

Table 4. List of hypermethylated and downregulated genes and their reported associations with colorectal cancer (CRC) or other cancer types.

Gene	Role	Linked to CRC or other cancers	Reference
Foxa2	FOXA2 (Forkhead Box A2) acts as a pioneering transcription factor, essential for establishing gene expression capabilities. It plays a crucial role in a variety of biological processes, such as organ development and cell differentiation, as well as in managing glycolipid metabolism, cell growth, movement, invasion, and drug resistance.	FOXA2 suppression exerts an anti-tumor effect in colorectal cancer by inducing ferroptosis through the NRF2/GPX4 regulatory pathway.	<a href="https://doi.org/10.1002/advs.202304521">https://doi.org/10.1002/advs.202304521</a>
Foxd2	This gene is predicted to function as a DNA-binding transcription activator specific to RNA polymerase II, with the ability to bind specifically to cis-regulatory regions of DNA. It is likely involved in the morphogenesis of anatomical structures, cell differentiation, and the positive regulation of transcription mediated by RNA polymerase II.	Forkhead box protein D2 suppresses colorectal cancer by reprogramming enhancer interactions.	<a href="https://doi.org/10.1093/nar/gkad361">https://doi.org/10.1093/nar/gkad361</a>
Cdh11	This gene encodes a type II classical cadherin from the cadherin superfamily, integral membrane proteins that mediate calcium-dependent cell-cell adhesion.	Cadherin-11 is inactivated by promoter methylation and functions as a tumor suppressor in colorectal cancer.	doi: 10.2147/CMAR.S193921
Irx4	IRX4 is a member of the Iroquois homeobox gene family. Members of this family appear to play multiple roles during pattern formation of vertebrate embryos	IRX4 suppresses prostate cancer growth through the interaction with vitamin D receptor, conferring prostate cancer susceptibility.	doi: 10.1093/hmg/dd5025.
Timp2	This gene is a member of the TIMP gene family. The proteins encoded by this gene family are natural inhibitors of the matrix metalloproteinases, a group of peptidases involved in degradation of the extracellular matrix.	TIMP-2 inhibits metastasis and predicts prognosis of colorectal cancer via regulating MMP-9	doi: 10.1080/19336918.2019.1639303
Emilin2	regulates angiogenesis, is a component of the extracellular matrix (ECM), and plays a role in colorectal cancer (CRC).	<i>EMILIN2</i> was methylated in 33% colorectal carcinomas (CRC) and in 32% adenomas, whilst only 1.2% of corresponding normal tissues demonstrated any methylation.	<a href="https://doi.org/10.1186/1476-4598-9-51">https://doi.org/10.1186/1476-4598-9-51</a>
Tubb6	Tubb6 acts as 1 of the tubulin scaffold components of microtubules.	<i>Methylation in TUBB6 is a potential biomarker for UC-associated dysplasia.</i>	<a href="https://doi.org/10.1093/ibd/izy119">https://doi.org/10.1093/ibd/izy119</a>

VWF	Von Willebrand factor (vWF) is a glycoprotein essential for primary hemostasis, facilitating platelet adhesion to subendothelial collagen and stabilizing factor VIII in the intrinsic coagulation cascade.	<i>VWF plasma levels are elevated in CRC patients, but not in a stage dependent manner.</i>	PMCID: PMC3204887 PMID: <a href="#">22046486</a>
Twist2	Twist2 belong to a type of transcription factors involved in metastasis	<i>Promoter methylation and protein expression of TWIST2 in the tumor stroma influence the epithelial-mesenchymal transition-like tumor budding phenotype in colorectal cancer.</i>	PMCID: PMC4359262 PMID: <a href="#">25528769</a>
Unc119	UNC119 is a binding partner of the tumor suppressor Ras-association domain family 6 (RASSF6) and induces apoptosis and cell cycle arrest through the regulation of MDM2 and p53.	<i>UNC119A and RASSF6 are co-immunoprecipitated from human colon cancer SW480 cells.</i>	doi: <a href="#">10.1111/cas.13706</a>
EBF3	This gene encodes a member of the early B-cell factor (EBF) family of DNA binding transcription factors.	<i>DNA methylation changes in EBF3 is common tumor-associated epigenetic events across multiple tumor types, suggesting their potential role as general drivers of tumor progression including CRC.</i>	PMCID: PMC6683458 PMID: <a href="#">31383000</a>
