	heparin binding	response to fatty acid/response to amino acid stimulus/positive regulation of cell death/epidermis development/angiogenesis/positive regulation of cysteine-type endopeptidase activity involved in apoptotic process/response to glucose stimulus/extracellular matrix constituent secretion/positive regulation of protein phosphorylation/response to anoxia/response to peptide hormone stimulus/integrin-mediated signaling pathway/response to organic cyclic compound/response to estradiol stimulus/positive regulation of cell proliferation/positive regulation of gene expression/regulation of cell growth/lung development/response to mineralocorticoid stimulus/cell-matrix adhesion/cellular lipid metabolic process/cell migration/positive regulation of cell activation/response to wounding/positive regulation of collagen biosynthetic process/transcription initiation from RNA polymerase II promoter/positive regulation of cardiac muscle contraction/positive regulation of stress fiber assembly/cartilage condensation/positive regulation of JNK cascade/fibroblast growth factor receptor signaling pathway/cytosolic calcium ion transport/ossification/positive regulation of ERK1 and ERK2 cascade/organ senescence/intracellular signal transduction/positive regulation of cell differentiation/DNA replication/reactive oxygen species metabolic process/small molecule metabolic process/positive regulation of G0 to G1 transition/cell differentiation	Golgi apparatus/cell cortex/cis-Golgi network/extracellular space/perinuclear region of cytoplasm/proteinaceous extracellular matrix/plasma membrane/cytosol
CYBRD1	cytochrome b reductase 1 [Source:HGNC Symbol;Acc:20797]	ferric-chelate reductase activity/metal ion binding	electron transport chain/cellular iron ion homeostasis/transmembrane transport/response to iron ion	brush border membrane/integral to membrane/plasma membrane
CYP4X1	cytochrome P450, family 4, subfamily X, polypeptide 1 [Source:HGNC Symbol;Acc:20244]	electron carrier activity/heme binding/aromatase activity		microsome/endoplasmic reticulum membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
CYR61	cysteine-rich, angiogenic inducer, 61 [Source:HGNC Symbol;Acc:2654]	extracellular matrix binding/heparin binding	reactive oxygen species metabolic process/chemotaxis/atrial septum morphogenesis/cell proliferation/positive regulation of cysteine-type endopeptidase activity involved in apoptotic process/positive regulation of ceramide biosynthetic process/positive regulation of protein kinase activity/positive regulation of cell-substrate adhesion/labyrinthine layer blood vessel development/chorio-allantoic fusion/anatomical structure morphogenesis/positive regulation of phospholipase activity/chondroblast differentiation/apoptotic process involved in heart morphogenesis/negative regulation of apoptotic process/atrioventricular valve morphogenesis/positive regulation of osteoblast differentiation/positive regulation of cartilage development/positive regulation of BMP signaling pathway/positive regulation of cell migration/osteoblast differentiation/regulation of ERK1 and ERK2 cascade/regulation of cell growth/intussusceptive angiogenesis/positive regulation of osteoblast proliferation/positive regulation of protein phosphorylation/positive regulation of transcription from RNA polymerase II promoter/ventricular septum development/extracellular matrix organization/wound healing, spreading of cells	extracellular region
DDX60	DEAD (Asp-Glu-Ala-Asp) box polypeptide 60 [Source:HGNC Symbol;Acc:25942]	double-stranded DNA binding/ATP-dependent helicase activity/ATP binding/single-stranded RNA binding/double-stranded RNA binding	positive regulation of MDA-5 signaling pathway/positive regulation of RIG-I signaling pathway/response to virus/innate immune response	cytoplasm
DHFR	dihydrofolate reductase [Source:HGNC Symbol;Acc:2861]	drug binding/mRNA binding/dihydrofolate reductase activity/NADP binding	glycine biosynthetic process/regulation of transcription involved in G1/S phase of mitotic cell cycle/regulation of nitric-oxide synthase activity/response to methotrexate/one-carbon metabolic process/nucleotide biosynthetic process/tetrahydrofolate metabolic process/folic acid metabolic process/tetrahydrofolate biosynthetic process/nitric oxide metabolic process	nucleoplasm/cytosol

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
DKK3	dickkopf 3 homolog (Xenopus laevis) [Source:HGNC Symbol;Acc:2893]		Wnt receptor signaling pathway/negative regulation of canonical Wnt receptor signaling pathway/anatomical structure morphogenesis/negative regulation of transcription, DNA-dependent/adrenal gland development/negative regulation of aldosterone biosynthetic process/negative regulation of cortisol biosynthetic process	extracellular space
DNMT1	DNA (cytosine-5-)-methyltransferase 1 [Source:HGNC Symbol;Acc:2976]	DNA binding/DNA (cytosine-5-)-methyltransferase activity/zinc ion binding	positive regulation of histone H3-K4 methylation/positive regulation of gene expression/transcription, DNA-dependent/cellular response to amino acid stimulus/gene silencing/negative regulation of transcription from RNA polymerase II promoter/chromatin modification/maintenance of DNA methylation/negative regulation of histone H3-K9 methylation	nucleus/replication fork/centromeric heterochromatin
DONSON	downstream neighbor of SON [Source:HGNC Symbol;Acc:2993]		multicellular organismal development	nucleus
DSC2	desmocollin 2 [Source:HGNC Symbol;Acc:3036]	calcium ion binding	homophilic cell adhesion/cell adhesion	desmosome/cell-cell adherens junction/integral to membrane/plasma membrane
DSG1	desmoglein 1 [Source:HGNC Symbol;Acc:3048]	calcium ion binding/toxin binding	protein stabilization/homophilic cell adhesion/cell-cell junction assembly/calcium-dependent cell-cell adhesion/cellular component disassembly involved in apoptotic process	cytosol/desmosome/internal side of plasma membrane/integral to membrane
DST	dystonin [Source:HGNC Symbol;Acc:1090]	calcium ion binding	cell motility/response to wounding/cytoplasmic microtubule organization/hemidesmosome assembly/retrograde axon cargo transport/cell cycle arrest/integrin-mediated signaling pathway/maintenance of cell polarity/microtubule cytoskeleton organization/regulation of microtubule polymerization or depolymerization/cell adhesion/intermediate filament cytoskeleton organization/axonogenesis	nucleus/Z disc/axon part/basement membrane/microtubule plus end/hemidesmosome/cell cortex/ intermediate filament cytoskeleton/endoplasmic reticulum membrane/nuclear envelope/neurofilament cytoskeleton/cell leading edge/microtubule cytoskeleton/actin cytoskeleton/ axon/integral to membrane/cytoplasmic membrane-bounded vesicle/ intermediate filament/H zone
DUSP4	dual specificity phosphatase 4 [Source:HGNC Symbol;Acc:3070]	protein tyrosine/threonine phosphatase activity/protein tyrosine phosphatase activity/MAP kinase tyrosine/serine/threonine phosphatase activity	nerve growth factor receptor signaling pathway/toll-like receptor 3 signaling pathway/toll-like receptor 1 signaling pathway/TRIF-dependent toll-like receptor signaling pathway/peptidyl-tyrosine dephosphorylation/response to organic substance/toll-like receptor 2 signaling pathway/innate immune response/stress-activated MAPK cascade/Toll signaling pathway/endoderm formation/toll-like receptor 4 signaling pathway/MyD88-dependent toll-like receptor signaling pathway	soluble fraction/nucleoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
DUT	deoxyuridine triphosphatase [Source:HGNC Symbol;Acc:3078]	dUTP diphosphatase activity	pyrimidine nucleoside biosynthetic process/DNA replication/pyrimidine base metabolic process/dUMP biosynthetic process/dUTP metabolic process	mitochondrion/nucleoplasm
E2F7	E2F transcription factor 7 [Source:HGNC Symbol;Acc:23820]	sequence-specific DNA binding transcription factor activity/DNA binding	cell cycle/transcription, DNA-dependent/negative regulation of cell proliferation	transcription factor complex
EDNRA	endothelin receptor type A [Source:HGNC Symbol;Acc:3179]	phosphatidylinositol phospholipase C activity/endothelin receptor activity	positive regulation of release of sequestered calcium ion into cytosol/penile erection/response to lipopolysaccharide/positive regulation of kidney development/smooth muscle cell proliferation/fibroblast proliferation/response to hypoxia/aging/elevation of cytosolic calcium ion concentration involved in G-protein signaling coupled to IP3 second messenger/response to morphine/activation of protein kinase C activity by G-protein coupled receptor protein signaling pathway/patterning of blood vessels/elevation of cytosolic calcium ion concentration/maternal process involved in parturition/in utero embryonic development/regulation of epithelial cell proliferation/positive regulation of neutrophil chemotaxis/heart development/Rho protein signal transduction/sensory perception of pain/glomerular filtration/neural crest cell development/glucose transport/negative regulation of apoptotic process/positive regulation of protein phosphorylation/positive regulation of cell proliferation/activation of adenylate cyclase activity/negative regulation of cAMP biosynthetic process/positive regulation of inflammatory response/histamine secretion/respiratory gaseous exchange/positive regulation of ERK1 and ERK2 cascade/cell proliferation/activation of phospholipase C activity/artery smooth muscle contraction/cellular response to mechanical stimulus/head development/positive regulation of odontogenesis	nuclear membrane/integral to plasma membrane/T-tubule/membrane raft
ENO1	enolase 1, (alpha) [Source:HGNC Symbol;Acc:3350]	transcription corepressor activity/sequence-specific DNA binding transcription factor activity/DNA binding/magnesium ion binding/phosphopyruvate hydratase activity	response to virus/negative regulation of transcription from RNA polymerase II promoter/glycolysis/transcription, DNA-dependent/gluconeogenesis/negative regulation of cell growth	phosphopyruvate hydratase complex/plasma membrane/nucleus/M band/cytosol

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
ENPP4	ectonucleotide pyrophosphatase/phosphodiesterase 4 (putative) [Source:HGNC Symbol;Acc:3359]	hydrolase activity		integral to membrane
EPHA3	EPH receptor A3 [Source:HGNC Symbol;Acc:3387]	GPI-linked ephrin receptor activity/ATP binding	regulation of focal adhesion assembly/cell migration/regulation of microtubule cytoskeleton organization/apoptotic process/cellular response to retinoic acid/cell adhesion/regulation of Rho GTPase activity/response to cytokine stimulus/positive regulation of neuron projection development/fever generation/regulation of actin cytoskeleton organization/fasciculation of sensory neuron axon/regulation of epithelial to mesenchymal transition/response to lipopolysaccharide/fasciculation of motor neuron axon	integral to plasma membrane/early endosome/extracellular region
ESPL1	extra spindle pole bodies homolog 1 (S. cerevisiae) [Source:HGNC Symbol;Acc:16856]	cysteine-type peptidase activity	negative regulation of sister chromatid cohesion/apoptotic process/cytokinesis/positive regulation of mitotic metaphase/anaphase transition/homologous chromosome segregation/mitotic sister chromatid segregation/proteolysis/meiotic spindle organization/establishment of mitotic spindle localization	centrosome/nucleus
ESR1	estrogen receptor 1 [Source:HGNC Symbol;Acc:3467]	nitric-oxide synthase regulator activity/chromatin binding/estrogen-activated sequence-specific DNA binding RNA polymerase II transcription factor activity/zinc ion binding/core promoter sequence-specific DNA binding/estrogen response element binding/steroid binding/hormone binding	antral ovarian follicle growth/epithelial cell proliferation involved in mammary gland duct elongation/positive regulation of nitric-oxide synthase activity/prostate epithelial cord arborization involved in prostate glandular acinus morphogenesis/positive regulation of sequence-specific DNA binding transcription factor activity/positive regulation of fibroblast proliferation/regulation of branching involved in prostate gland morphogenesis/mammary gland alveolus development/vagina development/mammary gland branching involved in pregnancy/positive regulation of survival gene product expression/Sertoli cell proliferation/positive regulation of epidermal growth factor receptor signaling pathway/androgen metabolic process/positive regulation of ERK1 and ERK2 cascade/positive regulation of transcription from RNA polymerase II promoter/negative regulation of I-kappaB	chromatin remodeling complex/integral to membrane/T-tubule/plasma membrane/perinuclear region of cytoplasm/terminal button/nucleoplasm/perikaryon/mitochondrial part

