

Cancer	Up/ Down	Gene Symbol	Gene name	NCBI ID	Function	Reference
Breast cancer	Up	APOC1	Apolipoprotein C1	341	Lipid transport and metabolism	81
		VWA5A	Von Willebrand factor A domain containing 5A	4013	Von Willebrand Factor generally helps in primary homeostasis. It induces platelets adhesion and aggregation to the vascular injury.	82
		LXN	Latexin	56925	Latexin regulates homeostasis and also regulates survival, self-renewal and stress response of the hematopoietic stem cells.	83
		CLIC4	Chloride intracellular channel 4	25932	It acts as an effector in thrombin/PAR1 signaling pathway and plays important role in thrombin mediated RhoA activation.	84
		MCFD2	Multiple coagulation factor deficiency 2, ER cargo receptor complex subunit	90411	MCFD2 helps in the regulation of the recruitment in transport. It involved in the transportation of glycosylated FV and FVIII by the secretory pathway. It also contains LMAN1 (Lectin mannose binding 1) binding sites, which are important for the cargo formation.	85
Lung Cancer	Up	ABCB7	ATP binding cassette subfamily B member 7	22	It is a mitochondrial iron transporter that induces HIF1 alpha and regulates the apoptotic and non-apoptotic cell death by stimulating the mitochondrial reactive oxygen species and NFkB signaling.	40
		SLC44A5	Solute carrier family 44-member 5	204962	It is one type of choline transporter and promotes tumorigenesis of hepatocellular carcinoma. It acts as an inducer of cell viability, invasion and supressor of apoptosis.	63
		AIF1L	Allograft inflammatory factor 1-like	83543	AIF1L plays crucial role in the contractility of actomyosin and filopodial extension in podocytes. Also, it helps in the proliferation and migration of breast cancer cell.	86
		SYNE1	Spectrin repeat containing nuclear envelope protein 1	23345	This gene encodes for protein Nesprin-1 which help in the regulation of nuclear morphology, cytoskeletal organization and cell motility.	87
		ID2	Inhibitor of DNA binding 2	3398	ID2 helps in the regulation of cellular differentiation, proliferation and survival. It also plays critical role in balancing stem cell renewal and differentiation. ID2 acts as either tumor supressor gene or oncogene depending on the cellular environment.	88
	Down	ID4	Inhibitor of DNA binding 4	3400	ID4 helps in the promotion of stem cell survival, differentiation and Controls various developmental processes. Its expression can be reduced or increased depending on the context of cancer environment.	89
		RPS6KA6	Ribosomal protein S6 kinase6	27330	This protein regulates various components that involves in the cellular growth, survival and proliferation. It is one type of Ser/Thr protein kinase and associated with the downstream signaling of MAPK pathway.	90
		PPM1D	Protein Phosphatase, Mg2+/Mn2+ Dependent 1D	8493	PPM1D blocks the activation of P38 which downregulates the P53 and induce the cells to return into their homeostatic state. It also regulates different activities of DNA repair.	91
		TP53BP2	Tumor protein p53 binding protein 2	7159	TP53BP2 plays crucial role in regulating the cell growth and P53 dependent apoptosis.	92
		ANGPT1	Angiopoietin 1	284	Angiopoietin 1 is endothelial-specific growth factor that prevents the death of endothelial cells. It is very important to maintain the vascular integrity and vascular development.	93
		RHOBTB3	Rho-related BTB domain-containing protein 3	22836	RhoBTB3 binds directly with the Rab9 GTPase and facilitates transportation of cargo from endosomes to the trans golgi network.	94
		SLCO4C1	Solute carrier organic anion transporter family member 4C1	353189	SLCO4C1 are the member of OATP (Organic anion transporting polypeptides) family, mainly helps in the absorption of various substrates that includes bile acids, different xenobiotics and also steroid conjugates.	95
		TRAM2	Translocation associated membrane protein 2	9697	TRAM2 is an important part of translocon that regulates the posttranscriptional processing of nascent proteins into the ER membrane. It also plays crucial role in cancer progression by enhancing cellular proliferation, EMT, migration and invasion.	96