Dcn	Decorin (DCN) is thought to play an anti-metastatic role by antagonizing bioactive TGF- $\beta$ in advanced human cancers.	<i>Methylated +58CpG site decreases DCN mRNA expression and enhances TGF-<math>\beta</math>/Smad signaling in NSCLC cells with high metastatic potential in NSCLC cells.</i>	<a href="https://doi.org/10.3892/ijo.2014.2255">https://doi.org/10.3892/ijo.2014.2255</a>
Grb10	Grb10 is a growth factor receptor-binding protein that interacts with insulin receptors and insulin-like growth-factor receptors.	<a href="https://doi.org/10.18632/aging.204603">https://doi.org/10.18632/aging.204603</a>	<a href="https://doi.org/10.18632/aging.204603">https://doi.org/10.18632/aging.204603</a>
Itgb3	ITGB3 (Integrin beta-3) is a subunit of integrins, which are transmembrane receptors involved in cell adhesion to the extracellular matrix (ECM) and in signaling processes that regulate cell behavior.	<i>Downregulation of ITGB3 in colon adenocarcinoma is associated with poor prognosis by impacting genome stability, the cell cycle, and the tumor immune microenvironment.</i>	doi: <a href="#">10.3389/fonc.2022.1047648</a>

Mrc2	a member of the mannose receptor family of proteins that contain a fibronectin type II domain and multiple C-type lectin-like domains.	<i>MRC2 could be a prognostic indicator for certain cancer and is critical for tumor immune microenvironments.</i>	DOI 10.3389/fmolb.2022.951636
Ednrb	EDNRB (Endothelin Receptor Type B) is a G-protein-coupled receptor that binds to endothelins, which are peptides involved in various physiological functions such as vasoconstriction, cell proliferation, and cell differentiation.	<i>Hypermethylation of the EDNRB promoter increases the risk of colorectal cancer.</i>	doi: <a href="https://doi.org/10.1186/1746-1596-8-199">10.1186/1746-1596-8-199</a>
Igfbp6	Insulin-like growth factors binding protein-6 involved in cell migration and positive regulation of stress-activated MAPK cascade.	<i>IGFBP-6 is the effector of tumor suppressor activity of SEMA3B in lung cancer cells.</i>	<a href="https://doi.org/10.1038/onc.2008.263">https://doi.org/10.1038/onc.2008.263</a>
DACT3	DACT3 as a negative regulator of Wnt/ $\beta$ -catenin signaling that is epigenetically repressed in colorectal cancer.	<i>DACT3 is an epigenetic regulator of Wnt/<math>\beta</math>-catenin signaling in colorectal cancer and is a therapeutic target of histone modifications</i>	doi: <a href="https://doi.org/10.1016/j.ccr.2008.04.019">10.1016/j.ccr.2008.04.019</a>
FJX1	FJX1 (Four-Jointed Box 1) is a gene that encodes a protein involved in developmental processes, particularly in cell polarity and growth regulation.	<i>FJX1 has been identified as a potential diagnostic and prognostic serum biomarker for colorectal cancer.</i>	DOI: <a href="https://doi.org/10.1007/s12094-022-02852-5">10.1007/s12094-022-02852-5</a>
FOXS1?	FOXS1 is a transcription factor from the forkhead box (FOX) family, which regulates gene expression involved in key cellular processes such as development, differentiation, proliferation, and survival.	<i>FOXS1 promotes angiogenesis and metastasis by upregulating CXCL8 in CRC.</i>	doi: <a href="https://doi.org/10.3389/fonc.2022.894043">10.3389/fonc.2022.894043</a>
MN1?	MN1 (Meningioma 1) is a gene that encodes a transcriptional co-activator involved in regulating gene expression.	<i>high levels of MN1 expression contribute to poor CRC prognosis and (2) MN1 can serve as a novel potential biomarker in predicting the prognosis of CRC patients.</i>	DOI: 10.1016/j.acthis.2019.05.006
Rgma	RGMA (Repulsive Guidance Molecule A) is a member of the repulsive guidance molecule family, primarily involved in neuronal development and axon guidance.	<i>RGMA expression and promoter methylation are strongly associated with the development and progression of colorectal cancer.</i>	DOI: 10.3892/or.2012.1693

Hs3st3b1	<i>HS3ST3B1 (Heparan Sulfate-Glucosamine 3-Sulfotransferase 3B1) is an enzyme involved in the biosynthesis of heparan sulfate, a complex polysaccharide found on the surface of cells and in the extracellular matrix</i>	<i>HS3ST3B1 decreased around 5 fold in CRCs.</i>	DOI 10.1186/s12885-015-1724-9
