

**Supplementary Table S1:** Upregulated genes with a log fold change of > 2 in TGF- $\beta$  treated HBVP

Symbol	Gene Name	Log fold change	Functions	Associated with	Reference
FOXS1	forkhead box S1	8.25 $\uparrow$	<ul style="list-style-type: none"> <li>Promotes cell proliferation and EMT in gastric cancer.</li> <li>TGF<math>\beta</math>-induced FOXS1 controls EMT.</li> <li>Forkhead proteins required for brain pericyte differentiation, development and maintenance of the BBB.</li> </ul>	TGF- $\beta$ proliferation cell motility EMT Cancer pericyte development BBB	Sci Rep. 2019 (1):5281. doi: 10.1038/s41598-019-41717-w Hepatology Comm. 2022, 6 (5): 1157 Dev Cell 2015, 6;34(1): 19
ESM1	endothelial cell-specific molecule 1 /Endocan	7.60 $\uparrow$	<ul style="list-style-type: none"> <li>Specific biomarker of tip cells during neo-angiogenesis.</li> <li>Expression increased by pro-angiogenic growth factors.</li> <li>Role in endothelium-dependent pathological disorders.</li> <li>Secreted proteoglycan that has been shown to indicate angiogenic activity.</li> <li>Putative indicator of new blood vessels that are not functional.</li> </ul>	angiogenesis cancer BBB (?)	Front Oncol. 2021;11: 687120. Immunol Methods 2013;398-399:27
COMP5/TSP5	cartilage oligomeric matrix protein/thrombospondin 5	7.20 $\uparrow$	<ul style="list-style-type: none"> <li>Extracellular matrix protein.</li> <li>Member of the TSP family.</li> <li>Cell adhesion.</li> <li>Induced by TGF-<math>\beta</math></li> <li>Remodeling of the tumor microenvironment</li> </ul>	cell motility cancer angiogenesis TGF- $\beta$	JBC 2005, 280;(38): 32655. Arteriosclerosis, Thrombosis, and Vascular Biology. 2001;21:47 Vessel Plus. 2018;2:30.
GPR183	G protein-coupled receptor 183	7.13 $\uparrow$	<ul style="list-style-type: none"> <li>Regulates migration of astrocytes.</li> <li>Communication between astrocytes and macrophages.</li> <li>Suggested to be involved in the regulation of the neuro-vascular unit.</li> <li>G protein coupled receptors are essential for the integrity of the BBB.</li> </ul>	cell motility BBB	Glia 63:341-351(2015) Front Cell Neurosci. 2020;14:139.
TSPAN2	tetraspanin 2	6.04 $\uparrow$	<ul style="list-style-type: none"> <li>Forms large transmembrane protein networks.</li> <li>Regulate cell motility and invasion.</li> <li>Regulates cell/ECM adhesion, cell/cell interaction and migration.</li> <li>Involved in the progression of the lung tumor metastasis.</li> </ul>	cell motility cancer	J Cell Biol (2001) 155;(7): 1103 Biochem Soc Trans. 2017;45(2):465-475.

NOX4	NADPH oxidase 4	5.99 ↑	<ul style="list-style-type: none"> <li>Regulates glycolysis, glucose &amp; fatty acid oxidation in heart.</li> <li>Overexpression predicts poor prognosis and promotes tumor progression in human colorectal cancer.</li> <li>Upregulation of NOX4 by TGF-beta is required for its pro-apoptotic activity in hepatocytes.</li> <li>Inhibition of NOX4/ROS suppresses neuronal and BBB injury</li> </ul>	metabolism cancer TGF-β BBB	JCI Insight 2017;2: e96184 Oncotarget. 2017;8(20):33586-33600 J Hepatol 2008, 49(6):965 Front. Cell. Neurosci., 2020, Sect. Cell. Neuropath.doi.org/10.3389/fncel.2020.578060
ELN	elastin	5.95 ↑	<ul style="list-style-type: none"> <li>ECM protein that lends elasticity and resilience to tissues such as the arteries.</li> <li>TGF-β is involved in regulation of elastin deposition during fetal development, tissue repair, and in pathological conditions.</li> <li>In many malignancies, the remodeled ECM expresses high levels of the elastin which may have either positive or negative effects on tumor growth.</li> </ul>	cell motility TGF-β cancer	Lab Invest. 1992;66(5):580-8 Tumor Microenvironment 2020: Extracellular Matrix Components – Part B: 1
AMIGO2	adhesion molecule with Ig-like domain 2	5.49 ↑	<ul style="list-style-type: none"> <li>Controls cell survival and angiogenesis via Akt activation.</li> <li>Loss of AMIGO2 in ECs led to apoptosis and inhibition of angiogenesis with Akt inactivation.</li> <li>Extracellular vesicle-derived AMIGO2 stimulates endothelial cell adhesion to cancer cells.</li> <li>Most upregulated gene in TGFβ-treated human embryonic palatal mesenchymal cells.</li> </ul>	angiogenesis cancer metastasis TGF-β EMT?	J Cell Biol (2015) 211 (3): 619. Scientific Reports 2020,12, Art.No.: 792 Front Physiol. 2012;3:85.
AC112721.1	uncharacterized	5.30 ↑	<ul style="list-style-type: none"> <li>Autophagy-related lncRNA.</li> <li>Associated with pathways closely related to tumor metastasis and invasion (cytoskeleton regulation, gap junctions, focal adhesion, ECM receptor interaction)</li> </ul>	autophagy cell motility cancer	Front Oncol. 2021;11:647236. doi:10.3389/fonc.2021.647236
CHRNA9	cholinergic receptor, nicotinic, alpha 9 (neuronal)	5.22 ↑	<ul style="list-style-type: none"> <li>Member of the ligand-gated ionic channel family and nicotinic acetylcholine receptor gene super-family</li> <li>Involved in ROS regulation.</li> <li>Important for lung tumor carcinogenesis.</li> </ul>	ROS regulation cancer	Int. J. Mol. Sci. 2020, 21(14): 4918 J Exp Clin Med 2011, 3(6): 246
PRR5L	proline rich 5 like	4.94 ↑	<ul style="list-style-type: none"> <li>modulates mTORC2 activity which is known to regulate glucose uptake, glycolysis and the pentose phosphate pathway (PPP).</li> </ul>	metabolism	Nature Cell Biology 2012, 14:686
EGR2	early growth response 2	4.92 ↑	<ul style="list-style-type: none"> <li>Regulation of cholesterol/lipid biosynthetic genes</li> <li>during peripheral nerve myelination.</li> </ul>	metabolism senescence	J Neurochem 2005;93:737 Aging Cell. 2021, 20(3):e13318

