Supplementary material

Somatic evolution of Cancer: A new synthesis

Ulfat Baig

Rohini Kharate

Milind Watve

We give here data and references demonstrating the nearly complete overlap between the pathways, hallmarks and phenomena involved in cancer and wound healing.

Table 1 exemplifies the parallels along with the genes/molecules/pathways/mechanisms that are common to both the processes. This is not an exhaustive list, but an illustrative one.

Table 2 uses a complete catalogue of genes, mutations in which have been causally implicated in cancer, to examine how many of them have evidence for a role in wound healing.

Table 3a and 3b examine the list of genes (coming from two different sources) differentially expressed during various phases of wound healing, for evidence of their involvement in cancers.

Supplementary table 1:

The phenomena or hallmarks of cancer that were once thought to be unique to cancers are now demonstrated to be involved in wound healing, along with their underlying mechanisms.

|  |  |  |  |
| --- | --- | --- | --- |
| Phenomenon/ hallmark | Genes/molecules/pathway/ mechanism involved | Role in cancer | Role in wound healing |
| Oncogenes and oncoprotein | Small GTP binding and hydrolyzing proteins (GTPases)  Ras | Mutations that affect some key oncoproteins (such as Ras and Raf) result ineither constitutive activation of proliferative signalling or failure ofnormal negative feedback mechanisms, both of which can drive uncontrolled cell proliferation without the need for mitogenic stimuli. (MacCarthy-Morrogh and Martin 2020) | Ras mediates re-epithelization of wound (Tscharntke et al 2005). Also regulates vascular permeability during angiogenesis, and blood vessels lacking R-Ras leak plasma proteins constantly. (Ketomäki et al. 2019) |
| RAF proto-oncogene serine/threonine-protein kinase, also known as proto-oncogene  Raf | Signaling through the Ras/Raf/MAPK regulates a variety of cellular functions that are important for tumorigenesis.  Results in either constitutive activation of proliferative signaling or failure of normal negative feedback mechanisms, both of which can drive uncontrolled cell proliferation without the need for mitogenic stimuli (MacCarthy-Morrogh and Martin 2020), (Molina and Adjei 2006) | Conditional ablation experiments show that Raf -1 is necessary for wound healing (Ehrenreiter, et al 2005). The Ras/Raf/MAPK pathway can stimulate angiogenesis through changes in expression of genes directly involved in the formation of new blood vessels. (Molina and Adjei 2006) |
| Receptor tyrosine kinases Mitogenic signals  EGF-EGFR signaling | Activation of mitogenic signals: Overall decline in mitogenic signals, detrimental to normal cells, likely drives the competition in favor of precancer clones carrying oncogenic mutations. Hence, if cancer is ‘a wound that does not heal’, combining ‘healing signaling’ and stress-targeted therapies might revert this pernicious dynamic, improving several aspects of cancer treatment (Dias and Bernards 2021) | EGF-EGFR signaling axis is a model of prosurviva (MacCarthy-Morrogh and Martin 2021) proliferative signaling for normal cells, playing a key role in development, homeostasis, and wound healing (Dias and Bernards 2021)  There is complicated crosstalk between innate immunity and EGFR signaling in wound healing processes, and imbalance of this crosstalk may lead to impaired wound healing. (Chen et al. 2016) |
| Epidermal growth factor (EGF) and transforming growth factor (TGF) | Melanoma cells secrete TGF-β, PDGF, FGF2, and IL-8, which act in a paracrine manner to stimulate fibroblast activation and proliferation.  (Foster et al. 2018) (Sundaram et al 2018) | In wound healing, TGF-β1, via the SMAD-4 pathway, stimulates wound healing activities including  wound contraction by fibroblasts and ECM component deposition,immune cell recruitment, angiogenesis, keratinocyte migration via integrins. TGF-β2 shares similar roles to TGF-β1 and is involved in stimulating ECM deposition, while TGF-β3 is involved in regulating TGF-β1 and decreasing collagen I deposition and scar formation (Foster et al. 2018) (López-Cortés et al. 2021). |
| Extracellular signal-regulated kinase 1/2 (ERK) belongs to the mitogen-activated protein kinase (MAPK) family | Nearly one-third of all types of cancers involve deregulated ERK. ERK was constitutively active in ~50 tumor cell lines  (Lu et al 2020).  The mitogen-activated protein kinase (MAPK) a complex interconnected signaling cascade with frequent involvement in oncogenesis, tumor progression, and drug resistance. The MAPK family consists of a large number of kinases altered in cancers and against which many targeted therapies were developed. (Braicu et al 2019) | Expression of the metallo-proteinases, MMP-9 and MMP-2, induced by EGFR-dependent activation of ERK1/2 and PI3K/Akt signaling cascades are also important for promotion of airway epithelial cell migration and wound repair in response to airway epithelial cell injury. (Chen et al. 2016). MAPKAPK-2 signaling is critical for cutaneous wound healing (Thuraisingam et al 2010) |
| Transcription Factors | Core transcription factors *OCT4*, *SOX2*, *NANOG* | Increased expression of SOX2 may be involved in primary transformation and carcinogenesis of squamous tumors in the process of hyperplasia and dysplasia.  Transcription factors in very early stage of carcinogenesis can greatly enhance detection of oral squamous cell carcinoma (OSCC). (Naini et al. 2019) | During wound healing, SOX2 induced proliferation of epithelial and connective tissue cells and promoted angiogenesis.( Uchiyama et al 2019). Olfactomedin-4 improves cutaneous wound healing by promoting skin cell proliferation and migration through POU5F1/OCT4 and ESR1 signalling cascades (Klaas et al 2022) Epidermal stem cells (EpSCs) with high expression of regulatory factor Nanog can promote wound healing (Yin et al 2022). |