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
ESR1			kinase/NF-kappaB cascade/neuroprotection/positive regulation of nitric oxide biosynthetic process/transcription initiation from RNA polymerase II promoter/response to estradiol stimulus/prostate epithelial cord elongation/uterus development/negative regulation of gene expression/negative regulation of sequence-specific DNA binding transcription factor activity/cellular response to estrogen stimulus/epithelial cell development/osteoblast development/positive regulation of retinoic acid receptor signaling pathway	
EZH2	enhancer of zeste homolog 2 (Drosophila) [Source:HGNC Symbol;Acc:3527]	histone-lysine N-methyltransferase activity/DNA binding/histone methyltransferase activity	histone lysine methylation/transcription, DNA-dependent/negative regulation of transcription, DNA-dependent/negative regulation of retinoic acid receptor signaling pathway	ESC/E(Z) complex
FABP3	fatty acid binding protein 3, muscle and heart (mammary-derived growth inhibitor) [Source:HGNC Symbol;Acc:3557]	lipid binding/long-chain fatty acid transporter activity/icosatetraenoic acid binding	negative regulation of cell proliferation/response to fatty acid/response to insulin stimulus/response to drug/phosphatidylcholine biosynthetic process/fatty acid metabolic process	cytosol/sarcoplasm
FADS2	fatty acid desaturase 2 [Source:HGNC Symbol;Acc:3575]	heme binding/stearoyl-CoA 9-desaturase activity	electron transport chain/transport/unsaturated fatty acid biosynthetic process	membrane fraction/endoplasmic reticulum membrane/integral to plasma membrane
FBLN1	fibulin 1 [Source:HGNC Symbol;Acc:3600]	extracellular matrix structural constituent/calcium ion binding/peptidase activator activity	embryo implantation/interspecies interaction between organisms/extracellular matrix organization	basement membrane/extracellular space/soluble fraction/proteinaceous extracellular matrix
FGFBP1	fibroblast growth factor binding protein 1 [Source:HGNC Symbol;Acc:19695]	heparin binding	positive regulation of cell proliferation/positive regulation of fibroblast growth factor receptor signaling pathway/cell-cell signaling/negative regulation of cell proliferation/signal transduction	plasma membrane/cell surface/extracellular space
FHL1	four and a half LIM domains 1 [Source:HGNC Symbol;Acc:3702]	zinc ion binding	muscle organ development/negative regulation of cell growth/cell differentiation/negative regulation of G2/M transition of mitotic cell cycle/negative regulation of G1/S transition of mitotic cell cycle/organ morphogenesis	cytosol/nucleus/cytoplasm/plasma membrane
FLNA	filamin A, alpha [Source:HGNC Symbol;Acc:3754]	signal transducer activity	protein localization at cell surface/establishment of protein localization/early endosome to late endosome transport/cilium assembly/platelet degranulation/actin crosslink formation/receptor clustering/platelet activation/negative regulation of sequence-specific DNA binding	extracellular region/plasma membrane/nucleus/actin cytoskeleton/Myb complex/cytosol/trans-Golgi network/cell cortex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
FLNA			transcription factor activity/positive regulation of I-kappaB kinase/NF-kappaB cascade/negative regulation of protein catabolic process/actin cytoskeleton reorganization/spindle assembly involved in mitosis/positive regulation of transcription factor import into nucleus/cell junction assembly/inhibition of adenylate cyclase activity by dopamine receptor signaling pathway/cytoplasmic sequestering of protein/protein stabilization	
FN1	fibronectin 1 [Source:HGNC Symbol;Acc:3778]	extracellular matrix structural constituent/heparin binding	platelet activation/platelet degranulation/substrate adhesion-dependent cell spreading/angiogenesis/acute-phase response/leukocyte migration/peptide cross-linking/regulation of cell shape	platelet alpha granule lumen/endoplasmic reticulum-Golgi intermediate compartment/fibrinogen complex/proteinaceous extracellular matrix
FOXM1	forkhead box M1 [Source:HGNC Symbol;Acc:3818]	DNA binding/DNA binding, bending/double-stranded DNA binding/promoter binding/specific RNA polymerase II transcription factor activity/sequence-specific DNA binding/RNA polymerase II distal enhancer sequence-specific DNA binding transcription factor activity/sequence-specific DNA binding transcription factor activity	positive regulation of cell proliferation/positive regulation of transcription from RNA polymerase II promoter/negative regulation of cell aging/liver development/regulation of sequence-specific DNA binding transcription factor activity/transcription from RNA polymerase II promoter/regulation of oxygen and reactive oxygen species metabolic process/positive regulation of double-strand break repair/vasculogenesis/regulation of cell growth/embryo development/regulation of cell proliferation/regulation of Ras protein signal transduction/DNA damage response, signal transduction by p53 class mediator resulting in transcription of p21 class mediator/regulation of reactive oxygen species metabolic process/DNA repair/tissue development/pattern specification process/cell cycle/regulation of cell cycle arrest/G2/M transition of mitotic cell cycle/negative regulation of transcription from RNA polymerase II promoter/negative regulation of stress-activated MAPK cascade	transcription factor complex/cytoplasm
FOXN1	forkhead box N1 [Source:HGNC Symbol;Acc:12765]	promoter binding/specific RNA polymerase II transcription factor activity/specific transcriptional repressor activity/RNA polymerase II distal enhancer sequence-specific DNA binding transcription factor activity/double-stranded DNA binding/transcription activator activity/sequence-specific DNA binding/DNA binding, bending	organ morphogenesis/epithelial cell proliferation/thymus development/pattern specification process/keratinocyte differentiation/embryo development/defense response/regulation of sequence-specific DNA binding transcription factor activity	transcription factor complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
GART	phosphoribosylglycinamide formyltransferase, phosphoribosylglycinamide synthetase, phosphoribosylaminoimidazole synthetase [Source:HGNC Symbol;Acc:4163]	phosphoribosylamine-glycine ligase activity/metal ion binding/ATP binding/phosphoribosylglycinamide formyltransferase activity/methyltransferase activity/phosphoribosylformylglycinamidine cyclo-ligase activity	purine base metabolic process/response to organic substance/purine ribonucleoside monophosphate biosynthetic process/'de novo' IMP biosynthetic process/organ development/purine base biosynthetic process/response to inorganic substance/methylation	cytosol
GK5	glycerol kinase 5 (putative) [Source:HGNC Symbol;Acc:28635]	ATP binding/glycerol kinase activity	glycerol catabolic process	
GNG11	guanine nucleotide binding protein (G protein), gamma 11 [Source:HGNC Symbol;Acc:4403]	GTPase activity/signal transducer activity	signal transduction/energy reserve metabolic process/cellular response to glucagon stimulus/G-protein coupled receptor signaling pathway	plasma membrane/heterotrimeric G-protein complex
GPRC5B	G protein-coupled receptor, family C, group 5, member B [Source:HGNC Symbol;Acc:13308]	G-protein coupled receptor activity		cytoplasmic vesicle membrane/nucleolus/plasma membrane/integral to membrane/Golgi apparatus
GRIP1	glutamate receptor interacting protein 1 [Source:HGNC Symbol;Acc:18708]	transcription coactivator activity	androgen receptor signaling pathway/positive regulation of transcription, DNA-dependent/synaptic transmission/intracellular signal transduction	endoplasmic reticulum/postsynaptic membrane/cytosol/synaptosome/cytoplasmic membrane-bounded vesicle/cell junction/plasma membrane
GSN	gelsolin [Source:HGNC Symbol;Acc:4620]	calcium ion binding	barbed-end actin filament capping/actin filament severing/aging/actin filament polymerization/regulation of cell adhesion/response to ethanol/response to folic acid/cilium morphogenesis/phosphatidylinositol-mediated signaling/vesicle-mediated transport/cellular response to cadmium ion/oligodendrocyte development/cellular component disassembly involved in apoptotic process/tissue regeneration	extracellular region/lamellipodium/protein complex/actin cytoskeleton/cytosol/ruffle/perinuclear region of cytoplasm/extracellular space
GTSE1	G-2 and S-phase expressed 1 [Source:HGNC Symbol;Acc:13698]		DNA damage response, signal transduction by p53 class mediator resulting in cell cycle arrest/microtubule-based process/G2 phase of mitotic cell cycle	cytoplasmic microtubule
HAS2	hyaluronan synthase 2 [Source:HGNC Symbol;Acc:4819]	hyaluronan synthase activity	positive regulation of urine volume/kidney development/cellular response to interleukin-1/renal water absorption/positive regulation of cell proliferation/hyaluronan biosynthetic process/cellular response to platelet-derived growth factor stimulus/positive regulation of cell motility/cellular response to tumor necrosis factor/positive regulation of monocyte aggregation/cellular response to fluid shear stress	soluble fraction/membrane fraction/integral to plasma membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
HELLS	helicase, lymphoid-specific [Source:HGNC Symbol;Acc:4861]	ATP binding/DNA binding/helicase activity/chromatin binding	methylation-dependent chromatin silencing/transcription, DNA-dependent/maintenance of DNA methylation/urogenital system development/multicellular organismal development/mitosis/centromeric heterochromatin assembly/lymphocyte proliferation/anti-apoptosis/cell division	centromeric heterochromatin/nucleus
HIST1H2BG	histone cluster 1, H2bg [Source:HGNC Symbol;Acc:4746]	DNA binding	nucleosome assembly/defense response to bacterium	nucleosome/nucleus
HMGB2	high mobility group box 2 [Source:HGNC Symbol;Acc:5000]	double-stranded DNA binding/transcription regulatory region DNA binding/chemoattractant activity/sequence-specific DNA binding transcription factor activity/DNA binding, bending/single-stranded DNA binding/damaged DNA binding	nucleosome assembly/base-excision repair, DNA ligation/male gonad development/positive regulation of endothelial cell proliferation/phosphatidylinositol-mediated signaling/spermatid nucleus differentiation/apoptotic DNA fragmentation/positive regulation of nuclease activity/V(D)J recombination/negative regulation of transcription, DNA-dependent/DNA topological change/cellular response to lipopolysaccharide/positive regulation of megakaryocyte differentiation/positive regulation of erythrocyte differentiation/response to steroid hormone stimulus/positive regulation of DNA binding/cell chemotaxis/positive regulation of transcription from RNA polymerase II promoter	condensed chromosome/protein complex/nucleolus/extracellular space/perinuclear region of cytoplasm/nucleoplasm
HMMR	hyaluronan-mediated motility receptor (RHAMM) [Source:HGNC Symbol;Acc:5012]	hyaluronic acid binding		cytoplasm/cell surface
HSD11B1	hydroxysteroid (11-beta) dehydrogenase 1 [Source:HGNC Symbol;Acc:5208]	11-beta-hydroxysteroid dehydrogenase (NADP+) activity/nucleotide binding/11-beta-hydroxysteroid dehydrogenase [NAD(P)] activity	glucocorticoid biosynthetic process/lung development/small molecule metabolic process	endoplasmic reticulum membrane/integral to membrane
HSD17B2	hydroxysteroid (17-beta) dehydrogenase 2 [Source:HGNC Symbol;Acc:5211]	17-alpha,20-alpha-dihydroxypregn-4-en-3-one dehydrogenase activity/nucleotide binding/testosterone 17-beta-dehydrogenase (NAD+) activity/estradiol 17-beta-dehydrogenase activity	androgen biosynthetic process/response to retinoic acid/cellular response to metal ion/bone development/estrogen biosynthetic process	integral to membrane/endoplasmic reticulum membrane/microsome
IFI27	interferon, alpha-inducible protein 27 [Source:HGNC Symbol;Acc:5397]		activation of cysteine-type endopeptidase activity involved in apoptotic process/activation of pro-apoptotic gene products/induction of apoptosis by extracellular signals/type I interferon-mediated signaling pathway	integral to membrane/mitochondrial outer membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
IFI44	interferon-induced protein 44 [Source:HGNC Symbol;Acc:16938]		response to virus	cytoplasm
IFIT1	interferon-induced protein with tetratricopeptide repeats 1 [Source:HGNC Symbol;Acc:5407]		negative regulation of protein binding/negative regulation of viral genome replication/negative regulation of defense response to virus by host/intracellular transport of viral proteins in host cell/positive regulation of viral genome replication/type I interferon-mediated signaling pathway/negative regulation of helicase activity/cellular response to exogenous dsRNA/response to virus	cytosol
IFIT2	interferon-induced protein with tetratricopeptide repeats 2 [Source:HGNC Symbol;Acc:5409]		response to virus/cellular response to interferon-alpha/type I interferon-mediated signaling pathway/negative regulation of protein binding	cytosol
IGF1	insulin-like growth factor 1 (somatomedin C) [Source:HGNC Symbol;Acc:5464]		positive regulation of smooth muscle cell proliferation/bone mineralization involved in bone maturation/negative regulation of androgen receptor signaling pathway/positive regulation of mitosis/myotube cell development/negative regulation of ERK1 and ERK2 cascade/glycolate metabolic process/lung alveolus development/phosphatidylinositol-mediated signaling/prostate gland stromal morphogenesis/positive regulation of calcineurin-NFAT signaling cascade/lung vasculature development/positive regulation of protein kinase B signaling cascade/positive regulation of smooth muscle cell migration/positive regulation of DNA replication/glial cell differentiation/proteoglycan biosynthetic process/positive regulation of tyrosine phosphorylation of Stat5 protein/positive regulation of epithelial cell proliferation/positive regulation of MAPK cascade/insulin-like growth factor receptor signaling pathway/platelet activation/positive regulation of phosphatidylinositol 3-kinase cascade/positive regulation of insulin-like growth factor receptor signaling pathway/regulation of establishment or maintenance of cell polarity/Type I pneumocyte differentiation/negative regulation of release of cytochrome c from mitochondria/lung lobe morphogenesis/Type II pneumocyte differentiation/multicellular organism growth/negative	insulin-like growth factor binding protein complex/platelet alpha granule lumen