MAPK15	<i>MAPK15 (also known as ERK8) is a member of the Mitogen-Activated Protein Kinase (MAPK) family, involved in various cellular processes, such as proliferation, differentiation, and stress responses.</i>	Upregulating MAPK15 transcriptionally to enhance chemosensitivity suggests that targeting MAPK15 could be a potential strategy to improve the effectiveness of chemotherapeutic drugs. Upregulating MAPK15 transcriptionally to enhance chemosensitivity suggests that targeting MAPK15 could be a potential strategy to improve the effectiveness of chemotherapeutic drugs.	<a href="https://doi.org/10.1016/j.isci.2022.105459">https://doi.org/10.1016/j.isci.2022.105459</a>
Col23a1	<i>Col23a1 is a member of the collagen family, which is essential for forming the extracellular matrix that provides structural support to tissues.</i>	<i>The increase in methylation status between cancerous and paired normal mucosa in CRC samples for Col23a1 gene is about 31.62% so, this gene is potential interest for CRC.</i>	doi: <a href="https://doi.org/10.1186/s13148-019-0628-y">10.1186/s13148-019-0628-y</a>
Brachyury	<i>Brachyury is a transcription factor that plays a crucial role in the formation of the posterior mesoderm during embryonic development. Brachyury is known to be involved in cancer, particularly in epithelial-mesenchymal transition (EMT), which is a key process in tumor metastasis.</i>	<i>Brachyury is expressed in a subpopulation of CRC cells that resemble invasive front mesenchymal-like cells, where it acts to impose characteristics of CSCs in a fully reversible manner, suggesting reversible formation and modulation of such cells. BRACHYURY, itself regulated by the oncogene <math>\beta</math>-catenin.</i>	doi: 10.1002/ijc.26029.
Col8a2	<i>Col8a2 refers to Collagen Type VIII Alpha 2 Chain, a member of the collagen family, specifically involved in forming the structure of certain tissues.</i>	<i>Collagen type VIII alpha 2 chain (COL8A2), an important component of the basement membrane of the corneal endothelium, facilitates the malignant development of glioblastoma cells via inducing EMT.</i>	DOI: <a href="https://doi.org/10.1007/s10863-020-09865-1">10.1007/s10863-020-09865-1</a>

ANO5	ANO5 is a protein involved in various cellular functions, including membrane repair, calcium-activated chloride channel activity,	ANO5 is methylated in 63% Laterally spreading tumors (LST) are colorectal adenomas	<a href="https://doi.org/10.1158/1541-7786.MCR-16-0175">https://doi.org/10.1158/1541-7786.MCR-16-0175</a>
Adam12	ADAM12 is a member of the ADAM family of proteins, which are involved in processes like cell adhesion, migration, and proteolysis.	promoter methylation is involved in down-regulation of ADAM12 expression in CRC.	<a href="https://doi.org/10.1016/j.prp.2021.153449">https://doi.org/10.1016/j.prp.2021.153449</a>
SH3PXD2A (Tks5)	SH3PXD2A encodes a protein involved in actin cytoskeleton reorganization and cell migration.	The SH3PXD2A gene (SH3 and PX domains 2A) has been linked to several key processes in cancer, particularly due to its role in cell migration and invasion.	doi: <a href="https://doi.org/10.1091/mbc.E12-12-0908">10.1091/mbc.E12-12-0908</a>
TCF4	TCF4 acts as a transcriptional regulator in the Wnt/ $\beta$ -catenin signaling pathway	TCF4 gene methylation is significantly higher in patients with gastric adenocarcinoma compared with those without gastric adenocarcinoma	doi: <a href="https://doi.org/10.2147/IJGM.S395951">10.2147/IJGM.S395951</a>
FAM181B	FAM181B is a gene with an unclear function, belonging to a family of proteins that share sequence similarities but whose roles are not yet fully understood. Like other "FAM" genes, its precise biological significance remains to be characterized through further research.	FAM181A and FAM181B proteins that bind to TEAD via an $\Omega$ -loop both in biochemical assays and in cells.	doi: <a href="https://doi.org/10.1002/pro.3775">10.1002/pro.3775</a>