			<ul style="list-style-type: none"> <li>• Regulator of senescence.</li> </ul>		
MMP-10	matrix metallo-peptidase 10	4.81 ↑	<ul style="list-style-type: none"> <li>• Upregulated by TGF-β.</li> <li>• Promotes migration, invasion and angiogenesis.</li> <li>• In the brain, MMPs are critical for BBB integrity.</li> </ul>	cell motility angiogenesis TGF-β Cancer BBB (?)	PLoS One 2011, 6(10):e25438 Front Oncol. 2019, 9:1370. doi:10.3389/fonc.2019.0137 J Cereb Blood Flow Metab. 2016;36(9):1481
RP11-492E3.2	non coding RNA	4.79 ↑	<ul style="list-style-type: none"> <li>• Exosomal antisense ncRNA.</li> </ul>		lncRNAfunc: Functional analysis of Long non-coding RNAs - Search (uth.edu)
ADAM19	ADAM metallo-peptidase domain 19	4.53 ↑	<ul style="list-style-type: none"> <li>• Endopeptidase that cleaves ECM proteins.</li> <li>• Protective biomarker in human prostate cancer.</li> <li>• Target for metabolic syndrome in human and mice.</li> <li>• Regulated by TGF-β.</li> </ul>	cell motility cancer metabolism TGF-β	Curr Pharm Des. 2009;15(20):2336 BMC Cancer 2016, 16: Art.No. 15 Mediators of Inflammation 2017, Art.No.: 7281986
NXPH4	neurexophilin 4	4.47 ↑	<ul style="list-style-type: none"> <li>• Secreted neuropeptide-like glycoproteins.</li> <li>• Regulates specific synapse function.</li> <li>• Exerts co-receptor function for TGF-β on the membrane of cancer cells and enhances responses to TGF-β</li> </ul>	cancer TGF- β	eLife 2019;8:e46773 Carcinogenesis 2011, 32(4): 613
IL11	interleukin 11	4.43 ↑	<ul style="list-style-type: none"> <li>• TGF-β1 stimulates IL11 expression in epithelial cells and fibroblasts.</li> <li>• Stimulates fibrosis which also needs activated pericytes.</li> <li>• Stimulate survival and proliferation of cancer cells alongside angiogenesis of the primary tumor.</li> </ul>	cancer TGF- β proliferation angiogenesis	Exp Mol Med 2020, 52: 1871 Front. Cell Dev. Biol.2020, 14: 1 J Clin Periodontol. 2006, 33(3):165 Cytokine & Growth Factor Reviews 2015, 26 (5): 489
RP11-509E16.1	lncRNA	4.33 ↑	<ul style="list-style-type: none"> <li>• Involved in T cell differentiation.</li> <li>• Triggers the dissemination of colorectal cancer cells via upregulation of Zeb1.</li> </ul>	cancer EMT	Nature Comm 2015, 6:6932; doi: 10.1038/ncomms7932 Mol Cancer. 2019 Apr 13;18(1):87
SAMD11	sterile alpha motif domain containing 11	4.32 ↑	<ul style="list-style-type: none"> <li>• Predicted to enable histone binding activity.</li> <li>• Protein domain specific binding activity.</li> <li>• Protein self-association.</li> <li>• Suggested to be involved in cervical cancer.</li> </ul>	cancer	SAMD11 Gene - GeneCards Clin Exp Pharmacol Physiol. 2022, 49(1):175
DIO3	deiodinase, iodothyronine, type III	4.24 ↑	<ul style="list-style-type: none"> <li>• Crucial role in human carcinogenesis.</li> <li>• Role in the regulation of cell proliferation in several neoplastic contexts.</li> <li>• Expression induced by TGF-β.</li> </ul>	cancer proliferation TGF-β	Minerva Endocrinol. 2012, 37(4):315-27 Oncogene 2021, 40: 6248 Molecular Endocrinology 2005, 19(12): 3126
PTH1H	parathyroid hormone-like hormone	4.23 ↑	<ul style="list-style-type: none"> <li>• Autocrine/paracrine ligand, regulates cell differentiation and proliferation.</li> <li>• Possible role in angiogenesis.</li> <li>• Important in normal and abnormal calcium metabolism.</li> <li>• TGF-β stimulates PTH1H and osteolytic metastases.</li> </ul>	proliferation angiogenesis cancer TGF-β	Entry - *168470 - PARATHYROID HORMONE-LIKE HORMONE; PTH1H - OMIM J Biol Chem 2002, 277(27):24571

BMF	Bcl2 modifying factor	4.16 ↑	<ul style="list-style-type: none"> <li>• BCL2 protein family.</li> <li>• Binds BCL2 proteins and function as an apoptotic activator.</li> <li>• Might act as a sentinel for stress-impaired protein translation machinery.</li> <li>• Upregulated by TGF-β.</li> </ul>	apoptosis translation cancer TGF-β	Cell Death Differ. 2010, 17 (11): 1672. Oncogene 2007, 26(7): 970
SEMA7A	semaphorin 7A	4.15 ↑	<ul style="list-style-type: none"> <li>• Involvement in migration and differentiation of neurons.</li> <li>• Promotes axon outgrowth.</li> <li>• Neuronal guidance protein.</li> <li>• Promotes chemokine-driven dendritic cell migration.</li> <li>• Plays a critical role in TGF-β-induced pulmonary fibrosis.</li> <li>• Up-regulated in breast cancer and promotes macrophage production of angiogenic molecules.</li> </ul>	cell motility cartilage intermediate layer protein, nucleotide pyrophosphohydrolase cancer angiogenesis	Immunol Res. 2014, 58(1):159 Immunol Res. 2013, 57(1-3):81 J Exp Med 2007, 204(5): 1083 J Immunol 2014, 192 (1 Suppl.) 138.34
AC020571.3	lncRNA	4.11 ↑	<ul style="list-style-type: none"> <li>• Unknown function.</li> </ul>		
LBH	limb bud and heart development	3.94 ↑	<ul style="list-style-type: none"> <li>• Functions as a Tumor Suppressor of Nasopharyngeal carcinoma by inducing G1/S cell cycle arrest.</li> <li>• Mediates proliferation, fibroblast-to-myofibroblast transition and EMT-like processes in cardiac fibro-blasts.</li> <li>• TGF-β induces LBH expression in nasopharyngeal epithelial cells.</li> </ul>	proliferation cancer EMT	Scientific Rep. 2015, 5, Art.No. 7626 Mol Cell Biol 2021, 476(7): doi.org/ 10.1007/s11010-021-04111-7
RP1-27K12.4	Lnc RNA	3.91 ↑	<ul style="list-style-type: none"> <li>• Unknown function</li> </ul>		
ALQX5AP	Arachidonate 5-lipoxygenase-activating protein	3.87 ↑	<ul style="list-style-type: none"> <li>• Arachidonate binding protein.</li> <li>• Essential for cellular leukotriene (LT) synthesis</li> <li>• Predicts poor prognosis by enhancing M2 macrophage polarization and immunosuppression in ovarian cancer microenvironment.</li> </ul>	metabolism cancer	FEBS Lett. 1993, 8, 318(3):277 Front. Oncol. 2021,Sec. Gynecological Oncology, doi.org/10.3389/fonc.2021. 675104
CLIP	cartilage intermediate layer protein, nucleotide pyrophosphohydrolase	3.66 ↑	<ul style="list-style-type: none"> <li>• Matrix protein that resides in the middle of human articular cartilage.</li> <li>• Regulates the extracellular microenvironment of the NVU.</li> <li>• Suppresses TGF-β signaling in cardiac fibroblasts.</li> </ul>	TGF-β	Int J Mol Med 2021, 47(2):475 <u>Int J Gerontology</u> 2017, 11(2): 67
PLEK2	Pleckstrin 2	3.61 ↑	<ul style="list-style-type: none"> <li>• Regulates cell protrusions such as lamellipodia and filopodia.</li> <li>• Involved in tumorigenesis and metastasis.</li> </ul>	cell motility cancer TGF-β	Front. Cell Dev. Biol., 2021 Sec. Molecular and Cellular Oncology <a href="https://doi.org/10.3389/fcell.2021.768238">https://doi.org/10.3389/fcell.2021.768238</a> Cell Death & Disease 2021,12, Art.NO.: 901