		CAV2	Caveolin 2	858	Caveolins are the members of integral membrane proteins and helps in receptor mediated endocytosis. CAV2 also mediates the cellular proliferation, differentiation.	65
		CAP1	Adenylyl cyclase-associated protein 1	10487	The CAPI proteins alternate the dynamics of actin filament by promoting the cofilin-driven actin depolymerization. It also plays crucial role in cell motility, morphogenesis and receptor mediated endocytosis.	97

	GLIPR1	Glioma pathogenesis-related protein 1	11010	GLIPR1 either act as a tumor promoter or tumor suppressor depending on the cell type and the tumor microenvironment.	98	
	TFPI2	Tissue factor pathway inhibitor 2	7980	TFPI2 mainly synthesized by fibroblasts, endothelial cells and smooth muscles cells and stored in a larger concentration into the extra cellular matrix (ECM) of those cells. It inhibits wide range of serine proteases and regulates the ECM digestion and remodeling.	99	
	PLAUR	Plasminogen activator, urokinase receptor	5329	It is the receptor of urokinase plasminogen activator which regulates the plasminogen activation. It mediates the degradation of extra cellular matrix, cellular migration and growth factor activation.	100	
	MAN2A1	Mannosidase alpha class 2A member 1	4124	It is an enzyme of golgi complex and helps in the N-linked glycosylation process. It also reduces the ability of T cells to kill the cancer cells.	101	
	ABCA3	ATP Binding Cassette Subfamily A Member 3	21	It is the member of ATP binding cassette transporter family which transports various components across biological membrane by utilizing the energy of ATP hydrolysis. This protein highly expressed in the limiting membrane of lamellar bodies of alveolar epithelial type II cells where it helps in the transportation of pulmonary surfactant.	102	
	DUSP4	Dual Specificity Phosphate 4	1846	It helps in the regulation of MAPK activity that controls various biological processes such as cellular proliferation, survival and cell death.	103	
	EPHA4	EPH Receptor A4	2043	This EPH receptor binds with its ligand ephrin and activate its tyrosine specific kinase domain and then induce intracellular signaling pathways. Mainly it is involved various developmental events.	104	
	ASAHI	N-acylsphingosine amidohydrolase 1	427	This gene encodes for an enzyme acid ceramidase which catalyze the conversion of ceramide into sphingosine and free fatty acid. This sphingosine regulates the transcription of various steroidogenic genes.	105	
	FOXO1	Forkhead box O1	2308	It is a transcription factor of FoxO family and regulates several physiological processes like cell cycle, apoptosis, glucose metabolism, cell differentiation and cellular development.	106	
	MECOM	MDS1 and EVI1 complex locus	2122	MECOM is involved in early development, cellular differentiation and regulates several pathophysiological processes like hematopoietic stem cell proliferation, differentiation and cell death.	107	
Ovarian cancer	Up	SLC6A12	Solute Carrier Family 6 Member 12	6539	It is a transporter protein that helps in the cellular absorption of betaine and GABA. It regulates GABA transmission in the brain by the reabsorption into presynaptic terminals.	108
		PRRG4	Proline rich Gla 4	79056	PRRG4 promotes the migratory behaviors of breast cancer cells by modulating mitochondrial function.	69
		ZDHHC14	Zinc Finger DHHC-Type Palmitoyltransferase 14	79683	In case of gastric cancer, this protein induces tumor migration and invasion.	109
		AKR1C3	Aldo-Keto Reductase Family 1 Member C3	8644	AKR1C3 induces the androgen biosynthesis and androgen receptor activation. It also induces EMT of prostate cancer cell.	110
		FRAS1	Fraser Extracellular Matrix Complex Subunit 1	80144	It is an extra cellular matrix component and involved in epithelial mesenchymal coupling.	111
		TSC22D1	TSC22 Domain Family Member 1	8848	This protein belongs to the TSC22 family and it induces differentiation, apoptosis as well as inhibit cellular proliferation in various cells.	112