RASL11B	RASL11B, a member of the small GTPase superfamily, shares significant similarity with RAS proteins and is involved in various pathophysiological processes, including inflammation, arteriosclerosis, and cancer.	The RASL11B gene promotes hyaluronic acid-induced chondrogenic differentiation in human amniotic mesenchymal stem cells by activating the Sox9/ERK/Smad signaling pathways.	doi: <a href="https://doi.org/10.1177/1535370220944375">10.1177/1535370220944375</a>
CCDC8	CCDC8 plays a key role in maintaining cellular structure and signaling. As part of the 3M complex (with CUL7 and OBSL1), it helps regulate cell proliferation, growth, and proper cell cycle progression.	The hypermethylation of intergenic area of Ccdc8 has been reported in 55.6% of CRC patients.	doi: <a href="https://doi.org/10.1038/s12276-022-00731-1">10.1038/s12276-022-00731-1</a>
Tnf	<i>TNF-<math>\alpha</math> (tumor necrosis factor-<math>\alpha</math>) is a specific form of TNF produced primarily by immune cells like macrophages.</i>	<i>The relative expression of TNF-<math>\alpha</math> mRNA in colorectal cancer is significantly higher than that seen in adjacent normal colorectal tissue.</i>	doi: <a href="https://doi.org/10.3748/wjg.v20.i48.18390">10.3748/wjg.v20.i48.18390</a>

LRTM1	LRTM1 encodes a protein involved in neuronal development and function.	LRTM1 is identified as potential tumor suppressor gene in Bladder cancer.	DOI: <a href="https://doi.org/10.1186/s12894-023-01354-y">10.1186/s12894-023-01354-y</a>
Scn4b	SCN4B, or Sodium Channel, Voltage-Gated, Type IV Beta Subunit, is a gene that encodes a protein involved in modulating voltage-gated sodium channels, which play a critical role in the excitability of cells.	SCN4B functions as a metastasis-suppressor gene, inhibiting excessive cell migration in breast cancer.	<a href="https://doi.org/10.1038/ncomms13648">https://doi.org/10.1038/ncomms13648</a>
Sstr2	Sstr2, or Somatostatin Receptor 2, is a gene that encodes one of the five receptors for somatostatin, a peptide hormone involved in inhibiting hormone secretion, cell growth, and neurotransmission	Sstr2 methylation has been reported in CRC sample.	<a href="https://doi.org/10.1016/j.gene.2017.07.082">https://doi.org/10.1016/j.gene.2017.07.082</a>
Entpd1	ENTPD1 is an enzyme that hydrolyzes extracellular ATP and ADP to AMP, playing a key role in purinergic signaling.	Local expression of Entpd1 directly stimulates tumor cell growth by depleting extracellular ATP.	doi: <a href="https://doi.org/10.1593/neo.101332">10.1593/neo.101332</a>
Col6a3	COL6A3 is an extracellular matrix protein involved in providing structural support and maintaining cell stability.	Plasma levels of COL6A3 were significantly elevated in colorectal cancer (CRC) patients compared to healthy individuals.	doi: <a href="https://doi.org/10.18632/oncotarget.4966">10.18632/oncotarget.4966</a>
<i>TMEM132D</i>	<i>Transmembrane Protein 132D</i> is involved in cell adhesion and signaling pathways associated with cell survival and response to stress.	<i>TMEM132D</i> gene methylation can be involved in predicting CRC risk.	doi: <a href="https://doi.org/10.5009/gnl17163">10.5009/gnl17163</a>
<i>Cd300a</i>	<i>CD300a</i> is an inhibitory receptor expressed on various immune cells, including natural killer (NK) cells, monocytes, dendritic cells, certain T-cell subsets.	<i>CD300</i> molecules are potential immune regulators and promising therapeutic targets in acute myeloid leukemia.	doi: <a href="https://doi.org/10.1002/cam4.4905">10.1002/cam4.4905</a>
<i>Gna15</i>	<i>Gna15</i> is a G-protein involved in cellular signaling pathways that regulate various cellular functions, including responses to external stimuli and cell growth.	<i>Gna15</i> is methylated in CRC but its methylation is nonresponse to anti-EGFR therapies like cetuximab.	<a href="https://doi.org/10.1111/cas.15367">https://doi.org/10.1111/cas.15367</a>
<i>Pcdh17</i>	<i>PCDH17</i> (Protocadherin 17) is a gene encoding a cadherin-like protein involved in cell-cell adhesion, particularly within neural and epithelial tissues. It has a significant role as a tumor suppressor by promoting processes like apoptosis and autophagy in cancer cells.	Protocadherin 17 functions as a tumor suppressor by promoting apoptosis and autophagy in tumor cells and is frequently	doi: <a href="https://doi.org/10.1002/path.4093">10.1002/path.4093</a> .