			<ul style="list-style-type: none"> <li>• TGF-<math>\beta</math>-induced PLEK2 promotes metastasis and chemoresistance in oesophageal squamous cell carcinoma.</li> </ul>		
NEDD9	neural precursor cell expressed, developmentally down-regulated 9	3.60 $\uparrow$	<ul style="list-style-type: none"> <li>• Docking protein which plays a central coordinating role in cell adhesion.</li> <li>• Functions in transmitting growth control signals between focal adhesions and the mitotic spindle, this initiating cell proliferation.</li> <li>• Role in integrin beta-1 signaling in B- and T-cells.</li> <li>• TGF-<math>\beta</math> target gene.</li> <li>• Promotes oncogenic signaling and a stem/mesenchymal gene signature in ovarian cancer.</li> </ul>	cell motility proliferation TGF- $\beta$ cancer EMT (?)	Immunity 2006, 25:907 PLoS One. 2016;11(6): e0157992. Oncogene 2018, 37: 4854
PPP1R14C	Protein phosphatase 1, regulatory subunit 14C	3.58 $\uparrow$	<ul style="list-style-type: none"> <li>• Modulates capabolic response of osteoblasts.</li> <li>• Upregulated in triple-negative breast cancer.</li> <li>• Might regulate TGF-<math>\beta</math> signaling.</li> </ul>	metabolism cancer TGF- $\beta$	EBioMedicine 9, 2016: 45 Biochem J. 2010;430(2):191
FOXQ1	Foxhead box Q1	3.53 $\uparrow$	<ul style="list-style-type: none"> <li>• Regulates including cell proliferation, differentiation and development, especially tumor proliferation.</li> <li>• Overexpression delayed cellular senescence in human fibroblasts.</li> <li>• Mediates the crosstalk between TGF-<math>\beta</math> and Wnt signaling pathways.</li> </ul>	proliferation cancer TGF- $\beta$	Cell Death & Disease 2017, 8:2946 Cancer Biol Ther 2015;16(7):1099
CDH6	Cadherin 6	3.46 $\uparrow$	<ul style="list-style-type: none"> <li>• Cell adhesion molecule involved in renal cancer.</li> <li>• Target in TGF-<math>\beta</math> signalling pathway.</li> </ul>	cell motility cancer TGF- $\beta$	Cancer Res. 1997, 57(13):2741 PLoS One 2013,12;8(9): e75489
RASD1	RAS, dexamethasone-induced 1	3,41 $\uparrow$	<ul style="list-style-type: none"> <li>• Can activate G proteins in a receptor-independent manner and inhibits signal transduction through different G protein-coupled receptors.</li> <li>• Pivotal role in maintaining the equilibrium between adipogenesis and osteogenesis.</li> <li>• Overexpression of RASD1 inhibits glioma cell migration/invasion.</li> </ul>	Metabolism cancer cell motility	Metabolism 2020, 108: 154250 Scientific Reports 2017, 7, Art.No.: 320
F2RL1	Coagulation factor 2 receptor like 1	3,25 $\uparrow$	<ul style="list-style-type: none"> <li>• Promotes TGF-<math>\beta</math> dependent cell motility in pancreatic cancer cells.</li> </ul>	cell motility cancer TGF- $\beta$	Oncotarget. 2016, 7(27):41095
SYTL5	synaptotagmin-like 5	3.22 $\uparrow$	<ul style="list-style-type: none"> <li>• Rab effector protein.</li> <li>• Binds phospholipids in neuroendocrine cells.</li> <li>• Regulates exocytosis.</li> <li>• Involved in EMT processes in NSCLC.</li> </ul>	cancer EMT proliferation cell motility	NextProt, Madame Curie Bioscience Database EBioMedicine 2019, 46: 42-53