		MBD5	Methyl-CpG Binding Domain Protein 5	55777	MBD5 regulates transcriptional processes and development. It also involved in the regulation of glucose homeostasis.	113
		SLC5A3	Solute Carrier Family 5 Member 3	6526	It is a myo-inositol transporter and has been found upregulated in several cancers. It promotes the growth of cervical cancer cell proliferation.	114
		PRDM1	PR/SET Domain 1	639	It regulates the differentiation of both B lymphocyte and T lymphocyte and act as an immunosuppressor.	115
		ZFX	Zinc Finger Protein X-Linked	7543	It is one type of transcriptional activator and involved in the regulation of various cancer cells transcriptome.	116
		CTNS	Cystinosis	1497	It is a lysosomal integral membrane protein that helps in the transportation of disulphide amino acid cysteine from lysosome to the cytosol.	117
		AKR1B1	Aldo-Keto Reductase Family 1 Member B1	231	AKR1B1 involved in glucose metabolism, osmoregulation and decreases the superoxide and toxic materials. It also involved in tumorigenesis.	118

	TGFBR3	Transforming Growth Factor Beta Receptor 3	7049	TGFBR3 promotes growth, migration, invasion and angiogenesis of few cancers and also suppresses the growth, migration and angiogenesis of few cancers.	119
	AKR1C1	Aldo-Keto Reductase Family 1 Member C1	1645	This enzyme plays a role in hormone metabolism mainly progesterone. This is also involved in the metabolism of various exogenous and endogenous compounds like steroids, aromatic hydrocarbons, prostaglandins etc.	120
	CAT	Catalase	847	Catalase is an important antioxidant enzyme that converts two molecules of H ₂ O ₂ into one molecule of oxygen and two molecules of water. H ₂ O ₂ is a non radical reactive oxygen species. By breaking the H ₂ O ₂ , catalase helps to maintain the optimum level of the molecule in the cell which is important in cellular signaling.	121
	PKD2	Protein Kinase D 2	5311	PKD2 is one type of ser/thr protein kinase. It is involved in the cellular growth, proliferation, migration, invasion, angiogenesis of various cancer cells.	122
	C7orf26	Chromosome 7 open reading frame 26	79034	It is also known as integrator complex subunit 15 which is critical for the eye and brain development during embryogenesis.	123
	TMEM222	Transmembrane Protein 222	84065	It is under the family of TMEM, which are the diverse group of transmembrane proteins. TMEM222 is involved in the neuronal development.	124
	ARID5B	AT-Rich Interaction Domain 5B	84159	It is belonging to the family of AT-Rich interaction domain family. Generally, the members of this family regulate epigenetic mechanism by binding to the specific or non-specific AT rich sequences of the DNA and also interacts with other proteins to influence chromatin structure. ARID5B is crucial for the development of hematopoietic stem cell.	125
	CCNG2	Cyclin G2	901	It is involved in cell cycle regulation. It has negative regulation in cancer initiation and progression.	126
	ABHD11	Abhydrolase Domain Containing 11	83451	ABDH11 regulates metabolism of lipids and also maintains the expansion and differentiation of embryonic stem cell.	127
	CDK19	Cyclin Dependent Kinase 19	23097	It is cyclin dependent kinase involved in cellular homeostasis. CDK19 along with CDK 8 forms a mediator co activator complex which is required for the transcriptional events.	128
	PXK	PX Domain Containing Serine/Threonine Kinase Like	54899	PXK protein contains a PX domain, a protein kinase domain and a WASP homology 2 domain. Expression of PXK mediates the ligand induced EGR trafficking and degradation of COS cells.	129
Down	ITGA3	Integrin subunit alpha 3	3675	It is an integrin family member protein that mainly interacts with several extra cellular matrix related proteins, induces the cell-matrix as well as cell-cell adhesion, linking the external and internal structures of the cell.	130
	ANXA3	Annexin A3	306	Annexin 3 is generally associated with vesicular transport, signal transduction, membrane fusion, endocytosis. It regulates several physiological activities like cell division, differentiation, survival, apoptosis. It also has angiogenic, anticoagulative and anti-inflammatory properties.	131