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
IGF1			regulation of cell proliferation/positive regulation of fibroblast proliferation/inner ear development/chondroitin sulfate proteoglycan biosynthetic process/anti-apoptosis/exocrine pancreas development/positive regulation of glycolysis/cellular component movement/positive regulation of protein import into nucleus, translocation/myoblast differentiation/negative regulation of smooth muscle cell apoptotic process/DNA replication/positive regulation of DNA binding/positive regulation of glycogen biosynthetic process/platelet degranulation/prostate gland growth/positive regulation of cardiac muscle hypertrophy/blood vessel remodeling/positive regulation of transcription from RNA polymerase II promoter/prostate epithelial cord arborization involved in prostate glandular acinus morphogenesis/positive regulation of Ras protein signal transduction/myoblast proliferation/positive regulation of osteoblast differentiation/satellite cell maintenance involved in skeletal muscle regeneration/regulation of multicellular organism growth/mammary gland development/muscle hypertrophy/water homeostasis/positive regulation of activated T cell proliferation/positive regulation of glucose import/Ras protein signal transduction/positive regulation of cerebellar granule cell precursor proliferation/branching morphogenesis of a tube	
IGFBP3	insulin-like growth factor binding protein 3 [Source:HGNC Symbol;Acc:5472]	metal ion binding/protein tyrosine phosphatase activator activity	regulation of cell growth/positive regulation of myoblast differentiation/negative regulation of protein phosphorylation/positive regulation of apoptotic process/protein phosphorylation/negative regulation of smooth muscle cell proliferation/negative regulation of smooth muscle cell migration/negative regulation of signal transduction	nucleus/insulin-like growth factor binding protein complex
IGFBP5	insulin-like growth factor binding protein 5 [Source:HGNC Symbol;Acc:5474]		skeletal muscle tissue growth/negative regulation of smooth muscle cell proliferation/ intracellular signal transduction/ regulation of cell growth/striated muscle cell differentiation /negative regulation of insulin-like growth factor receptor signaling pathway/	intracellular/insulin-like growth factor binding protein complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
IGFBP5			signal transduction/glucose homeostasis/osteoblast differentiation/mammary gland involution/positive regulation of protein kinase B signaling cascade/negative regulation of smooth muscle cell migration/negative regulation of translation/cellular response to organic cyclic compound/glucose metabolic process/cellular response to cAMP/hair follicle morphogenesis	
IGFL1	IGF-like family member 1 [Source:HGNC Symbol;Acc:24093]			extracellular space
IL17RB	interleukin 17 receptor B [Source:HGNC Symbol;Acc:18015]	cytokine receptor activity	regulation of cell growth/defense response	extracellular region/cell surface/cytoplasm/integral to plasma membrane
IL1F9				
IL1R1	interleukin 1 receptor, type I [Source:HGNC Symbol;Acc:5993]	interleukin-1, Type I, activating receptor activity	immune response/innate immune response/ovulation/response to nitric oxide	intracellular/integral to plasma membrane/cell surface/extracellular region
IL1R2	interleukin 1 receptor, type II [Source:HGNC Symbol;Acc:5994]	interleukin-1, Type II, blocking receptor activity/interleukin-1 receptor activity	immune response	extracellular region/integral to membrane/plasma membrane
INCENP	inner centromere protein antigens 135/155kDa [Source:HGNC Symbol;Acc:6058]		cytokinesis/chromosome segregation/mitotic prometaphase	spindle/microtubule/condensed chromosome kinetochore/centromeric heterochromatin/kinetochore/central element/midbody/cytosol
ITGA8	integrin, alpha 8 [Source:HGNC Symbol;Acc:6144]	receptor activity	cell-cell adhesion/nervous system development/memory/cell projection organization/smooth muscle tissue development/metanephros development/extracellular matrix organization/positive regulation of transcription from RNA polymerase II promoter involved in smooth muscle cell differentiation/inner ear morphogenesis/cell-matrix adhesion/integrin-mediated signaling pathway/establishment of protein localization/positive regulation of transforming growth factor beta receptor signaling pathway	apical part of cell/alpha8-beta1 integrin complex
JAM2	junctional adhesion molecule 2 [Source:HGNC Symbol;Acc:14686]		cell-cell adhesion/leukocyte migration/blood coagulation	integral to plasma membrane/tight junction
KIAA0101	KIAA0101 [Source:HGNC Symbol;Acc:28961]			nucleus/mitochondrion
KIF11	kinesin family member 11 [Source:HGNC Symbol;Acc:6388]	microtubule motor activity/ATP binding	cell division/microtubule-based movement/spindle assembly involved in mitosis/blood coagulation/mitotic centrosome separation	kinesin complex/microtubule/chromatin remodeling complex/cytosol/spindle/spindle pole
KIF14	kinesin family member 14 [Source:HGNC Symbol;Acc:19181]	microtubule motor activity/ATP binding	microtubule-based movement	microtubule/nucleus/cytoplasm/spindle

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
KIF15	kinesin family member 15 [Source:HGNC Symbol;Acc:17273]	motor activity/DNA binding/microtubule motor activity/ATP binding	blood coagulation/microtubule-based movement/mitosis/cell proliferation	centrosome/microtubule/cytosol/plus-end kinesin complex/spindle
KIF18A	kinesin family member 18A [Source:HGNC Symbol;Acc:29441]	tubulin-dependent ATPase activity/ATP binding/plus-end-directed microtubule motor activity	blood coagulation/mitotic metaphase plate congression/mitotic prometaphase/microtubule depolymerization/microtubule-based movement/protein transport	ruffle/kinetochore microtubule/microtubule organizing center/cytosol/nucleus/caveola
KIF20A	kinesin family member 20A [Source:HGNC Symbol;Acc:9787]	ATP binding/transporter activity/microtubule motor activity	microtubule-based movement/protein transport/vesicle-mediated transport/M phase of mitotic cell cycle/microtubule bundle formation/cytokinesis	nucleoplasm/microtubule/Golgi apparatus/spindle
KIF23	kinesin family member 23 [Source:HGNC Symbol;Acc:6392]	microtubule motor activity/ATP binding	blood coagulation/mitotic spindle elongation/positive regulation of cell cycle cytokinesis/spindle midzone assembly involved in mitosis/microtubule-based movement/cell cycle cytokinesis	cytosol/midbody/kinesin complex/nucleoplasm/centrosome/microtubule/centralspindlin complex
KIF2C	kinesin family member 2C [Source:HGNC Symbol;Acc:6393]	ATP binding/microtubule motor activity/centromeric DNA binding	microtubule depolymerization/mitotic prometaphase/cell proliferation/regulation of chromosome segregation/microtubule-based movement/cell division/blood coagulation/chromosome segregation/establishment or maintenance of microtubule cytoskeleton polarity	microtubule/cytosol/condensed chromosome kinetochore/nucleus/kinesin complex/chromosome, centromeric region
KIF4A	kinesin family member 4A [Source:HGNC Symbol;Acc:13339]	microtubule motor activity/DNA binding/ATP binding	axon guidance/organelle organization/anterograde axon cargo transport/blood coagulation	midbody/spindle microtubule/nuclear matrix/nucleus/cytosol/chromosome
KLK10	kallikrein-related peptidase 10 [Source:HGNC Symbol;Acc:6358]	serine-type peptidase activity/serine-type endopeptidase activity	cell cycle/proteolysis	extracellular region
KLK7	kallikrein-related peptidase 7 [Source:HGNC Symbol;Acc:6368]	serine-type endopeptidase activity/serine-type peptidase activity	epidermis development/proteolysis	extracellular region
KLK8	kallikrein-related peptidase 8 [Source:HGNC Symbol;Acc:6369]	serine-type endopeptidase activity	proteolysis/regulation of synapse organization/response to wounding/neuron projection morphogenesis/keratinocyte proliferation/negative regulation of myelination/memory/negative regulation of axon regeneration/cell death	cytoplasm/extracellular space
KREMEN1	kringle containing transmembrane protein 1 [Source:HGNC Symbol;Acc:17550]		Wnt receptor signaling pathway/cell communication/regulation of canonical Wnt receptor signaling pathway	integral to membrane/membrane fraction
KRT16	keratin 16 [Source:HGNC Symbol;Acc:6423]	structural constituent of cytoskeleton	epidermis development/intermediate filament cytoskeleton organization/cell proliferation/cytoskeleton organization	intermediate filament