			<ul style="list-style-type: none"> <li>• Promotes proliferation, invasion, and metastasis and inhibited cell <u>apoptosis</u> of NSCLC cells.</li> </ul>		
DHRS2	dehydrogenase/reductase (SDR family) member 2	3.22 ↑	<ul style="list-style-type: none"> <li>• Mitochondrial gene.</li> <li>• Involved in energy generation processes.</li> <li>• Closely associated with the inhibition of cell proliferation, migration and quiescence in cancers.</li> </ul>	metabolism cancer proliferation cell motility	UniProt J Exp Clin Cancer Res 2019, 38, Art. No.: 30
IFIH1	Inferferon induced with helicase C domain 1	3,20 ↑	<ul style="list-style-type: none"> <li>• Involved in virus-induced autoimmune diabetes type II</li> </ul>	metabolism	Arq Bras Endocrinol Metabol 2013, 57(9):667
WNT5B	wingless-type MMTV integration site family, member 5B	3.16 ↑	<ul style="list-style-type: none"> <li>• Supresses Smad2/3 activation.</li> <li>• Regulates canonical and non-canonical Wnt-pathway during adipositas and diabetes type II.</li> </ul>	metabolism TGF-β	J Diab Invest 2020, 11(2): 307 Signal Transduction 2010, 285 (18): 14031 J Diabetes Investig 2020,11(2): 307
MGP	matrix Gla protein	3.14 ↑	<ul style="list-style-type: none"> <li>• Highly expressed by vascular smooth muscle cells (VSMCs).</li> <li>• Lack of MGP causes vascular abnormalities.</li> <li>• Might contribute to breast cancer resistance mechanism by augmenting the interaction of cells with ECM components.</li> </ul>	Angiogenesis cell motility (?)	Curr Med Chem 2020, 27(10):1647 Angiogenesis 2016, 19: 1 Int. J. Mol. Sci. 2018, 19: 2901
ZNF365	Zinc finger protein 365	3.13 ↑	<ul style="list-style-type: none"> <li>• Maternal LPS-binding protein.</li> <li>• Downregulation associated with poor prognosis in colon cancer.</li> <li>• Overexpressed in TGF-β mediated pulmonary fibrosis</li> </ul>	Cancer TGF-β	FASEB 2018, 31 (2): 979 Oncol Lett. 2020;20(4):85 FASEB 2020, 34 (S1, Exp. Biology): 1
CLDN14	Claudin 14	3.08 ↑	<ul style="list-style-type: none"> <li>• Extracellular calcium metabolism</li> <li>• Cell adhesion molecule, upregulated in gastric cancer.</li> <li>• Part of endothelial tight junctions</li> </ul>	cell motility proliferation cancer BBB (?)	JASN 2014,25 (4) 745 Diagnostic Pathology 2013, 8: Art. No.: 205 Tissue Barriers. 2013;1(3): e24782
HAS2	hyaluronan synthase 2	3.07 ↑	<ul style="list-style-type: none"> <li>• Responsible for the synthesis and deposition of hyaluronan in the ECM.</li> <li>• Overexpression of HAS2 lin renal epithelial tip cells led to enhanced cell migration.</li> <li>• Silencing of HAS2 suppresses the malignant phenotype of invasive breast cancer cells.</li> <li>• TGFβ-induced EMT depends on hyaluronan synthase HAS2.</li> </ul>	cell motility cancer EMT TGF-β	JASN June 2006, 17 (6):1553 Int J Cancer 2007, 120(12): 2557 Oncogene 2013,32(37): 435
KCNN4	K <sup>+</sup> intermediate /small conductance calcium-activated channel, subfamily N, member 4	3.06 ↑	<ul style="list-style-type: none"> <li>• Forms a voltage-independent potassium channel</li> <li>• Promotes invasion and metastasis through MAPK/ERK.</li> <li>• Targeted inhibition of KCa3.1 attenuates TGF-β-induced reactive astrogliosis.</li> </ul>	cell motility TGF-β	J Investig Med. 2020, 68(1):68 J Neurochem 2014, 130(1): 41

HECW2	HECT, C2 and WW domain containing E3 ubiquitin protein ligase 2	3.06 ↑	<ul style="list-style-type: none"> <li>Ubiquitin ligase.</li> <li>Stabilises p73</li> <li>promotes endothelial cell junctions</li> </ul>	BBB (?)	J Med Genet. 2017;54(2):84 Cellular Signalling 2016, 28: 1642
SLC46A3	solute carrier family 46, member 3	3.05 ↑	<ul style="list-style-type: none"> <li>Involved in plasma membrane electron transport.</li> <li>Plasma membrane analog of the mitochondrial electron transport chain.</li> </ul>	metabolism	Current Molecular Med 2006. 6 (8): 895
GPR68	G protein-coupled receptor 68	2.95 ↑	<ul style="list-style-type: none"> <li>Involved in pH homeostasis.</li> <li>Modulates intestinal inflammation and fibrosis.</li> <li>Mediates the interaction of cancer-associated fibroblasts and cancer cells</li> <li>Expression regulated by TGF-β</li> <li>Indirectly influences glycolysis</li> </ul>	cancer TGF-β metabolism	Inflamm Intest Dis 2021;6:140 FASEB J. 2018, 32(3):1170 J Immunol May 1, 2020, 204 (1 Supplement) 76.22 BBA - Molecular Basis of Disease 2019, 1865 (12): 165537
STK38L	serine/threonine kinase 38 like	2.87 ↑	<ul style="list-style-type: none"> <li>Ablation promotes loss of cell viability in a subset of KRAS-dependent PCC.</li> </ul>	cancer	Oncotarget 2017,8(45):78556
PMEPA1	prostate transmembrane protein, androgen induced 1	2,83 ↑	<ul style="list-style-type: none"> <li>Suppresses the aTGF-β signaling pathways through interactions with Smad proteins.</li> <li>Overexpression of this gene may play a role in multiple types of cancer.</li> </ul>	TGF-β proliferation cell motility cancer	PMEPA1 prostate transmembrane protein, androgen induced 1 [Homo sapiens (human)] - Gene - NCBI (nih.gov)
ITGB3/CD61	integrin, beta 3 (platelet glycoprotein IIIa, antigen CD61)	2.83 ↑	<ul style="list-style-type: none"> <li>Associated with the risk of human cancers.</li> <li>Key regulator in reactive oxygen species-induced migration and invasion of CRC.</li> <li>In breast cancer cells enhances TGF-β signaling.</li> <li>Facilitates EMT and angiogenesis.</li> </ul>	cancer cell motility TGF-β EMT angiogenesis	Mol Cell Proteomics. 2011;10(10): M110.005397 Oncotarget. 2017;8(70):114856 Am J Transl Res. 2019;11(12):7195
RGS9	regulator of G-protein signaling 9	2,82 ↑	<ul style="list-style-type: none"> <li>Increases GTPase activity of G protein alpha subunits.</li> </ul>		RGS9 regulator of G protein signaling 9 [Homo sapiens (human)] - Gene - NCBI (nih.gov)
SLC19A2	solute carrier family 19 (thiamine transporter), member 2	2.80 ↑	<ul style="list-style-type: none"> <li>Thiamine transporter.</li> <li>Upregulation in stem cell like cancer cells of NPCC contributes to enhanced glycolysis.</li> </ul>	cancer (?) metabolism	Int J Radiation Oncoll Bio Physics 2016,96 (2) Suppl. E582
SKIL	SKI-like oncogene	2.77 ↑	<ul style="list-style-type: none"> <li>component of the SMAD pathway, which regulates cell growth and differentiation through TGF-β</li> <li>involved in EMT processes.</li> </ul>	TGF-β cancer EMT	SKIL SKI like proto-oncogene [Homo sapiens (human)] - Gene - NCBI (nih.gov) Cell Death Differ 2021,28(1):267
MFSD7	major facilitator superfamily domain containing 7	2.77 ↑	<ul style="list-style-type: none"> <li>Predicted to enable transmembrane transporter activity.</li> <li>Predicted to be involved in transmembrane transport.</li> </ul>		SLC49A3 Gene - GeneCard
MYO1D	myosin ID	2.75 ↑	<ul style="list-style-type: none"> <li>Evolutionarily conserved regulator of animal left-right asymmetry.</li> </ul>	cancer TGF-β	Nat Commun. 2018;9(1):1942. Oncogene 2019, 38:7416 Int J Mol Sci. 2019;20(16):3913.