	NFE2L3	Nuclear factor erythroid 2-related factor 3	9603	It is a transcription factor, associated with stress response and signal transduction. It is also involved in the cellular growth and proliferation of several carcinogenesis.	132
	GJC1	Gap junction protein gamma 1	10052	This gene encodes for protein of gap junction, is the member of connexin family and have effects on junctional conductance.	133
	CYR61	Cysteine rich angiogenic inducer 61	3491	CYR61 mediates the process of embryo implantation during the early embryo development. It is associated with several cellular processes like cell adhesion, migration, proliferation and apoptosis as well as induced angiogenesis.	134
	DARS2	Aspartyl -tRNA synthetase 2	55157	DARS2 gene encodes for the mitochondrial aspartyl-tRNA synthetase. This protein transfers the aspartic acid to its specific mitochondrial tRNA.	135
	UGCG	UDP-glucose ceramide glycosyltransferase	7357	It is an important enzyme, helps in the metabolism of glycosphingolipids.	136
	DEPDC1B	Dishevelled, Egl-10, Pleckstrin domain containing 1B	55789	DEPDC1 consist of two distinct domains. DEP domain interacts with GPCRs to stimulate GPCR signaling. The RhoGAP domain involved in Rho-GTPase signal	137

			transduction that regulates cellular proliferation, migration, invasion and cytoskeletal reorganization.	
DUSP1	Dual specificity phosphatase 1	1843	DUSP1 (MKP1) is one type of mitogen-active protein kinase that regulates several cellular signaling pathways. MKP1 involved in the regulation of monocyte adhesion and migration as well as macrophage activation, inflammation and survival.	138
BUB1	Budding uninhibited by benzimidazoles 1	699	It is a member of ser/thr protein kinase family and Crucial components of spindle assembly checkpoint during mitotic cell division.	139
TBC1D1	TBC1 Domain family member 1	23216	It is an activating protein of RAB-GTPase that controls the glucose metabolism in muscle cells.	140
ADCY7	Adenylate cyclase 7	113	It is a membrane bound adenylate cyclase that generates second messenger cAMP and this cAMP regulates broad ranges of cellular processes.	141
TPX2	Targeting protein for Xklp2	22974	TPX2 is a microtubule binding protein and promotes the nucleation of microtubules. TPX2 also binds to the Aurora A, activate it and then directs it to the spindle. TPX2 also interacts, either directly or indirectly, with several other proteins that maintains the spindle assembly and function.	142
AURKA	Aurora kinase A	6790	Aurora kinases are member of serine/threonine protein kinases family. It is essential for centrosome maturation and separation during the mitotic phase of cell cycle.	143
AKAP12	A-kinase anchoring protein 12	9590	AKAP12 is a scaffolding protein, controls the several intracellular signaling pathways. This protein is a negative regulator of mitogenesis that maintains cytoskeleton structure, endothelial integrity and forms blood brain barrier and blood retinal barrier.	73
TPM2	Tropomyosin 2	7169	TPM2 encodes for the protein β -tropomyosin which is crucial for the regulation of muscle contraction, where tropomyosin interacts with actin and myosin. This interaction maintains and stabilizes the structure of sarcomere of muscle cells.	144
FLNC	Filamin C	2318	FLNC is a crosslinking protein of actin filaments. It maintains the structural integrity of muscle cells. It is also involved in the intracellular signaling pathways.	145
PGM2	Phosphoglucomutase 2	55276	It is an enzyme that plays a crucial role in carbohydrate metabolism and converts Glucose 1 phosphate to glucose 6 phosphate and vice versa.	146
COTL1	Coactosin- like protein 1	23406	It is a cytoskeletal associated protein that regulates cytoskeletal organization and dynamics of actin filaments.	147
HJURP	Holliday junction recognition protein	55355	HJURP is an important protein that contributes to the recruitment and assembly of kinetochore and centromere and secure the chromosomal structure of tumor cells.	148

References

All the references are mentioned in the main text.