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
KRT6A	keratin 6A [Source:HGNC Symbol;Acc:6443]	structural constituent of cytoskeleton	cell differentiation/ectoderm development/positive regulation of cell proliferation	keratin filament/intermediate filament
KRT6B	keratin 6B [Source:HGNC Symbol;Acc:6444]	structural constituent of cytoskeleton	ectoderm development	keratin filament
KYNU	kynureninase [Source:HGNC Symbol;Acc:6469]	pyridoxal phosphate binding/kynureninase activity	quinolinate biosynthetic process/tryptophan catabolic process to kynurenine/NAD biosynthetic process/anthranilate metabolic process/tryptophan catabolic process to acetyl-CoA/tryptophan catabolic process/response to vitamin B6/response to interferon-gamma/L-kynurenine catabolic process	soluble fraction/mitochondrion/cytosol
LCN2	lipocalin 2 [Source:HGNC Symbol;Acc:6526]	transporter activity/small molecule binding/iron ion binding	positive regulation of cell projection organization/response to herbicide/cellular response to tumor necrosis factor/apoptotic process/response to virus/siderophore transport/cellular response to interleukin-1/cellular response to lipopolysaccharide/cellular response to hydrogen peroxide/protein homotrimerization/regulation of apoptotic process/cellular response to nutrient levels/positive regulation of gene expression/response to drug/innate immune response	extracellular region/cytosol/extracellular space
LEPR	leptin receptor [Source:HGNC Symbol;Acc:6554]	transmembrane signaling receptor activity/cytokine receptor activity	energy reserve metabolic process/multicellular organismal development/cholesterol metabolic process/cytokine-mediated signaling pathway/negative regulation of hydrolase activity	plasma membrane/integral to membrane/extracellular region
LIG1	ligase I, DNA, ATP-dependent [Source:HGNC Symbol;Acc:6598]	metal ion binding/ATP binding/DNA binding/DNA ligase (ATP) activity	telomere maintenance via semi-conservative replication/cell division/DNA ligation involved in DNA repair/telomere maintenance via recombination/nucleotide-excision repair, DNA gap filling/S phase of mitotic cell cycle/transcription-coupled nucleotide-excision repair/lagging strand elongation/anatomical structure morphogenesis/double-strand break repair via homologous recombination/base-excision repair	nucleoplasm/mitochondrion/chromosome
LMNB1	lamin B1 [Source:HGNC Symbol;Acc:6637]	structural molecule activity	cellular component disassembly involved in apoptotic process	nuclear envelope/nuclear matrix/lamin filament/nucleoplasm/nuclear inner membrane
LOC100131541				
LOC375196				
LY75	lymphocyte antigen 75 [Source:HGNC Symbol;Acc:6729]	receptor activity/carbohydrate binding	inflammatory response/immune response/endocytosis	integral to plasma membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
MAD2L1	MAD2 mitotic arrest deficient-like 1 (yeast) [Source:HGNC Symbol;Acc:6763]		negative regulation of apoptotic process/cell division/mitotic cell cycle spindle assembly checkpoint/anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/positive regulation of mitotic cell cycle spindle assembly checkpoint/mitotic prometaphase/mitotic sister chromatid segregation/negative regulation of mitotic anaphase-promoting complex activity	condensed chromosome kinetochore/spindle pole/perinuclear region of cytoplasm/nucleus/cytosol/kinetochore
MANEA	mannosidase, endo-alpha [Source:HGNC Symbol;Acc:21072]	glycoprotein endo-alpha-1,2-mannosidase activity	protein N-linked glycosylation via asparagine/post-translational protein modification	integral to membrane/Golgi membrane
MATN2	matrilin 2 [Source:HGNC Symbol;Acc:6908]	calcium ion binding		proteinaceous extracellular matrix
MCM10	minichromosome maintenance complex component 10 [Source:HGNC Symbol;Acc:18043]	metal ion binding	G1/S transition of mitotic cell cycle/cell cycle checkpoint/DNA replication/M/G1 transition of mitotic cell cycle	nucleolus/cytoplasm/nucleoplasm
MCM2	minichromosome maintenance complex component 2 [Source:HGNC Symbol;Acc:6944]	DNA binding/ATP binding/DNA replication origin binding/metal ion binding/helicase activity	DNA strand elongation involved in DNA replication/nucleosome assembly/S phase of mitotic cell cycle/G1/S transition of mitotic cell cycle/M/G1 transition of mitotic cell cycle/DNA unwinding involved in replication/DNA-dependent DNA replication initiation/cell cycle checkpoint	nuclear origin of replication recognition complex/MCM complex/chromatin
MCM4	minichromosome maintenance complex component 4 [Source:HGNC Symbol;Acc:6947]	ATP binding/DNA binding/helicase activity	G1/S transition of mitotic cell cycle/DNA strand elongation involved in DNA replication/M/G1 transition of mitotic cell cycle/cell cycle checkpoint/S phase of mitotic cell cycle/DNA-dependent DNA replication initiation	MCM complex
MCM5	minichromosome maintenance complex component 5 [Source:HGNC Symbol;Acc:6948]	ATP binding/helicase activity/DNA binding	cell cycle checkpoint/DNA-dependent DNA replication initiation/DNA strand elongation involved in DNA replication/G1/S transition of mitotic cell cycle/M/G1 transition of mitotic cell cycle/S phase of mitotic cell cycle	MCM complex
MCM6	minichromosome maintenance complex component 6 [Source:HGNC Symbol;Acc:6949]	DNA helicase activity/ATP binding/single-stranded DNA binding	cell cycle checkpoint/S phase of mitotic cell cycle/M/G1 transition of mitotic cell cycle/DNA unwinding involved in replication/DNA strand elongation involved in DNA replication/DNA-dependent DNA replication initiation/G1/S transition of mitotic cell cycle	MCM complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
MEF2C	myocyte enhancer factor 2C [Source:HGNC Symbol;Acc:6996]	miRNA binding/RNA polymerase II core promoter proximal region sequence-specific DNA binding transcription factor activity involved in positive regulation of transcription/RNA polymerase II core promoter sequence-specific DNA binding transcription factor activity/RNA polymerase II regulatory region sequence-specific DNA binding/AT DNA binding/DNA binding	blood vessel development/cellular response to calcium ion/positive regulation of B cell proliferation/toll-like receptor 4 signaling pathway/neural crest cell differentiation/glomerulus morphogenesis/muscle cell fate determination/regulation of synaptic activity/positive regulation of myoblast differentiation/cellular response to lipopolysaccharide/negative regulation of ossification/positive regulation of cardiac muscle cell differentiation/B cell homeostasis/toll-like receptor 2 signaling pathway/smooth muscle cell differentiation/cellular response to transforming growth factor beta stimulus/regulation of megakaryocyte differentiation/osteoblast differentiation/TRIF-dependent toll-like receptor signaling pathway/stress-activated MAPK cascade/humoral immune response/cellular response to fluid shear stress/outflow tract morphogenesis/chondrocyte differentiation/melanocyte differentiation/myotube differentiation/platelet formation/sinoatrial valve morphogenesis/epithelial cell proliferation involved in renal tubule morphogenesis/positive regulation of macrophage apoptotic process/positive regulation of cardiac muscle cell proliferation/apoptotic process/B cell receptor signaling pathway/Toll signaling pathway/cardiac ventricle formation/positive regulation of transcription, DNA-dependent/ventricular cardiac muscle cell differentiation/positive regulation of survival gene product expression/endochondral ossification/positive regulation of protein homodimerization activity/response to virus/positive regulation of bone mineralization/B cell proliferation/nephron tubule epithelial cell differentiation/ blood vessel remodeling/positive regulation of neuron differentiation/positive regulation of skeletal muscle tissue development/nerve growth factor receptor signaling pathway/ cellular response to drug/positive regulation of skeletal muscle cell differentiation/germinal center formation/primary heart field specification/negative regulation of neuron apoptotic process/ innate immune response/	protein complex/cytoplasm/nuclear speck/nucleus

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
			regulation of germinal center formation/positive regulation of osteoblast differentiation/cellular response to parathyroid hormone stimulus/negative regulation of transcription from RNA polymerase II promoter/learning or memory/toll-like receptor 1 signaling pathway/toll-like receptor 3 signaling pathway/positive regulation of behavioral fear response/positive regulation of alkaline phosphatase activity/heart looping/cellular response to trichostatin A/neuron development/MyD88-dependent toll-like receptor signaling pathway/secondary heart field specification	
MEIS1	Meis homeobox 1 [Source:HGNC Symbol;Acc:7000]	sequence-specific DNA binding/RNA polymerase II distal enhancer sequence-specific DNA binding transcription factor activity/chromatin binding	angiogenesis/definitive hemopoiesis/lens morphogenesis in camera-type eye	transcription factor complex
MELK	maternal embryonic leucine zipper kinase [Source:HGNC Symbol;Acc:16870]	protein serine/threonine kinase activity/calcium ion binding/non-membrane spanning protein tyrosine kinase activity/ATP binding/lipid binding	protein autophosphorylation/apoptotic process/G2/M transition of mitotic cell cycle/neural precursor cell proliferation/hemopoiesis/positive regulation of apoptotic process	plasma membrane/cell cortex
MEOX2	mesenchyme homeobox 2 [Source:HGNC Symbol;Acc:7014]	sequence-specific DNA binding/sequence-specific DNA binding transcription factor activity	somite specification/blood circulation/multicellular organismal development/palate development/skeletal muscle tissue development/limb development/angiogenesis	cytoplasm/nucleus
MEST	mesoderm specific transcript homolog (mouse) [Source:HGNC Symbol;Acc:7028]	hydrolase activity	metabolic process/mesoderm development/response to retinoic acid/regulation of lipid storage	endoplasmic reticulum membrane/endoplasmic reticulum/integral to membrane
MFAP5	microfibrillar associated protein 5 [Source:HGNC Symbol;Acc:29673]	extracellular matrix structural constituent		microfibril
MGLL	monoglyceride lipase [Source:HGNC Symbol;Acc:17038]	acylglycerol lipase activity/carboxylesterase activity/lysophospholipase activity	triglyceride catabolic process/regulation of endocannabinoid signaling pathway/fatty acid biosynthetic process/platelet activation/regulation of sensory perception of pain/inflammatory response/arachidonic acid metabolic process/regulation of inflammatory response	plasma membrane
MKI67	antigen identified by monoclonal antibody Ki-67 [Source:HGNC Symbol;Acc:7107]	ATP binding	organ regeneration/meiosis/DNA metabolic process/cellular response to heat/cell proliferation	chromosome, centromeric region/condensed chromosome/nucleolus/cytoplasm
MMAA	methylmalonic aciduria (cobalamin deficiency) cblA type [Source:HGNC Symbol;Acc:18871]	GTP binding/nucleoside-triphosphatase activity	cobalamin biosynthetic process	mitochondrion
MMP1	matrix metallopeptidase 1 (interstitial collagenase) [Source:HGNC Symbol;Acc:7155]	zinc ion binding/metalloendopeptidase activity/calcium ion binding	extracellular matrix disassembly/interspecies interaction between organisms/proteolysis/collagen catabolic process/leukocyte migration/blood coagulation	extracellular region/proteinaceous extracellular matrix