			<ul style="list-style-type: none"> <li>• Overexpressed MYO1D promotes colorectal tumor progression through upregulating the EGFR in the plasma membrane.</li> <li>• Might regulate TGF-<math>\beta</math> receptor trafficking</li> </ul>		
NEBL	nebulette	2.74 $\uparrow$	<ul style="list-style-type: none"> <li>• cardiac-specific isoform of nebulin family proteins.</li> <li>• Regulates stability and length of actin thin filaments.</li> <li>• New susceptibility gene for endocardial fibroelastosis.</li> </ul>	vessel dilatation (?)	J Am Coll Cardiol. 2010, 56 (18) 1493
PRG4	proteoglycan 4	2.73 $\uparrow$	<ul style="list-style-type: none"> <li>• Codes for lubricin.</li> <li>• Protects cartilage surface from protein deposition and cell adhesion.</li> <li>• Close analog to vitronectin.</li> <li>• Putative role in cell-cell and cell-ECM interactions.</li> <li>• TGF-<math>\beta</math> regulates PRG expression in vascular smooth muscle cells.</li> <li>• Involved in tumor angiogenesis.</li> </ul>	cell motility (?) TGF- $\beta$ angiogenesis	J Diabetes 2010, 2(4):233 Semin Cancer Biol. 2020;62:1
HEY1	hes-related family bHLH transcription factor with YRPW motif 1	2.73 $\uparrow$	<ul style="list-style-type: none"> <li>• Basic HLH transcription factor, inhibits myogenesis</li> <li>• Induces cell proliferation in neural stem cells</li> <li>• Upregulated in glioma.</li> <li>• Promotes migration&amp; invasion of melanoma cells</li> </ul>	cancer proliferation cell motility	J Cell Mol Med 2009,13(1):136 J Cancer. 2021;12(23):6979
CLDN4	claudin 4	2.72 $\uparrow$	<ul style="list-style-type: none"> <li>• silencing promotes proliferation of gastric cancer cells through activation of PI3K/Akt.</li> <li>• in GBM TGF-<math>\beta</math> mediated upregulation of CLDN4 induces EMT.</li> <li>• tight junction protein, expressed in endothelial cells.</li> </ul>	proliferation cancer cell motility EMT TGF- $\beta$ BBB	Exp Physiol 2020,105(6):979 Cell Death & Disease 2022,13, Art.No.: 339 Neoplasia 2012,14: 974
AC002454.1	LncRNA	2.70 $\uparrow$	<ul style="list-style-type: none"> <li>• AC002454.1 and CDK6 synergistically promote endometrial cell migration and invasion in endometriosis.</li> </ul>	cell motility	Reproduction 2019,157(6):535
WNT2	wingless-type MMTV integration site family member 2	2.70 $\uparrow$	<ul style="list-style-type: none"> <li>• Autocrine WNT2 signaling in fibroblasts promotes colorectal cancer progression.</li> <li>• Cooperates with TGF-<math>\beta</math> signaling.</li> <li>• Increases tumor angiogenesis in colon cancer.</li> </ul>	Cancer TGF- $\beta$ angiogenesis	Oncogene 2017, 36: 5460 Angiogenesis 2020, 23: 159
REPS2	RALBP1 associated Eps domain containing 2	2.64 $\uparrow$	<ul style="list-style-type: none"> <li>• Regulates the endocytosis of growth factor receptors (downregulated in cancer cells)</li> </ul>	cancer	Asian Pac J Cancer Prev 2013, 14(5):2851
TPM1	tropomyosin 1 (alpha)	2.63 $\uparrow$	<ul style="list-style-type: none"> <li>• Functions as a tumor suppressor (proliferation, angiogenesis &amp;, metastasis) in renal cell carcinoma.</li> <li>• Expression regulated by TGF-<math>\beta</math>.</li> <li>• Cell elasticity is regulated by the tropomyosin isoform composition of the actin cytoskeleton.</li> </ul>	cancer proliferation cell motility	J Cancer. 2019;10(10): 2220 J Cell Mol Med 2017, 21(5): 916 PlosOne 2015, doi.org/10.1371/journal.pone.0126214