		<p><i>methyated in gastric and colorectal cancers.</i></p>	
NME5	<p><i>NME/NM23 Family Member 5) is involved in cellular processes like proliferation, differentiation, and apoptosis.</i></p>	<p><i>NME5 reduced gemcitabine-induced apoptosis and cell cycle arrest, potentially explaining the decreased sensitivity to the drug. Additionally, NME5 exerted its effects through a nuclear factor kappaB (NF-κB)-dependent mechanism.</i></p>	<p><a href="https://doi.org/10.1111/j.1742-4658.2012.08521.x">https://doi.org/10.1111/j.1742-4658.2012.08521.x</a></p>
DCHS1	<p><i>DCHS1(cadherin superfamily) is a protein involved in cell adhesion, migration, and tissue organization</i></p>	<p><i>DCHS1 is variably expressed across many cancers, with its expression levels significantly linked to both tumor prognosis and diagnosis.</i></p>	<p>doi: <a href="https://doi.org/10.1186/s13048-024-01478-1">10.1186/s13048-024-01478-1</a></p>
NOVA2	<p><i>NOVA2 is an alternative splicing (AS) factor that, under normal physiological conditions, regulates endothelial cell (EC) polarity and the maturation of vessel lumens.</i></p>	<p><i>NOVA2 is upregulated in endothelial cells' (ECs) of tumor vasculature tumor with respect to normal mucosa of.</i></p>	<p>doi: <a href="https://doi.org/10.2147/OTT.S171678">10.2147/OTT.S171678</a></p>
NPR1	<p><i>NPR1 is a receptor for atrial natriuretic peptide (ANP), playing a key role in fluid balance and regulating blood pressure.</i></p>	<p><i>NPR1 regulates the intrinsic apoptosis pathway and plays an important role in promoting the GC malignant phenotype.</i></p>	<p><a href="https://doi.org/10.1002/ijc.34831">https://doi.org/10.1002/ijc.34831</a></p>
Wnt2b	<p><i>Wnt2b (Wnt Family Member 2B) is part of the Wnt family, which includes signaling molecules critical for cell proliferation, differentiation, and migration. Wnt2b is particularly involved in the Wnt/β-catenin signaling pathway,</i></p>	<p><i>Wnt2b was significantly increased in colon cancer cells compared with normal colon epithelial cells</i></p>	<p><a href="https://doi.org/10.1016/j.cellsig.2019.05.009">https://doi.org/10.1016/j.cellsig.2019.05.009</a></p>
Wnt5b	<p><i>Wnt5b, a member of the Wnt protein family, plays a key role in cell signaling, particularly through the non-canonical Wnt pathway.</i></p>	<p><i>The role of Wnt5a in CRC progression is complex. While some studies indicate it could support tumor growth, others have shown that Wnt5a is often silenced in CRC cell lines and tissue samples due to frequent promoter methylation.</i></p>	<p>1.PMID: 19760930 2. doi: 10.1007/s13277-014-2015-9</p>

<i>Brinp1</i>	<i>BRINP1 (BMP/Retinoic Acid Inducible Neural-Specific Protein 1), is a gene associated with cellular processes like cell cycle regulation, differentiation, and apoptosis.</i>	<i>Reduced expression of BRINP1 is, associated with promoter hypermethylation, is significantly linked to improved survival outcomes in gastric cancer.</i>	<a href="https://doi.org/10.1038/modpathol.2015.144">https://doi.org/10.1038/modpathol.2015.144</a>
<i>Rbpms</i>	<i>RBPMs (RNA Binding Protein with Multiple Splicing) is a RNA-binding protein involved in the regulation of gene expression and RNA splicing.</i>	<i>RBPMs functions as a tumor suppressor gene, and reduced levels of RBPMs are linked to increased cisplatin resistance in ovarian cancer cells.</i>	doi: <a href="https://doi.org/10.3390/ijms23010535">10.3390/ijms23010535</a>
<i>Rbpms2</i>	<i>RBPMs2 is a RNA-binding protein involved in the regulation of gene expression and RNA splicing.</i>	<i>Rbpms2 is a tumor suppressor gene and downregulated in CRC tumors.</i>	doi: <a href="https://doi.org/10.4103/sjg.sjg_530_20">10.4103/sjg.sjg_530_20</a>
<i>Col1a2</i>	<i>COL1A2 (Collagen Type I Alpha 2 Chain) is a gene that encodes one of the two alpha chains of type I collagen</i>	<i>COL1A2 is a novel tumor suppressor in CRC and provided a potential therapeutic approach to treat CRC.</i>	doi: <a href="https://doi.org/10.7150/jca.25542">10.7150/jca.25542</a>
<i>Cntn3</i>	<i>CNTN3 (Contactin 3) is a member of the immunoglobulin superfamily and functions as a neural cell adhesion molecule. It is involved in cell-cell communication, axonal growth, and synaptic plasticity within the nervous system.</i>	<i>Cntn3 is downregulated in CRC and related to the prognosis and tumour-infiltrating immune cells of colorectal cancer.</i>	doi: <a href="https://doi.org/10.1155/2020/1204605">10.1155/2020/1204605</a>
<i>Spp1</i>	<i>Spp1 is a glycoprotein that plays a role in a variety of biological processes, including inflammation, bone remodeling, and apoptosis</i>	<i>Bioinformatic analysis reveals that SPP1 promotes metastasis in colorectal cancer by activating the epithelial-mesenchymal transition (EMT) pathway.</i>	DOI: <a href="https://doi.org/10.1016/j.biopha.2017.05.056">10.1016/j.biopha.2017.05.056</a>
<i>Has3</i>	<i>HAS3 (Hyaluronan Synthase 3) is an enzyme responsible for synthesizing hyaluronan (HA), a component of the extracellular matrix that supports cell proliferation, migration, and tissue repair.</i>	<i>HAS3 and HA mediate colon cancer growth by inhibiting apoptosis.</i>	doi: 10.2174/187152011796817655.