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
MSH6	mutS homolog 6 (E. coli) [Source:HGNC Symbol;Acc:7329]	damaged DNA binding/ATP binding/DNA-dependent ATPase activity/chromatin binding/guanine/thymine mispair binding	somatic hypermutation of immunoglobulin genes/response to UV/determination of adult lifespan/negative regulation of DNA recombination/meiotic mismatch repair/isotype switching/positive regulation of helicase activity/reciprocal meiotic recombination/DNA damage response, signal transduction resulting in induction of apoptosis	MutSalpha complex/nuclear chromosome/nuclear chromatin
MT1G	metallothionein 1G [Source:HGNC Symbol;Acc:7399]	zinc ion binding	monocyte differentiation/negative regulation of growth/monocyte activation/cellular response to vascular endothelial growth factor stimulus/cellular response to zinc ion/cellular response to copper ion/cellular response to cadmium ion	nucleus/perinuclear region of cytoplasm
MVD	mevalonate (diphospho) decarboxylase [Source:HGNC Symbol;Acc:7529]	diphosphomevalonate decarboxylase activity/ATP binding	positive regulation of cell proliferation/isopentenyl diphosphate biosynthetic process, mevalonate pathway/response to drug/isoprenoid biosynthetic process/cholesterol biosynthetic process	cytosol/soluble fraction
MYBL1	v-myb myeloblastosis viral oncogene homolog (avian)-like 1 [Source:HGNC Symbol;Acc:7547]	DNA binding	transcription, DNA-dependent/positive regulation of transcription, DNA-dependent	nucleus
MYBL2	v-myb myeloblastosis viral oncogene homolog (avian)-like 2 [Source:HGNC Symbol;Acc:7548]	sequence-specific DNA binding transcription factor activity/DNA binding	transcription, DNA-dependent/mitotic cell cycle	nucleus
NAP1L2	nucleosome assembly protein 1-like 2 [Source:HGNC Symbol;Acc:7638]		nucleosome assembly	chromatin assembly complex
NDN	necdin homolog (mouse) [Source:HGNC Symbol;Acc:7675]	DNA binding	neuron migration/post-embryonic development/genetic imprinting/axon extension involved in development/glial cell migration/axonal fasciculation/respiratory system process/nervous system development/regulation of growth/ negative regulation of cell proliferation/transcription, DNA-dependent/nerve growth factor receptor signaling pathway/ regulation of transcription, DNA-dependent/multicellular organismal homeostasis/sensory perception of pain/central nervous system development	centrosome/cell projection/nucleus/cytosol/perikaryon
NDRG2	NDRG family member 2 [Source:HGNC Symbol;Acc:14460]		cell differentiation/negative regulation of smooth muscle cell proliferation/negative regulation of cytokine production/regulation of vascular endothelial growth factor production/nervous system development/regulation of platelet-derived growth factor production/Wnt receptor signaling pathway/negative regulation of ERK1 and ERK2 cascade	Golgi apparatus/growth cone/cytosol/nucleus/perinuclear region of cytoplasm/centrosome

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
NEK2	NIMA (never in mitosis gene a)-related kinase 2 [Source:HGNC Symbol;Acc:7745]	protein serine/threonine kinase activity/ATP binding/metal ion binding	cell division/G2/M transition of mitotic cell cycle/chromosome segregation/spindle assembly/centrosome separation/mitosis/meiosis/negative regulation of DNA binding/protein autophosphorylation/regulation of mitotic centrosome separation/regulation of attachment of spindle microtubules to kinetochore/mitotic sister chromatid segregation	centrosome/microtubule/condensed nuclear chromosome/kinetochore/midbody/spindle pole/cytosol/condensed chromosome kinetochore/nucleolus
NPPB	natriuretic peptide B [Source:HGNC Symbol;Acc:7940]		receptor guanylyl cyclase signaling pathway/regulation of blood vessel size/inflammatory response/cGMP biosynthetic process/negative regulation of angiogenesis/negative regulation of smooth muscle cell proliferation/body fluid secretion/response to drug/response to hypoxia/response to peptide hormone stimulus/positive regulation of renal sodium excretion/regulation of vasodilation/positive regulation of urine volume/regulation of vascular permeability/regulation of blood pressure/response to organic cyclic compound/negative regulation of cell growth/heart development/response to calcium ion	nucleus/perinuclear region of cytoplasm/extracellular space
NR1D2	nuclear receptor subfamily 1, group D, member 2 [Source:HGNC Symbol;Acc:7963]	sequence-specific DNA binding/ligand-activated sequence-specific DNA binding RNA polymerase II transcription factor activity/zinc ion binding/steroid hormone receptor activity	transcription initiation from RNA polymerase II promoter	nucleoplasm
NR2F2	nuclear receptor subfamily 2, group F, member 2 [Source:HGNC Symbol;Acc:7976]	sequence-specific DNA binding/zinc ion binding/transcription corepressor activity/ligand-activated sequence-specific DNA binding RNA polymerase II transcription factor activity/retinoic acid binding/steroid hormone receptor activity	anterior/posterior pattern specification/neuron migration/negative regulation of endothelial cell proliferation/regulation of transcription involved in lymphatic endothelial cell fate commitment/negative regulation of cyclin-dependent protein kinase activity/negative regulation of endothelial cell migration/blood vessel morphogenesis/forebrain development/skeletal muscle tissue development/limb development/negative regulation of transcription from RNA polymerase II promoter/positive regulation of transcription, DNA-dependent/radial pattern formation/lipid metabolic process/response to estradiol stimulus	nucleus