PPP1R13L	protein phosphatase 1, regulatory subunit 13 like	2.63 ↑	<ul style="list-style-type: none"> <li>• Encodes the inhibitor of apoptosis-stimulating protein of p53 protein (iASPP).</li> <li>• Causes paediatric dilated cardiomyopathy.</li> <li>• Acts as a regulator of desmosomes.</li> <li>• Has been implicated in inflammatory pathways.</li> <li>• iASPP is essential for HIF-1alpha stabilization to promote angiogenesis and glycolysis via attenuating VHL-mediated protein degradation.</li> <li>• Downregulation of iASPP expression suppresses proliferation and invasion of HNSCC.</li> </ul>	angiogenesis metabolism cancer cell motility proliferation	Clin Genet 2020, 98(4):331 Oncogene 2022, 41: 1944 Chin Med Sci J 2019, 34(3):184
STK17B	serine/threonine kinase 17b	2.63 ↑	<ul style="list-style-type: none"> <li>• promotes carcinogenesis and metastasis via AKT/GSK-3β/SNAIL signaling in HCC.</li> </ul>	cancer EMT cell motility	Cell Death & Disease 2018, 9, Art.No.: 236
CDH2	cadherin 2, type 1, N-cadherin (neuronal)	2.62 ↑	<ul style="list-style-type: none"> <li>• E-Cadherin to N-Cadherin switch in EMT.</li> </ul>	EMT cell motility cancer	Cells. 2019;8(10):1118.
CASC15	cancer susceptibility candidate 15 (non-protein coding)	2.61 ↑	<ul style="list-style-type: none"> <li>• Tumor-Associated Long Non-Coding RNA</li> <li>• Can affect proliferation, invasion and apoptosis of tumors</li> </ul>	proliferation cancer cell motility	Curr Pharm Des 2021, 27(1):127
ANKRD44	ankyrin repeat domain 44	2.61 ↑	<ul style="list-style-type: none"> <li>• Putative regulatory subunit of PP6 that may be involved in the recognition of phosphoprotein substrates.</li> </ul>		ANKRD44 - Serine/threonine-protein phosphatase 6 regulatory ankyrin repeat subunit B - Homo sapiens (Human)   UniProtKB   UniProt
ADAMTS6	ADAM metalloproteinase with thrombospondin type 1 motif, 6	2.60 ↑	<ul style="list-style-type: none"> <li>• Suppresses tumor progression via the ERK signaling pathway.</li> <li>• Differentially expressed in brain pericytes, putatively associated to BBB density.</li> </ul>	cancer BBB (?)	Oncotarget 2016,7(38):61273 Cells 2021, 10, 963, doi.org/10.3390/cells10040963
PDGFA	platelet-derived growth factor alpha polypeptide	2.58 ↑	<ul style="list-style-type: none"> <li>• Activator of the PDGFR-beta who's expression is upregulated in activated pericytes.</li> <li>• essential and autocrine regulator of VEGFR expression in NSCLC.</li> <li>• regulation of cell motility during wound healing.</li> </ul>	cancer angiogenesis cell motility	Neuropathol Appl Neurobiol 2021, 47(6):768 Cancer Res 2005,65(16):7241 Cell Physiol Biochem 2010, 25(2-3):279
INSC	inscuteable homolog (Drosophila)	2.58 ↑	<ul style="list-style-type: none"> <li>• Involved in spindle orientation during mitosis.</li> <li>• May regulate cell proliferation and differentiation in the developing nervous system.</li> </ul>	Proliferation (?)	INSC - Protein inscuteable homolog - Homo sapiens (Human)   UniProtKB   UniProt
CRLF1	cytokine receptor-like factor 1	2.58 ↑	<ul style="list-style-type: none"> <li>• may have an ability to change the composition of ECM in fibrosis.</li> <li>• positively regulated by TGF-β in the mouse chondrogenic cells.</li> </ul>	cell motility (?) TGF-β proliferation	World J Hepatol. 2012;4(12):356 Calcified Tissue Int 2010, 86:47
DNAJB5/Hsc40	DnaJ (Hsp40) homolog, subfamily B, member 5	2.56 ↑	<ul style="list-style-type: none"> <li>• Involved in the regulation of ROS</li> </ul>	cancer	Antioxid Redox Signal. 2013;18(10):1165

NUAK1	NUAK family, SNF1-like kinase, 1	2,52 ↑	<ul style="list-style-type: none"> <li>• Phosphorylates p53 and regulates proliferation.</li> <li>• Cytosolic NUAK1 enhances ATP production by maintaining proper glycolysis and mitochondrial function in cancer cells.</li> <li>• Expression induced by TGF-β.</li> </ul>	proliferation cancer metabolism TGF-β	Oncogene 2011,30(26):2933 Front. Oncol., 2020, Sec. Cancer Metabolism, doi.org/10.3389/fonc.2020.01123 J Biol Chem 2019,15;294(11):4119
TNFSF11	tumor necrosis factor (ligand) superfamily, member 11	2.51 ↑	<ul style="list-style-type: none"> <li>• Cytokine that binds to TNFRSF11B/OPG and to TNFRSF11A/RANK.</li> <li>• Osteoclast differentiation and activation factor.</li> </ul>		TNFSF11 - Tumor necrosis factor ligand superfamily member 11 - Homo sapiens (Human)   UniProtKB   UniProt
EDN1	endothelin 1	2.51 ↑	<ul style="list-style-type: none"> <li>• Potent vasoconstrictor peptide produced by vascular endothelial cells.</li> <li>• Elevated plasma concentration in several solid tumors, multiple functions in cancer cells.</li> </ul>	cancer proliferation angiogenesis cell motility	Pharmacolog Rev 2016, 68 (2): 357 Br J Cancer. 2003;88(2):163.
BPGM	2,3-bisphosphoglycerate mutase	2.50 ↑	<ul style="list-style-type: none"> <li>• central part of the <u>Rapoport-Luebering-cycle</u>, a side pathway of glycolysis.</li> <li>• controls the serine pathway flux.</li> </ul>	metabolism	Nat Chem Biol 2017,13(10):1081
VGLL3	vestigial like 3 (Drosophila)	2.50 ↑	<ul style="list-style-type: none"> <li>• inhibitor of adipocyte differentiation.</li> <li>• regulates cranial neural crest migration.</li> </ul>	cell motility differentiation	J Lipid Res 2013, 54(2):473 Biol Open. 2017;6(10):1528 J Cell Mol Med 2022, 26 (9):2686
F3	coagulation factor III (thromboplastin, tissue factor)	2.47 ↑	<ul style="list-style-type: none"> <li>• Enables cells to initiate the blood coagulation cascades.</li> <li>• Participates in many tumour-related processes that contribute to malignant disease progression</li> </ul>	cancer angiogenesis BBB	Breast Cancer Res. 2008;10(2):204
SMAD7	SMAD family member 7	2.47 ↑	<ul style="list-style-type: none"> <li>• Negatively regulates TGF-β signaling</li> </ul>	TGF-β cancer	Acta Biochim Biophys Sin 2009;41(4):263
BHLHE40	basic helix-loop-helix family, member e40	2.46 ↑	<ul style="list-style-type: none"> <li>• confers pro-survival and pro-metastatic phenotype to breast cancer.</li> <li>• overexpression in multiple cell types has been shown to inhibit cell proliferation, migration, or invasion.</li> <li>• Regulates TWIST transcription in cancer cells.</li> </ul>	proliferation cell motility EMT cancer	Breast Cancer Res 2018, 20, Art.No.: 117 Mol Cellular Biol 2015, 35(24): 4096
DIXDC1	DIX domain containing 1	2.46 ↑	<ul style="list-style-type: none"> <li>• Regulate β-catenin stability.</li> <li>• Regulates cell stickyness.</li> </ul>	cell motility cancer	Mol Cell Biol. 1999;19(6):4414 medicalxpress.com
DGKI	diacylglycerol kinase, iota	2.45 ↑	<ul style="list-style-type: none"> <li>• regulates intracellular concentration of diacylglycerol</li> <li>• can mediate growth factors to induce mitosis</li> <li>• overexpressed in cancer</li> </ul>	cancer proliferation	J Biol Chem. (1998) 273:32746 Biochim Biophys Acta. (2000) 1483:199 Front. Med., 2020, Sec. Gastroenterology doi.org/10.3389/fmed.2020.00320
PODXL	podocalyxin-like	2.42 ↑	<ul style="list-style-type: none"> <li>• Might be a new prognostic biomarker in various cancers.</li> <li>• In B cell lymphoma promotes cell proliferation, survival, migration, resistance.</li> </ul>	cancer proliferation cell motility EMT	BMC Cancer 2020, 20, Art.No.: 620 Cancers 2020;12(2):396 PLoS One 2011,12;6(4):e18715