<i>Gas7</i>	<i>GAS7 is recognized as a versatile molecule with roles in immunomodulation, cancer progression, and tumor suppression. It can either facilitate malignant transformation or function as a tumor suppressor, depending on the cellular context, highlighting its dual role in cancer biology.</i>	<i>Methylation of the GAS7 promoter has also been observed in a range of cancers including CRC.</i>	<a href="https://doi.org/10.1245/s10434-011-1573-y">https://doi.org/10.1245/s10434-011-1573-y</a> doi: <a href="https://doi.org/10.1093/carcin/bgv115">10.1093/carcin/bgv115</a>



<i>Adgrl4</i>	<i>ADGRL4</i> is G protein-coupled receptor (aGPCR) found in endothelial cells. It plays a key role in regulating tumor angiogenesis, influencing blood vessel formation and remodeling within the tumor microenvironment.	Increased expression of the adhesion GPCR ADGRL4/ELTD1 enhances endothelial sprouting angiogenesis, independent of traditional GPCR signaling pathways.	doi: <a href="https://doi.org/10.1038/s41598-021-85408-x">10.1038/s41598-021-85408-x</a>
<i>Hip1</i>	<i>HIP1</i> (Huntingtin-Interacting Protein 1) is a protein involved in endocytosis and cell survival pathways.	Huntingtin-interacting protein 1 is highly expressed in prostate and colon cancers, playing an essential role in cell survival.	doi: <a href="https://doi.org/10.1172/JCI15529">10.1172/JCI15529</a>
<i>Lef1</i>	<i>LEF1</i> (Lymphoid Enhancer-Binding Factor 1) is a transcription factor primarily involved in the Wnt/ $\beta$ -catenin signaling pathway, which regulates cell proliferation, differentiation, and migration.	<i>Lef1</i> is commonly upregulated in various cancers, including colonic adenocarcinoma. It contributes to cancer progression by influencing pathways involved in cell proliferation, migration, and survival.	doi: <a href="https://doi.org/10.3390/ijms221910870">10.3390/ijms221910870</a>
<i>Cd93</i>	<i>CD93</i> receptor expressed on the surface of vascular endothelial cells and involved in angiogenesis.	<i>CD93</i> expression was related to reduced survival, higher tumor grade in glioblastoma	<a href="https://doi.org/10.1158/0008-5472.CAN-14-3636">https://doi.org/10.1158/0008-5472.CAN-14-3636</a>
<i>Il1r1</i>	<i>IL1R1</i> (Interleukin-1 Receptor Type 1) is a receptor for interleukin-1 (IL-1), a cytokine involved in inflammation and immune responses.	Cell-type-specific responses to interleukin-1 regulate microbial invasion and inflammation triggered by tumors in colorectal cancer, influencing how the immune environment responds to cancer progression and infection.	doi: <a href="https://doi.org/10.1016/j.immuni.2018.11.015">10.1016/j.immuni.2018.11.015</a>