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
NR3C2	nuclear receptor subfamily 3, group C, member 2 [Source:HGNC Symbol;Acc:7979]	zinc ion binding/sequence-specific DNA binding/sequence-specific DNA binding transcription factor activity/double-stranded DNA binding/steroid hormone receptor activity/steroid binding/mineralocorticoid receptor activity/hormone binding	cellular sodium ion homeostasis/excretion/regulation of cell proliferation/transcription initiation from RNA polymerase II promoter	nucleoplasm/endoplasmic reticulum membrane
NT5E	5'-nucleotidase, ecto (CD73) [Source:HGNC Symbol;Acc:8021]	ferrous iron binding/nucleotide binding/5'-nucleotidase activity	AMP catabolic process/purine base metabolic process/purine nucleotide catabolic process/adenosine biosynthetic process/negative regulation of inflammatory response/pyrimidine nucleoside catabolic process/pyrimidine base metabolic process/DNA metabolic process/purine nucleotide biosynthetic process	cytoplasm/plasma membrane/anchored to membrane/membrane fraction
NUF2	NUF2, NDC80 kinetochore complex component, homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:14621]		cell division/mitotic prometaphase/chromosome segregation	nucleus/cytosol/condensed chromosome kinetochore/Ndc80 complex
NUP210	nucleoporin 210kDa [Source:HGNC Symbol;Acc:30052]		regulation of glucose transport/transmembrane transport/carbohydrate metabolic process/glucose transport/cytokine-mediated signaling pathway/small molecule metabolic process/mRNA transport/protein transport/viral reproduction	nuclear pore/endoplasmic reticulum membrane/nuclear envelope/nuclear membrane
NUSAP1	nucleolar and spindle associated protein 1 [Source:HGNC Symbol;Acc:18538]	DNA binding	cytokinesis after mitosis/establishment of mitotic spindle localization/mitotic chromosome condensation/positive regulation of mitosis	spindle/microtubule/chromosome/nucleolus/cytoplasm
OAS2	2'-5'-oligoadenylate synthetase 2, 69/71kDa [Source:HGNC Symbol;Acc:8087]	ATP binding/zinc ion binding/2'-5'-oligoadenylate synthetase activity/RNA binding	purine nucleotide biosynthetic process/interferon-gamma-mediated signaling pathway/type I interferon-mediated signaling pathway/nucleobase-containing compound metabolic process/RNA catabolic process	cytoplasm/microsome/membrane/mitochondrion/cytosol/endoplasmic reticulum/nucleus
OIP5	Opa interacting protein 5 [Source:HGNC Symbol;Acc:20300]		mitosis/cell division/cell communication/CenH3-containing nucleosome assembly at centromere	chromosome, centromeric region/Cajal body/chromocenter/chromatin
OR51B5	olfactory receptor, family 51, subfamily B, member 5 [Source:HGNC Symbol;Acc:19599]	G-protein coupled receptor activity/olfactory receptor activity		plasma membrane/integral to membrane
PCDHGA1	protocadherin gamma subfamily A, 1 [Source:HGNC Symbol;Acc:8696]	calcium ion binding	homophilic cell adhesion	plasma membrane/integral to membrane
PCDHGC3	protocadherin gamma subfamily C, 3 [Source:HGNC Symbol;Acc:8716]	calcium ion binding	calcium-dependent cell-cell adhesion/homophilic cell adhesion	membrane/plasma membrane/integral to membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
PCNA	proliferating cell nuclear antigen [Source:HGNC Symbol;Acc:8729]	DNA polymerase processivity factor activity/purine-specific mismatch base pair DNA N-glycosylase activity/dinucleotide insertion or deletion binding	response to lipid/intracellular protein transport/negative regulation of transcription from RNA polymerase II promoter/transcription-coupled nucleotide-excision repair/response to cadmium ion/mismatch repair/nucleotide-excision repair, DNA gap filling/positive regulation of deoxyribonuclease activity/regulation of DNA replication/S phase of mitotic cell cycle/telomere maintenance via semi-conservative replication/cell proliferation/base-excision repair, gap-filling/telomere maintenance via recombination/base-excision repair/heart development/ regulation of transcription involved in G1/S phase of mitotic cell cycle/DNA strand elongation involved in DNA replication/ translesion synthesis /phosphatidylinositol-mediated signaling	PCNA complex/DNA replication factor C complex/cytoplasm/microtubule cytoskeleton/nucleoplasm/cyclin-dependent protein kinase holoenzyme complex/nuclear lamina/PCNA-p21 complex/nuclear replication fork
PI3	peptidase inhibitor 3, skin-derived [Source:HGNC Symbol;Acc:8947]	serine-type endopeptidase inhibitor activity	copulation	proteinaceous extracellular matrix
PIK3R3	phosphoinositide-3-kinase, regulatory subunit 3 (gamma) [Source:HGNC Symbol;Acc:8981]	1-phosphatidylinositol-3-kinase activity/1-phosphatidylinositol-3-kinase regulator activity	insulin receptor signaling pathway/T cell costimulation/ platelet activation/regulation of phosphatidylinositol 3-kinase activity	phosphatidylinositol 3-kinase complex/cytosol
PLA2G2A	phospholipase A2, group IIA (platelets, synovial fluid) [Source:HGNC Symbol;Acc:9031]	phospholipid binding/calcium ion binding/calcium-dependent phospholipase A2 activity	positive regulation of inflammatory response/low-density lipoprotein particle remodeling/phosphatidic acid metabolic process/lipid catabolic process/positive regulation of macrophage derived foam cell differentiation/defense response to Gram-positive bacterium	membrane/endoplasmic reticulum/secretory granule/extracellular space
PLA2R1	phospholipase A2 receptor 1, 180kDa [Source:HGNC Symbol;Acc:9042]	receptor activity/carbohydrate binding	negative regulation of phospholipase A2 activity/oxidative stress-induced premature senescence/replicative senescence/positive regulation of DNA damage response, signal transduction by p53 class mediator/reactive oxygen species metabolic process/negative regulation of arachidonic acid secretion/positive regulation of arachidonic acid secretion/ cytokine production/receptor-mediated endocytosis	extracellular region/plasma membrane/integral to plasma membrane/cell surface/integral to membrane
PNLIPRP3	pancreatic lipase-related protein 3 [Source:HGNC Symbol;Acc:23492]	triglyceride lipase activity/ retinyl-palmitate esterase activity	lipid catabolic process	extracellular region
POLQ	polymerase (DNA directed), theta [Source:HGNC Symbol;Acc:9186]	single-stranded DNA-dependent ATPase activity/ATP-dependent helicase activity/ATP binding/damaged DNA binding/DNA-directed DNA polymerase activity	DNA repair/DNA replication	nucleoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
PPARG	peroxisome proliferator-activated receptor gamma [Source:HGNC Symbol;Acc:9236]	chromatin binding/ligand-activated sequence-specific DNA binding RNA polymerase II transcription factor activity/arachidonic acid binding/transcription regulatory region DNA binding/prostaglandin receptor activity/RNA polymerase II regulatory region DNA binding/zinc ion binding/drug binding/steroid hormone receptor activity/sequence-specific DNA binding	induction of apoptosis/positive regulation of fatty acid oxidation/negative regulation of cell growth/positive regulation of sequence-specific DNA binding transcription factor activity/heart development/response to vitamin A/brown fat cell differentiation/negative regulation of interferon-gamma-mediated signaling pathway/response to cold/cellular response to organic cyclic compound/cellular response to lithium ion/positive regulation of fat cell differentiation/negative regulation of receptor biosynthetic process/positive regulation of transcription from RNA polymerase II promoter/response to low-density lipoprotein particle stimulus/transcription initiation from RNA polymerase II promoter/organ regeneration/negative regulation of sequestering of triglyceride/monocyte differentiation/cellular response to insulin stimulus/innate immune response/negative regulation of macrophage derived foam cell differentiation/negative regulation of cell proliferation/placenta development/response to caffeine/response to estrogen stimulus/lipoprotein transport/response to nutrient/negative regulation of telomerase activity/lipid homeostasis/response to drug/cell fate commitment/regulation of cholesterol transporter activity/negative regulation of acute inflammatory response/response to lipid/negative regulation of cholesterol storage/lipid metabolic process/epithelial cell differentiation/long-chain fatty acid transport/low-density lipoprotein particle receptor biosynthetic process/cell maturation/fatty acid oxidation/activation of cysteine-type endopeptidase activity involved in apoptotic process/glucose homeostasis/white fat cell differentiation/regulation of blood pressure/negative regulation of transcription from RNA polymerase II promoter/positive regulation of oligodendrocyte differentiation	cytosol/nucleoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
PPID	peptidylprolyl isomerase D [Source:HGNC Symbol;Acc:9257]	cyclosporin A binding/peptidyl-prolyl cis-trans isomerase activity	protein folding/protein peptidyl-prolyl isomerization	cytoplasm/intermediate filament cytoskeleton
PRC1	protein regulator of cytokinesis 1 [Source:HGNC Symbol;Acc:9341]		mitotic spindle elongation/cytokinesis	nucleus/spindle microtubule/cytoplasm/spindle pole/plasma membrane
PRIM1	primase, DNA, polypeptide 1 (49kDa) [Source:HGNC Symbol;Acc:9369]	DNA primase activity/metal ion binding	DNA-dependent DNA replication initiation/telomere maintenance via recombination/DNA strand elongation involved in DNA replication/S phase of mitotic cell cycle/G1/S transition of mitotic cell cycle/telomere maintenance via semi-conservative replication/DNA replication, synthesis of RNA primer/M/G1 transition of mitotic cell cycle	nucleoplasm/alpha DNA polymerase:primase complex
PRKDC	protein kinase, DNA-activated, catalytic polypeptide [Source:HGNC Symbol;Acc:9413]	DNA-dependent protein kinase activity/DNA binding/ATP binding	positive regulation of transcription from RNA polymerase II promoter/positive regulation of apoptotic process/T cell lineage commitment/double-strand break repair via nonhomologous end joining/somitogenesis/T cell receptor V(D)J recombination/peptidyl-serine phosphorylation/telomere maintenance/apoptotic process/protein destabilization/immunoglobulin V(D)J recombination/heart development/pro-B cell differentiation/germ cell programmed cell death/response to gamma radiation/B cell lineage commitment/brain development/T cell differentiation in thymus/cellular response to insulin stimulus	transcription factor complex/DNA-dependent protein kinase-DNA ligase 4 complex
PSG3	pregnancy specific beta-1-glycoprotein 3 [Source:HGNC Symbol;Acc:9520]		female pregnancy/defense response	extracellular region
PSG4	pregnancy specific beta-1-glycoprotein 4 [Source:HGNC Symbol;Acc:9521]		female pregnancy/defense response	extracellular region
PSG5	pregnancy specific beta-1-glycoprotein 5 [Source:HGNC Symbol;Acc:9522]		female pregnancy	extracellular region
PSG7	pregnancy specific beta-1-glycoprotein 7 (gene/pseudogene) [Source:HGNC Symbol;Acc:9524]			
PSG9	pregnancy specific beta-1-glycoprotein 9 [Source:HGNC Symbol;Acc:9526]		female pregnancy	extracellular region

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
PSIP1	PC4 and SFRS1 interacting protein 1 [Source:HGNC Symbol;Acc:9527]	RNA polymerase II transcription coactivator activity/supercoiled DNA binding/chromatin binding	interspecies interaction between organisms/nuclear mRNA 5'-splice site recognition/response to heat/provirus integration/transcription, DNA-dependent/response to oxidative stress/initiation of viral infection/regulation of transcription, DNA-dependent	nuclear heterochromatin/nucleoplasm/cytosol/nuclear periphery/transcriptionally active chromatin
PTHLH	parathyroid hormone-like hormone [Source:HGNC Symbol;Acc:9607]		cAMP metabolic process/activation of adenylate cyclase activity by G-protein signaling pathway/female pregnancy/epidermis development/negative regulation of cell proliferation/regulation of gene expression/negative regulation of chondrocyte differentiation/skeletal system development/positive regulation of cell proliferation/cell-cell signaling	nucleus/Golgi apparatus/extracellular space
PTTG1	pituitary tumor-transforming 1 [Source:HGNC Symbol;Acc:9690]	cysteine-type endopeptidase inhibitor activity/sequence-specific DNA binding transcription factor activity	anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/mitosis/transcription from RNA polymerase II promoter/chromosome organization/cell division/DNA repair/mitotic cell cycle/spermatogenesis/chromosome segregation/DNA metabolic process	nucleus/cytosol/cytoplasm
RBPMS	RNA binding protein with multiple splicing [Source:HGNC Symbol;Acc:19097]	poly(A) RNA binding/transcription coactivator activity/nucleotide binding	positive regulation of pathway-restricted SMAD protein phosphorylation/transcription, DNA-dependent/regulation of transcription, DNA-dependent/positive regulation of SMAD protein import into nucleus/RNA processing	cytoplasm/nucleus
RFC2	replication factor C (activator 1) 2, 40kDa [Source:HGNC Symbol;Acc:9970]	DNA binding/ATP binding/nucleoside-triphosphatase activity	transcription-coupled nucleotide-excision repair/S phase of mitotic cell cycle/DNA strand elongation involved in DNA replication/cell cycle checkpoint/telomere maintenance via recombination/telomere maintenance via semi-conservative replication/nucleotide-excision repair, DNA gap filling	DNA replication factor C complex/nucleoplasm
RFC4	replication factor C (activator 1) 4, 37kDa [Source:HGNC Symbol;Acc:9972]	nucleoside-triphosphatase activity/ATP binding/DNA binding	nucleotide-excision repair, DNA gap filling/transcription-coupled nucleotide-excision repair/phosphatidylinositol-mediated signaling/cell cycle checkpoint/telomere maintenance via semi-conservative replication/DNA strand elongation involved in DNA replication/S phase of mitotic cell cycle/telomere maintenance via recombination	DNA replication factor C complex/nucleoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
RFC5	replication factor C (activator 1) 5, 36.5kDa [Source:HGNC Symbol;Acc:9973]	nucleoside-triphosphatase activity/DNA binding/ATP binding	telomere maintenance via semi-conservative replication/transcription-coupled nucleotide-excision repair/cell cycle checkpoint/telomere maintenance via recombination/DNA strand elongation involved in DNA replication/nucleotide-excision repair, DNA gap filling/S phase of mitotic cell cycle	DNA replication factor C complex/nucleoplasm
RMI1	RMI1, RecQ mediated genome instability 1, homolog (S. cerevisiae) [Source:HGNC Symbol;Acc:25764]		DNA replication	nucleus
RNASEH2A	ribonuclease H2, subunit A [Source:HGNC Symbol;Acc:18518]	metal ion binding/ribonuclease H activity/RNA binding	RNA catabolic process/DNA replication	ribonuclease H2 complex/nucleus
RRM2	ribonucleotide reductase M2 [Source:HGNC Symbol;Acc:10452]	ribonucleoside-diphosphate reductase activity, thioredoxin disulfide as acceptor/transition metal ion binding	regulation of transcription involved in G1/S phase of mitotic cell cycle/nucleobase-containing small molecule interconversion/deoxyribonucleoside diphosphate metabolic process/deoxyribonucleotide biosynthetic process/protein heterotetramerization/DNA replication	nucleoplasm/cytosol
S100A12	S100 calcium binding protein A12 [Source:HGNC Symbol;Acc:10489]	calcium ion binding/zinc ion binding	xenobiotic metabolic process/inflammatory response/innate immune response/defense response to fungus/defense response to bacterium/killing of cells of other organism/positive regulation of I-kappaB kinase/NF-kappaB cascade	cytosol/nucleus/insoluble fraction/extracellular region
SALL1	sal-like 1 (Drosophila) [Source:HGNC Symbol;Acc:10524]	zinc ion binding/sequence-specific DNA binding transcription factor activity/chromatin binding/DNA binding	branching involved in ureteric bud morphogenesis/negative regulation of smoothened signaling pathway/olfactory bulb mitral cell layer development/embryonic digestive tract development/ olfactory nerve development /ureteric bud invasion/olfactory bulb interneuron differentiation/ forelimb morphogenesis/gonad development/regulation of neural precursor cell proliferation/ mesenchymal to epithelial transition involved in metanephros morphogenesis/adrenal gland development/hindlimb morphogenesis/outer ear morphogenesis/neural tube closure/inductive cell-cell signaling/ventricular septum development/histone deacetylation/pituitary gland development/positive regulation of transcription from RNA polymerase II promoter/negative regulation of transcription from RNA polymerase II promoter/ positive regulation of Wnt receptor signaling pathway/transcription, DNA-dependent/positive regulation of neuron differentiation/embryonic digit morphogenesis	cytoplasm/heterochromatin/chromocenter/nucleus/NuRD complex