			<ul style="list-style-type: none"> <li>• Requirement of podocalyxin in TGF-beta induced epithelial mesenchymal transition.</li> </ul>	TGF-β	
LTBP2	latent transforming growth factor beta binding protein 2	2.41 ↑	<ul style="list-style-type: none"> <li>• a major component of arterial tissue.</li> <li>• Modulator of TGF-β activity.</li> <li>• Promotes the migration and invasion of gastric cancer cells</li> <li>• As an angiogenic factor, LTBP2 upregulation elevated the tube formation of HUVECs</li> </ul>	TGF-β cancer cell motility angiogenesis	Int J Oncol. 2018;52(6):1886 Mol Cell Endocrinology, 2022, 550: 111647,
TNS1	tensin 1	2.41 ↑	<ul style="list-style-type: none"> <li>• localizes to focal adhesions.</li> <li>• may promote EMT and cancer cell metastasis.</li> <li>• Plays an essential role in TGF-β-induced myofibroblast differentiation and myofibroblast-mediated formation of extracellular fibronectin and collagen.</li> </ul>	EMT Cancer TGF-β cell motility (?)	Arch Med Sci 2020, doi.org/10.5114/aoms/127085 Am J Respir Cell Mol Biol 2017, 56(4):465
RASGRP3	RAS guanyl releasing protein 3 (calcium and DAG-regulated)	2.38 ↑	<ul style="list-style-type: none"> <li>• Controls cell proliferation and migration in cancer</li> </ul>	cancer cell motility	Gene 2017,633:35 Clin Exp Pharmacol Physiol 2018,45(7):720
XYLT1	xylosyltransferase I	2.38 ↑	<ul style="list-style-type: none"> <li>• XYLT1 is actively regulated by TGF-β.</li> <li>• Initiates glycosaminoglycan synthesis</li> </ul>	metabolism (?) TGF-β	Thesis: The regulation of XYLT1, the enzyme initiating glycosaminoglycan synthesis; An in vitro study with human immortalized fibroblasts with integrated reporter plasmid (uni-muenchen.de)
JUNB	jun B proto-oncogene	2.35 ↑	<ul style="list-style-type: none"> <li>• governs a feed-forward network of TGF-β signaling that aggravates breast cancer invasion.</li> <li>• Stimulates proliferation.</li> </ul>	cell motility cancer TGF-β proliferation	JunB proto-oncogene-NCBI (nih.gov) The EMBO Journal (2002)21:4104
NEK7	NIMA-related kinase 7	2.34 ↑	<ul style="list-style-type: none"> <li>• Regulation of mitosis</li> <li>• activation of the NLRP3 inflammasome</li> </ul>	proliferation inflammation	Genome Res. 2003, 13: 1366 Nat. Immunol. 2016, 17: 250
GPR115	G protein-coupled receptor 115	2.33 ↑	<ul style="list-style-type: none"> <li>• Contributes to lung adenocarcinoma metastasis.</li> <li>• Involved in processes of proliferation, migration, invasion and angiogenesis</li> </ul>	cancer proliferation cell motility angiogenesis	Front. Oncol., 2020, Sec. Molecular and Cellular Oncology doi.org/10.3389/fonc.2020.577530
TGFBR1	transforming growth factor, beta receptor 1	2.29 ↑	<ul style="list-style-type: none"> <li>• Receptor for TGF-β.</li> <li>• If activated induces EMT, cell motility and proliferation of pericytes.</li> <li>• Controls angiogenesis by two unique TGFBR1 signaling pathways.</li> </ul>	cell motility TGF-β proliferation EMT Cancer angiogenesis	Neuropathol Appl Neurobiol 2021, 47(6):768 Histol Histopathol 2011,26(9):1219
TMEM2	transmembrane protein 2	2.24 ↑	<ul style="list-style-type: none"> <li>• Expression induced by TGF-β.</li> <li>• Hyaluronidase</li> <li>• Predicts poor prognosis in PDAC.</li> </ul>	TGF-β cancer cell motility	Biochem Biophys Res Commun 2018, 505(1):74 Pancreatology 2020,20(7):1479