<i>Tnfrsf25</i>	is a receptor that binds TNF-like cytokines, primarily TL1A. This interaction activates pathways like NF- $\kappa$ B and MAPK, leading to immune cell activation, proliferation, and apoptosis.	<i>Tnfrsf25</i> is a one of the proapoptotic and highly methylated genes in CRC.	doi: <a href="https://doi.org/10.1177/1535370213514927">10.1177/1535370213514927</a>
<i>ARNTL2</i>	<i>ARNTL2</i> (paralog of <i>ARNTL1</i> ) is a transcription factors involved in regulating circadian rhythms and gene expression.	downregulation of <i>ARNTL2</i> could suppress colon carcinoma cell proliferation and migration via <i>SMOC2</i> -	PMID: 32355542; PMCID: PMC7191172.

<i>EMT through inactivation of PI3K/AKT signaling pathway.</i>			
<i>Esam</i>	<i>ESAM is a protein mainly found in endothelial cells. It is vital for cell adhesion, controlling vascular permeability, and maintaining blood vessel integrity.</i>	<i>The association of Esam with colon cancer has not yet been elucidated.</i>	<a href="https://www.ncbi.nlm.nih.gov/gene/90952">https://www.ncbi.nlm.nih.gov/gene/90952</a>
<i>Mxra7</i>	<i>Matrix Remodeling Associated 7, encodes a protein associated with the extracellular matrix (ECM) and tissue remodeling.</i>	<i>High expression of MXRA7 was associated with poor overall survival of patients with AML.</i>	<a href="https://doi.org/10.1016/j.exphem.2023.07.001">https://doi.org/10.1016/j.exphem.2023.07.001</a>
<i>Afap1l2</i>	<i>Actin Filament-Associated Protein 1-Like 2, encodes a protein involved in cellular signaling and cytoskeletal organization.</i>	<i>The association of Afap1l2 with colon cancer has not yet been elucidated.</i>	<a href="https://www.genecards.org/cgi-bin/carddisp.pl?gene=AFAP1L2">https://www.genecards.org/cgi-bin/carddisp.pl?gene=AFAP1L2</a>
<i>Eng</i>	<i>Endoglin (ENG) is a type I membrane glycoprotein located on cell surfaces and is part of the TGF beta receptor complex.</i>	<i>The association of Eng with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.1186/s12863-016-0384-3">https://doi.org/10.1186/s12863-016-0384-3</a>
<i>Afap1</i>	<i>The AFAP1 gene encodes a protein that interacts with Src,. This protein may help regulate actin filament stability in response to cellular signals.</i>	<i>The association of Afap1with colon cancer has not yet been elucidated.</i>	doi: <a href="https://doi.org/10.1128/mcb.13.12.7892">10.1128/mcb.13.12.7892</a>
<i>lft122</i>	<i>The IFT122 gene encodes a protein that is a crucial component of the intraflagellar transport (IFT) system, which is essential for the formation and maintenance of cilia and flagella.</i>	<i>The association of lft122 with colon cancer has not yet been elucidated.</i>	doi: <a href="https://doi.org/10.1136/jmg.2011.088864">10.1136/jmg.2011.088864</a> .