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
SAT1	spermidine/spermine N1-acetyltransferase 1 [Source:HGNC Symbol;Acc:10540]	diamine N-acetyltransferase activity/spermidine binding	angiogenesis/regulation of cell proliferation/putrescine catabolic process/polyamine biosynthetic process/small molecule metabolic process	cytosol/soluble fraction
SERPINB13	serpin peptidase inhibitor, clade B (ovalbumin), member 13 [Source:HGNC Symbol;Acc:8944]	serine-type endopeptidase inhibitor activity	regulation of proteolysis/response to UV	cytoplasm/extracellular region
SERPINB2	serpin peptidase inhibitor, clade B (ovalbumin), member 2 [Source:HGNC Symbol;Acc:8584]	serine-type endopeptidase inhibitor activity	blood coagulation/fibrinolysis/anti-apoptosis/regulation of proteolysis	Golgi apparatus/extracellular space/extracellular region/plasma membrane
SERPINB3	serpin peptidase inhibitor, clade B (ovalbumin), member 3 [Source:HGNC Symbol;Acc:10569]	serine-type endopeptidase inhibitor activity	regulation of proteolysis	extracellular region/cytoplasm
SERPINB4	serpin peptidase inhibitor, clade B (ovalbumin), member 4 [Source:HGNC Symbol;Acc:10570]	serine-type endopeptidase inhibitor activity	immune response/regulation of proteolysis	cytoplasm/extracellular region
SERPINF1	serpin peptidase inhibitor, clade F (alpha-2 antiplasmin, pigment epithelium derived factor), member 1 [Source:HGNC Symbol;Acc:8824]	serine-type endopeptidase inhibitor activity	cell proliferation/aging/response to glucocorticoid stimulus/positive regulation of neurogenesis/regulation of proteolysis/response to retinoic acid/negative regulation of angiogenesis/negative regulation of inflammatory response/negative regulation of epithelial cell proliferation involved in prostate gland development/short-term memory/kidney development	melanosome/extracellular space
SERPING1	serpin peptidase inhibitor, clade G (C1 inhibitor), member 1 [Source:HGNC Symbol;Acc:1228]	serine-type endopeptidase inhibitor activity	platelet activation/complement activation, classical pathway/blood coagulation, intrinsic pathway/fibrinolysis/negative regulation of complement activation, lectin pathway/blood circulation/innate immune response/platelet degranulation	platelet alpha granule lumen/extracellular space
SGCE	sarcoglycan, epsilon [Source:HGNC Symbol;Acc:10808]	calcium ion binding	cell-matrix adhesion/muscle organ development	cytoplasm/integral to plasma membrane/cytoskeleton/sarcolemma/sarcoglycan complex
SGOL2	shugoshin-like 2 (S. pombe) [Source:HGNC Symbol;Acc:30812]		meiotic sister chromatid cohesion, centromeric/cell division/protein localization/mitotic prometaphase	condensed nuclear chromosome, centromeric region/nucleus/cytosol/mitotic cohesin complex/chromosome, centromeric region/condensed chromosome kinetochore
SIX2	SIX homeobox 2 [Source:HGNC Symbol;Acc:10888]	sequence-specific DNA binding transcription factor activity/sequence-specific DNA binding	cell proliferation/middle ear morphogenesis/protein import into nucleus/anatomical structure morphogenesis/embryonic cranial skeleton morphogenesis/negative regulation of cell differentiation/ chondrocyte differentiation/kidney development/mesenchymal to epithelial transition involved in metanephros morphogenesis/ positive regulation of transcription from RNA polymerase II promoter/ mesodermal cell fate specification	nucleus

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
SLC2A1	solute carrier family 2 (facilitated glucose transporter), member 1 [Source:HGNC Symbol;Acc:11005]	xenobiotic transporter activity/glucose transmembrane transporter activity/D-glucose transmembrane transporter activity/dehydroascorbic acid transporter activity	cellular response to glucose starvation/regulation of insulin secretion/carbohydrate metabolic process/L-ascorbic acid metabolic process/energy reserve metabolic process/response to osmotic stress	membrane fraction/melanosome/basolateral plasma membrane/plasma membrane/female pronucleus/integral to membrane/cell-cell junction/midbody/caveola
SLC2A3	solute carrier family 2 (facilitated glucose transporter), member 3 [Source:HGNC Symbol;Acc:11007]	glucose transmembrane transporter activity	carbohydrate metabolic process/L-ascorbic acid metabolic process	integral to membrane/plasma membrane
SLC7A5	solute carrier family 7 (amino acid transporter light chain, L system), member 5 [Source:HGNC Symbol;Acc:11063]	peptide antigen binding/L-amino acid transmembrane transporter activity/neutral amino acid transmembrane transporter activity	leukocyte migration/blood coagulation/cell differentiation/nervous system development/ion transport/cellular amino acid metabolic process	apical plasma membrane/plasma membrane/cytosol/integral to membrane
SLC7A7	solute carrier family 7 (amino acid transporter light chain, y+L system), member 7 [Source:HGNC Symbol;Acc:11065]	amino acid transmembrane transporter activity	ion transport/leukocyte migration/amino acid transport/protein complex assembly/blood coagulation/cellular amino acid metabolic process/transmembrane transport	basolateral plasma membrane/integral to plasma membrane
SLC7A8	solute carrier family 7 (amino acid transporter light chain, L system), member 8 [Source:HGNC Symbol;Acc:11066]	organic cation transmembrane transporter activity/peptide antigen binding/L-amino acid transmembrane transporter activity/neutral amino acid transmembrane transporter activity/toxin transporter activity	metal ion homeostasis/leukocyte migration/response to toxin/cellular amino acid metabolic process/blood coagulation	basolateral plasma membrane/integral to plasma membrane/cytoplasm
SLIT2	slit homolog 2 (Drosophila) [Source:HGNC Symbol;Acc:11086]	calcium ion binding/heparin binding/GTPase inhibitor activity	apoptotic process involved in luteolysis/positive regulation of axonogenesis/positive regulation of apoptotic process/response to cortisol stimulus/negative regulation of mononuclear cell migration/axon extension involved in axon guidance/cellular response to heparin/negative regulation of neutrophil chemotaxis/negative regulation of vascular permeability/ negative regulation of small GTPase mediated signal transduction/Roundabout signaling pathway/negative regulation of lamellipodium assembly/negative regulation of chemokine-mediated signaling pathway/chemorepulsion involved in postnatal olfactory bulb interneuron migration/negative regulation of protein phosphorylation/negative regulation of retinal ganglion cell axon guidance/cell migration involved in sprouting angiogenesis/negative regulation of monocyte chemotaxis/retinal ganglion cell axon guidance/ negative regulation of cellular response to growth factor stimulus/negative regulation of cell growth/induction of negative chemotaxis/corticospinal neuron axon guidance through spinal cord/motor axon guidance/ branching morphogenesis of a tube/cellular response to hormone stimulus/negative regulation of actin filament polymerization/ negative regulation of smooth muscle cell chemotaxis/negative regulation of endothelial cell migration/ureteric bud development	cell surface/cytoplasm/extracellular space/plasma membrane

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
SLPI	secretory leukocyte peptidase inhibitor [Source:HGNC Symbol;Acc:11092]	serine-type endopeptidase inhibitor activity/endopeptidase inhibitor activity	negative regulation of viral genome replication/negative regulation of protein binding	extracellular region
SMARCA2	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily a, member 2 [Source:HGNC Symbol;Acc:11098]	ATP binding/DNA-dependent ATPase activity/helicase activity/RNA polymerase II transcription coactivator activity/transcription regulatory region DNA binding	negative regulation of transcription from RNA polymerase II promoter/aortic smooth muscle cell differentiation/nervous system development/negative regulation of cell proliferation/chromatin remodeling/negative regulation of cell growth	nucleoplasm/intermediate filament cytoskeleton/SWI/SNF complex/nBAF complex/npBAF complex/nuclear chromatin/WINAC complex
SOCS2	suppressor of cytokine signaling 2 [Source:HGNC Symbol;Acc:19382]		response to estradiol stimulus/regulation of JAK-STAT cascade/JAK-STAT cascade involved in growth hormone signaling pathway/anti-apoptosis/regulation of cell growth/protein ubiquitination/negative regulation of signal transduction/aging	cytosol
SORBS1	sorbin and SH3 domain containing 1 [Source:HGNC Symbol;Acc:14565]		muscle contraction/positive regulation of lipid biosynthetic process/stress fiber assembly/positive regulation of establishment of protein localization in plasma membrane/insulin receptor signaling pathway/focal adhesion assembly/glucose transport/positive regulation of glucose import/positive regulation of glycogen biosynthetic process	stress fiber/zonula adherens/focal adhesion/cytosol/nucleus/centrosome/membrane raft
SPAG5	sperm associated antigen 5 [Source:HGNC Symbol;Acc:13452]		regulation of attachment of spindle microtubules to kinetochore/mitotic anaphase/phosphatidylinositol-mediated signaling/spindle organization/mitotic sister chromatid segregation/cell division	mitotic spindle/spindle pole/kinetochore/cytoplasm/microtubule plus end/condensed chromosome kinetochore/nucleus
SPRR1A	small proline-rich protein 1A [Source:HGNC Symbol;Acc:11259]	structural molecule activity	keratinocyte differentiation/peptide cross-linking/keratinization	cytoplasm/cornified envelope
SPRR1B	small proline-rich protein 1B [Source:HGNC Symbol;Acc:11260]	structural molecule activity	keratinization/keratinocyte differentiation/peptide cross-linking	cytoplasm/cornified envelope
STAG3	stromal antigen 3 [Source:HGNC Symbol;Acc:11356]	binding	chromosome segregation/synaptonemal complex assembly	chromosome, centromeric region/synaptonemal complex/meiotic cohesin complex
SYCP2	synaptonemal complex protein 2 [Source:HGNC Symbol;Acc:11490]	DNA binding	synaptonemal complex assembly/fertilization/cell division/male genitalia morphogenesis/male meiosis/meiotic prophase I/apoptotic process/female meiosis	lateral element/synaptonemal complex
SYNGR3	synaptogyrin 3 [Source:HGNC Symbol;Acc:11501]		positive regulation of transporter activity	synaptic vesicle/integral to plasma membrane/cell junction/neuromuscular junction
TACC1	transforming, acidic coiled-coil containing protein 1 [Source:HGNC Symbol;Acc:11522]		interkinetic nuclear migration/cell division/microtubule cytoskeleton organization/cerebral cortex development/regulation of microtubule-based process/cell cycle/neurogenesis	nucleus/microtubule organizing center/microtubule cytoskeleton/intermediate filament cytoskeleton