			<ul style="list-style-type: none"> <li>Regulates cell adhesion and migration via degradation of hyaluronan at focal adhesion sites.</li> </ul>		J Biol Chem 2021;296:100481
SRRM3	serine/arginine repetitive matrix 3	2.24 ↑	<ul style="list-style-type: none"> <li>RNA splicing factor.</li> <li>Associated with cancer.</li> </ul>	cancer	Cancer Res 2021;81(18):4736
SYN1	synapsin I	2.22 ↑	<ul style="list-style-type: none"> <li>Mutations may be associated with X-linked disorders with primary neuronal degeneration</li> </ul>	neuronal development	BMC Med Genomics 2021;14(1):182
WNT9A	wingless-type MMTV integration site family, member 9A	2.21 ↑	<ul style="list-style-type: none"> <li>Induction linked to suppression of human colorectal cancer cell proliferation.</li> </ul>	Cancer proliferation	Int J Mol Sci. 2016;17(4):495.
TSPAN13	tetraspanin 13	2.20 ↑	<ul style="list-style-type: none"> <li>modulates voltage-gated Cav2.2 Ca<sup>2+</sup> channels.</li> <li>play a role in the regulation of cell development, activation, growth and motility.</li> <li>tumor suppressor.</li> </ul>	cell motility cancer proliferation	Scientific Reports 2013, 3, Art.No.: 1777 Bosn J Basic Med Sci. ,19(2):146
GREM1	gremlin 1, DAN family BMP antagonist	2.19 ↑	<ul style="list-style-type: none"> <li>inhibitor in the TGF-β signaling pathway.</li> <li>expression is found in many cancers.</li> <li>plays a BMP-dependent role.</li> <li>in angiogenesis on endothelium of human lung tissue.</li> </ul>	TGF-β cancer angiogenesis	BMC Cancer 2006, 6: 74 Blood 2007, 109 (5): 1834
SNAI1	snail family zinc finger 1	2.18 ↑	<ul style="list-style-type: none"> <li>encodes the SLUG protein</li> <li>induction of EM in human brain pericytes</li> <li>associated with enhanced migration and proliferation of brain pericytes</li> </ul>	cell motility cancer proliferation TGF-β	Neuropathol Appl Neurobiol 2021;47(6): 768
VDR	vitamin D (1,25-dihydroxyvitamin D3) receptor	2.18 ↑	<ul style="list-style-type: none"> <li>VDR signaling enhances adhesion and suppresses the invasive capacity of cells.</li> <li>loss of VDR can lead to abnormal tumor angiogenesis.</li> <li>Required for proliferation, migration, and differentiation of epidermal stem cells and progeny during cutaneous wound repair.</li> <li>Negative regulator of TGF-β/Smad signalling in systemic sclerosis.</li> </ul>	cell motility angiogenesis cancer proliferation	Endocrinol Metab Clin North Am. 2017;46(4):1009 Cancer Res. 2009;69(3):967 J Invest Dermatol 2018;138(11):2423 Ann Rheum Dis 2015;74(3):e20
VAT1L	vesicle amine transport 1-like	2.17 ↑	<ul style="list-style-type: none"> <li>Function unknown</li> </ul>		
SPDL1	spindle apparatus coiled-coil protein 1	2.14 ↑	<ul style="list-style-type: none"> <li>Functions in mitotic spindle formation</li> </ul>	proliferation cancer	Front. Genet 2022, 18 Sec. Compl. Gen. doi.org/10.3389/fgene.2022.79802
ARHGEF40	Rho guanine nucleotide exchange factor (GEF) 40	2.11 ↑	<ul style="list-style-type: none"> <li>Rho family GTPases control numerous cellular processes including cytoskeletal reorganization</li> </ul>	cell motility (?)	JBC - Mech Signal Transduction 2001, 276(7): 4948
LRRC17	leucine rich repeat containing 17	2.10 ↑	<ul style="list-style-type: none"> <li>Anti-apoptotic protein linked to prognosis of ovarian cancer.</li> </ul>	cancer	Anticancer Res 2020;40(10): 5601
SLITRK6	SLIT and NTRK-like family, member 6	2.10 ↑	<ul style="list-style-type: none"> <li>moderately negatively correlated with tumor malignancy.</li> </ul>	cancer	Biochem Biophys Rep 2021, 28: 101157

IL21R	interleukin 21 receptor	2.09 ↑	<ul style="list-style-type: none"> <li>• Transduces the growth promoting signal of IL21.</li> <li>• Controversial functions in cancer</li> <li>• Modulates functions of T, B, natural killer (NK), and myeloid cells.</li> </ul>	cancer immune surveillance	Clin Cancer Res 2007, 13 (23): 6926 Blood (2007) 109 (10): 4135
RP11-64D22.2	pseudogene	2.09 ↑	<ul style="list-style-type: none"> <li>• Promotes growth and tumorigenesis of breast cancer</li> </ul>	cancer	Molecular Therapy: Nucleic Acids 2020, 21: 916
TMC7	transmembrane channel-like 7	2.08 ↑	<ul style="list-style-type: none"> <li>• Predicted to enable mechanosensitive ion channel activity. Predicted to be involved in ion transmembrane transport</li> </ul>		TMC7 transmembrane channel like 7 [Homo sapiens (human)] - Gene - NCBI (nih.gov)
SPSB1	spla/ryanodine receptor domain and SOCS box containing 1	2.08 ↑	<ul style="list-style-type: none"> <li>• Involved in protein ubiquitination and ubiquitin-dependent protein catabolic process</li> <li>• Negative regulator of TGFBR2</li> </ul>	TGF-β cancer	J Biol Chem 2015, 290(29):17894
ARHGAP31	Rho GTPase activating protein 31	2.07 ↑	<ul style="list-style-type: none"> <li>• Negative regulator of Rho GTPase</li> </ul>	cancer	J Hematol Oncol 2021,14, Art.No.: 171
DAAM1	dishevelled associated activator of morphogenesis 1	2.06 ↑	<ul style="list-style-type: none"> <li>• Promotes new actin filaments, regulates cell growth through the stabilization of microtubules.</li> <li>• Overexpression correlates with metastasis in breast cancer.</li> <li>• Activation of DAAM1 leads to inhibition of endothelial cell proliferation, migration, and angiogenesis.</li> </ul>	cancer cell motility angiogenesis	Pathol Res Pract 2020, 216(3):152736 PNAS 2010;107(15):6906
SPOCK1	sparc/osteonectin, cwcv and kazal-like domains proteoglycan (testican) 1	2.05 ↑	<ul style="list-style-type: none"> <li>• Extracellular proteoglycan.</li> <li>• Induces EMT in several cancer cells lines</li> <li>• Promotes migration, degradation of the basement membrane, invasion, adhesion and angiogenesis.</li> <li>• Regulates BBB integrity.</li> </ul>	cancer EMT TGF- β cell motility proliferation angiogenesis BBB	Biochem. Biophys. Res. Commun. 2013, 440: 792 Molecular Cancer 2015,14, Art.No.: 12 Cell Physiol 2022, 322 (4): C688
PCDH9	protocadherin 9	2.05 ↑	<ul style="list-style-type: none"> <li>• acts as a tumor suppressor inducing arrest at G<sub>0</sub>/G<sub>1</sub>, is frequently methylated in HCC</li> <li>• inhibits EMT in cancer</li> </ul>	cancer EMT cell motility	Mol Med Rep. 2017;16(4):4475 Cell Death & Disease 2018, 9, Art. No.: 27
MB21D2	Mab-21 domain containing 2	2.04 ↑	<ul style="list-style-type: none"> <li>• Promotes a pro-oncogenic phenotype in HNSCC.</li> </ul>	cancer proliferation	Mol Oncol 2020, 14(12):306
RAP1GAP2	RAP1 GTPase activating protein 2	2.02 ↑	<ul style="list-style-type: none"> <li>• GTPase-activating protein that activates the small guanine-nucleotide-binding protein Rap1 in thrombocytes.</li> <li>• Inhibits cytoskeletal remodeling and motility in thyroid cancer cells.</li> </ul>	cancer cell motility	Endocr Relat Cancer. 2012;19(4):575
HS3ST3A1	heparan sulfate (glucosamine) 3-O-sulfotransferase 3A1	2.01 ↑	<ul style="list-style-type: none"> <li>• novel tumor regulator and a prognostic marker in breast cancer.</li> </ul>	cancer	Oncogene, 2016 Sep 22. PMID 27041583

KIAA1549L	KIAA1549-like	2.01 ↑	<ul style="list-style-type: none"><li>• Predicted to be integral component of membrane</li></ul>		KIAA1549 like [Homo sapiens (human)] - Gene - NCBI (nih.gov)
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