<i>Strc</i>	<i>The STRC gene, also known as Stereocilin, encodes a protein essential for hearing.</i>	<i>The association of Strc with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.1016/j.ijporl.2020.110247">https://doi.org/10.1016/j.ijporl.2020.110247</a>
<i>Dnah17</i>	<i>The DNAH17 gene, or Dynein Axonemal Heavy Chain 17, encodes a protein that is part of the dynein complex, a group of motor proteins critical for the movement of cilia and flagella.</i>	<i>The association of Dnah17 with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.3389/fgene.2022.862292">https://doi.org/10.3389/fgene.2022.862292</a>

<i>Rbm20</i>	<i>RNA Binding Motif Protein 20, encodes a protein that plays a critical role in RNA splicing, particularly affecting genes involved in heart muscle function.</i>	<i>The association of Rbm20 with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.1161/CIRCULATIONAHA.117.031947">https://doi.org/10.1161/CIRCULATIONAHA.117.031947</a>
<i>Zfp30</i>	<i>Zinc Finger Protein 30, encodes a transcription factor that belongs to the zinc finger protein family.</i>	<i>The association of Zfp30 with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.1038/s41467-019-09803-9">https://doi.org/10.1038/s41467-019-09803-9</a>
<i>Tenm4</i>	<i>Teneurin Transmembrane Protein 4, encodes a transmembrane protein that is part of the teneurin family, which is involved in cell signaling and adhesion, particularly in the nervous system.</i>	<i>The association of Tenm4 with colon cancer has not yet been elucidated.</i>	doi: <a href="https://doi.org/10.3389/fgene.2020.598064">10.3389/fgene.2020.598064</a>
<i>Ptafr</i>	<i>The PTAFR gene encodes the Platelet-Activating Factor Receptor (PAFR), a protein that plays a crucial role in immune responses, inflammation, and cell signaling.</i>	<i>The association of Ptafr with colon cancer has not yet been elucidated.</i>	<a href="https://doi.org/10.1038/celldisc.2016.17">https://doi.org/10.1038/celldisc.2016.17</a>
<i>Tbx3os2</i>	<i>The TBX3OS2 gene, or TBX3 Opposite Strand 2, is a long non-coding RNA (lncRNA) linked to the TBX3 gene, which encodes a transcription factor essential for developmental processes, particularly in limb and heart formation.</i>	<i>The association of Tbx3os2 with colon cancer has not yet been elucidated.</i>	<a href="https://www.ncbi.nlm.nih.gov/gene/43394">https://www.ncbi.nlm.nih.gov/gene/43394</a>
<i>Gm38414</i>	<i>Gm38414 is a predicted ncRNA.</i>	<i>The association of Gm38414 with colon cancer has not yet been elucidated.</i>	<a href="https://www.ncbi.nlm.nih.gov/gene/330738">https://www.ncbi.nlm.nih.gov/gene/330738</a>
<i>Gm44171</i>	<i>Gm44171 is a predicted gene.</i>	<i>The association of Gm44171 with colon cancer has not yet been elucidated.</i>	<a href="https://www.informatics.jax.org/marker/MGI:5690563">https://www.informatics.jax.org/marker/MGI:5690563</a>
<i>Gm4675</i>	<i>Gm4675 is a predicted gene.</i>	<i>The association of Gm4675 with colon cancer has not yet been elucidated.</i>	<a href="https://www.informatics.jax.org/sequence/MGP_PWKPhJ_G0014389">https://www.informatics.jax.org/sequence/MGP_PWKPhJ_G0014389</a>