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
TAF7L	TAF7-like RNA polymerase II, TATA box binding protein (TBP)-associated factor, 50kDa [Source:HGNC Symbol;Acc:11548]		transcription initiation from RNA polymerase II promoter/multicellular organismal development/spermatogenesis/regulation of transcription, DNA-dependent/cell differentiation	cytoplasm/transcription factor TFIID complex
TAGLN	transgelin [Source:HGNC Symbol;Acc:11553]		muscle organ development	cytoplasm
TFDP2	transcription factor Dp-2 (E2F dimerization partner 2) [Source:HGNC Symbol;Acc:11751]	DNA binding/sequence-specific DNA binding transcription factor activity/transcription cofactor activity	G1 phase of mitotic cell cycle/transcription, DNA-dependent	transcription factor complex/nucleoplasm
TFPI	tissue factor pathway inhibitor (lipoprotein-associated coagulation inhibitor) [Source:HGNC Symbol;Acc:11760]	serine-type endopeptidase inhibitor activity/endopeptidase inhibitor activity	blood coagulation, extrinsic pathway	extracellular space/plasma membrane
TFPI2	tissue factor pathway inhibitor 2 [Source:HGNC Symbol;Acc:11761]	serine-type endopeptidase inhibitor activity/extracellular matrix structural constituent	blood coagulation	proteinaceous extracellular matrix
TGFBR3	transforming growth factor, beta receptor III [Source:HGNC Symbol;Acc:11774]	heparin binding/coreceptor activity/transforming growth factor beta receptor activity, type III	negative regulation of epithelial cell proliferation/cardiac muscle cell proliferation/immune response/pathway-restricted SMAD protein phosphorylation/palate development/cell migration/response to luteinizing hormone stimulus/BMP signaling pathway/negative regulation of cellular component movement/response to follicle-stimulating hormone stimulus/intracellular protein kinase cascade/response to prostaglandin E stimulus/transforming growth factor beta receptor signaling pathway/cell growth/ventricular cardiac muscle tissue morphogenesis/heart trabecula formation/definitive erythrocyte differentiation/cardiac epithelial to mesenchymal transition/liver development	inhibin-betaglycan-ActRII complex/extracellular space/external side of plasma membrane/integral to plasma membrane
TIMELESS	timeless homolog (Drosophila) [Source:HGNC Symbol;Acc:11813]		transcription, DNA-dependent/mitosis/morphogenesis of an epithelium/regulation of S phase/negative regulation of transcription, DNA-dependent/circadian rhythm/cell division/response to DNA damage stimulus/multicellular organismal development/detection of abiotic stimulus	nuclear chromatin
TIMP2	TIMP metallopeptidase inhibitor 2 [Source:HGNC Symbol;Acc:11821]	metal ion binding/metalloendopeptidase inhibitor activity/enzyme activator activity	regulation of MAPK cascade/cellular response to organic substance/regulation of cAMP metabolic process/regulation of neuron differentiation/negative regulation of cell proliferation/extracellular matrix disassembly	extracellular region/basement membrane/cell surface

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
TIMP3	TIMP metallopeptidase inhibitor 3 [Source:HGNC Symbol;Acc:11822]	metal ion binding/metalloendopeptidase inhibitor activity	response to mechanical stimulus/response to estrogen stimulus/response to amino acid stimulus/visual perception/aging/tissue regeneration/response to folic acid/central nervous system development/negative regulation of membrane protein ectodomain proteolysis/response to organic cyclic compound/cellular response to organic substance	basement membrane/cytoplasm
TMPRSS4	transmembrane protease, serine 4 [Source:HGNC Symbol;Acc:11878]	scavenger receptor activity/serine-type endopeptidase activity	proteolysis	integral to membrane
TNXB	tenascin XB [Source:HGNC Symbol;Acc:11976]			
TOP2A	topoisomerase (DNA) II alpha 170kDa [Source:HGNC Symbol;Acc:11989]	drug binding/ATP binding/chromatin binding/sequence-specific DNA binding/DNA topoisomerase (ATP-hydrolyzing) activity/structure-specific DNA binding	resolution of meiotic recombination intermediates/positive regulation of apoptotic process/response to drug/DNA-dependent DNA replication/mitotic recombination/apoptotic chromosome condensation/mitotic cell cycle G2/M transition decatenation checkpoint/embryonic cleavage/positive regulation of retroviral genome replication/DNA ligation/DNA topological change/sister chromatid segregation/aging/phosphatidylinositol-mediated signaling/response to parathyroid hormone stimulus/DNA repair/positive regulation of transcription from RNA polymerase II promoter	nucleolus/cytoplasm/nucleoplasm/synaptonemal complex/DNA topoisomerase complex (ATP-hydrolyzing)
TRIM22	tripartite motif containing 22 [Source:HGNC Symbol;Acc:16379]	zinc ion binding/sequence-specific DNA binding transcription factor activity/transcription corepressor activity/ligase activity	protein trimerization/interspecies interaction between organisms/immune response/transcription, DNA-dependent/protein ubiquitination/response to virus	nucleus/Golgi apparatus/Cajal body/nuclear speck
TRIP13	thyroid hormone receptor interactor 13 [Source:HGNC Symbol;Acc:12307]	nucleoside-triphosphatase activity/transcription cofactor activity/ATP binding	pachytene/double-strand break repair/oogenesis/male meiosis I/oocyte maturation/synaptonemal complex assembly/transcription from RNA polymerase II promoter/female meiosis I/reciprocal meiotic recombination/spermatogenesis/spermatid development	male germ cell nucleus/nucleus
TTK	TTK protein kinase [Source:HGNC Symbol;Acc:12401]	protein tyrosine kinase activity/protein serine/threonine kinase activity/protein serine/threonine/tyrosine kinase activity/ATP binding	mitotic spindle organization/positive regulation of pathway-restricted SMAD protein phosphorylation/positive regulation of cell proliferation/mitotic cell cycle spindle assembly checkpoint	spindle

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
TYMS	thymidylate synthetase [Source:HGNC Symbol;Acc:12441]	nucleotide binding/folic acid binding/cofactor binding/thymidylate synthase activity	intestinal epithelial cell maturation/DNA replication/dUMP metabolic process/pyrimidine base metabolic process/organ regeneration/pyrimidine nucleoside biosynthetic process/deoxyribonucleoside monophosphate biosynthetic process/immortalization of host cell by virus/dTMP biosynthetic process/developmental growth/phosphatidylinositol-mediated signaling/dTTP biosynthetic process/response to organophosphorus/response to drug/aging/cartilage development/DNA repair/regulation of transcription involved in G1/S phase of mitotic cell cycle/response to glucocorticoid stimulus	soluble fraction/nucleoplasm/mitochondrial matrix/mitochondrial inner membrane/cytosol
UBE2C	ubiquitin-conjugating enzyme E2C [Source:HGNC Symbol;Acc:15937]	ubiquitin-protein ligase activity/ATP binding	negative regulation of ubiquitin-protein ligase activity involved in mitotic cell cycle/protein K48-linked ubiquitination/positive regulation of ubiquitin-protein ligase activity involved in mitotic cell cycle/mitosis/cell division/mitotic cell cycle spindle assembly checkpoint/protein K11-linked ubiquitination/cyclin catabolic process/activation of anaphase-promoting complex activity/phosphatidylinositol-mediated signaling/positive regulation of exit from mitosis/anaphase-promoting complex-dependent proteasomal ubiquitin-dependent protein catabolic process/free ubiquitin chain polymerization/spindle organization/exit from mitosis	anaphase-promoting complex/nucleoplasm/cytosol
UHRF1	ubiquitin-like with PHD and ring finger domains 1 [Source:HGNC Symbol;Acc:12556]	methyl-CpG binding/core promoter proximal region sequence-specific DNA binding/ligase activity/sequence-specific DNA binding transcription factor activity/zinc ion binding	cell proliferation/positive regulation of cellular protein metabolic process/protein ubiquitination/DNA repair/positive regulation of DNA topoisomerase (ATP-hydrolyzing) activity/positive regulation of transcription from RNA polymerase II promoter/cell cycle/transcription, DNA-dependent	nucleus/heterochromatin
UIMC1	ubiquitin interaction motif containing 1 [Source:HGNC Symbol;Acc:30298]		negative regulation of transcription, DNA-dependent/transcription, DNA-dependent/positive regulation of DNA repair/double-strand break repair/histone H2A K63-linked deubiquitination/G2/M transition DNA damage checkpoint/response to ionizing radiation	BRCA1-A complex
USP1	ubiquitin specific peptidase 1 [Source:HGNC Symbol;Acc:12607]	ubiquitin thiolesterase activity/ubiquitin-specific protease activity/cysteine-type endopeptidase activity	DNA repair/regulation of DNA repair/ubiquitin-dependent protein catabolic process/response to UV/monoubiquitinated protein deubiquitination	nucleoplasm

(Supplementary Table 1) contd…..

HUGO Symbol	Description	Gene function	Process	Localization
VARS	valyl-tRNA synthetase [Source:HGNC Symbol;Acc:12651]	aminoacyl-tRNA editing activity/valine-tRNA ligase activity/ATP binding	valyl-tRNA aminoacylation/tRNA aminoacylation for protein translation/regulation of translational fidelity/translational elongation	mitochondrion/cytosol
WISP2	WNT1 inducible signaling pathway protein 2 [Source:HGNC Symbol;Acc:12770]		signal transduction/negative regulation of cell proliferation/cell adhesion/regulation of cell growth/cell-cell signaling	cytoplasm/plasma membrane/cell surface/soluble fraction/extracellular region
XRCC3	X-ray repair complementing defective repair in Chinese hamster cells 3 [Source:HGNC Symbol;Acc:12830]	DNA-dependent ATPase activity/ATP binding/DNA binding	DNA recombination/DNA repair	nucleus/perinuclear region of cytoplasm/mitochondrion
ZMIZ1	zinc finger, MIZ-type containing 1 [Source:HGNC Symbol;Acc:16493]	zinc ion binding	transcription, DNA-dependent/regulation of transcription, DNA-dependent	nuclear speck/cytoplasm
ZNF114	zinc finger protein 114 [Source:HGNC Symbol;Acc:12894]	zinc ion binding/DNA binding	transcription, DNA-dependent/regulation of transcription, DNA-dependent	nucleus
ZNF117	zinc finger protein 117 [Source:HGNC Symbol;Acc:12897]	zinc ion binding/sequence-specific DNA binding transcription factor activity/DNA binding	transcription, DNA-dependent	nucleus
ZNF238	zinc finger protein 238 [Source:HGNC Symbol;Acc:13030]	zinc ion binding/sequence-specific DNA binding transcription factor activity/sequence-specific DNA binding	transcription, DNA-dependent/skeletal muscle tissue development/negative regulation of transcription from RNA polymerase II promoter	nuclear chromosome
ZNF385A	zinc finger protein 385A [Source:HGNC Symbol;Acc:17521]	DNA binding/zinc ion binding	regulation of transcription, DNA-dependent/transcription, DNA-dependent	nucleolus/cytoplasm
ZWINT	ZW10 interactor [Source:HGNC Symbol;Acc:13195]		establishment of localization in cell/mitotic cell cycle checkpoint/mitotic prometaphase/spindle organization/phosphatidylinositol-mediated signaling/cell division/mitotic sister chromatid segregation	cytosol/nucleus/kinetochore/condensed chromosome kinetochore