| Signal Transducers and Activators of Transcription (STATs) | The transcription factors STAT1 and STAT3 appear to play opposite roles in tumorigenesis. While STAT3 promotes cell survival/proliferation, motility and immune tolerance and is considered as an oncogene, STAT1 enhances inflammation and innate and adaptive immunity, triggering in most instances anti-proliferative and pro-apoptotic responses in tumor cells (Pensa et al. 2013) | Stat 3 and Stat 6(Byun and Gardner 2013)  Stat3 is activated by oncogenic signals such as Src and EGFR signaling as well as by cytokines and mitogens involved in wound healing such as interleukin-6 and hepatocyte-growth factor (HGF) (Dauer et al. 2005)Stat3 activation results upregulation of genes involved in cell invasion, chemotaxis, angiogenesis, and blood coagulation. (Dauer et al. 2005)  Cell shape change during wound healing is also mediated in part by the JAK/STAT pathway (Lee et al. 2017). |
| *ETS1, ETS2* | ETS1 and/or ETS2 form an autoregulatory circuit with the MAPK pathway components ERK1, ERK2 and DUSP6 (Bushweller 2019) | Ets-1 plays an important role in angiogenesis in the early phase of ulcer healing. (Ito et al 1998) cdk10 and ETS2 involved during corneal wound healing (Zehra et al 2019) |
| Tumor suppressor genes | Retinoblastoma  Rb1 | Reduced expression of [retinoblastoma protein](https://www.sciencedirect.com/topics/medicine-and-dentistry/retinoblastoma-protein) pRb in cancer (Bartkova et al 2003). Mutational inactivation of *Rb1* causes the pediatric cancer retinoblastoma, while deregulation of the pathway is common in most human cancer. The *Rb1*-encoded protein (pRb) is well known as a general cell cycle regulator, and this activity is critical for pRb-mediated tumor suppression. (Goodrich, 2006; Goodrich 2022) | Rb1 enhances cutaneous wound healing process by increasing keratinocyte migration (Shin et al 2018) |
| FoxO3a | FOXO3a acts as a tumor suppressor in cancer. FOXO3a is frequently inactivated in cancer cell lines (Liu, *et al.*2018). | FoxO play a crucial role in wound healing. FoxO1 and FoxO3 primarily function in epithelial wound healing. re-epithelialisation and keratinocyte migration. (Miao, C., Li, Y. and Zhang, X. (2019),  FOXO1 and FOXO3 possess biological functions such as morphogenesis, maintenance and tissue regeneration. FOXOs important target to enhance wound healing (Rajendran et al. 2019) |
| P53 | Importasnt tumor suppressor. Loss or mutation of p53 in cancers can affect the recruitment and activity of myeloid and T cells, allowing immune evasion and promoting cancer progression. p53 can also function in immune cells, resulting in various outcomes that can impede or support tumour development. (Blagih et al 2020). Prevents dedifferentiation (Di Fiore et al 2014) | p21 and p53 activity induced during human wound healing.  (Blagih et al 2020). |
| PTEN | loss of PTEN function is common in different types of tumours  (Álvarez-Garcia et al 2019) | Injury to the corneal epithelium downregulates the expression of PTEN at wound edges, allowing increased PI3K/Akt signaling, thereby contributing to a significant enhancement of cell migration and wound healing. (Cao et al 2011). |
| Adenomatous polyposis coli (APC) | Mutations in APC are found in around 80% of sporadic colonic tumors.  (Minde et al 2011). | Promotes chronic wound healing (Zhao et al 2019) |
| Collagen | Both promoting and tumor suppressing roles Upregulated collagen in tumour growth (Xue and Jackson 2015, Xu et al 2019, Bhattacharjee et al 2021)  ECM as well as immune modulator (Mutolo et al 2012, Romer et al 2021) | Collagen, a key component of the extracellular matrix, plays critical roles in the regulation of the phases of wound healing either in its native, fibrillar conformation or as soluble components in the wound milieu.  (Mathew-Steiner et al 2021) |
| Tumor suppressor genes p16INK4A | p16Ink4a is a negative regulator of cell proliferation. Close to 50% of all human cancers show p16Ink4a inactivation (Romagosa et al. 2011) | P16INK4A is expressed by epidermal and oral keratinocytes at the migrating fronts of healing wounds (Natarajan et al. 2005) (Chikenji et al. 2019) |
| FAT1, FAT4 | Fat cadherins are extremely large cell adhesion molecules, with >30 cadherin repeats, including FAT1, FAT2, FAT3, FAT4. FAT1 is an important *trans*-membrane protein involved in the regulation of cell adhesion and growth, migration, actin dynamics and orientation, playing critical roles in tumor development. It is often regarded as a tumor-suppressor gene or oncogene in different types of human cancer ( Hu et al 2018) | FAT1 depletion led to a significant increase in cell migration and invasion abilities in the YSE2 and Colo680N cell lines which were also confirmed by the wound healing migration assay( Hu et al 2018) |
| SMAD proteins | SMAD4, which serves as the central mediator of TGF-βsignaling, is specifically inactivated in over half of pancreatic duct adenocarcinoma, and varying degrees in many other types of cancers.  DPC4/Smad4 is a critical tumor suppressor involved in the progression of pancreatic cancer(Zhao et al 2018). | Extracellular matrix modelling and wound healing (Schiller et al 2004). SMAD3 null mice had excessive proliferation. Smad knockout leads to aberrant wound healing (Owens et al 2010) |
| promyelocytic leukemia protein (PML)  PML–RARα | PML tumor suppressor in multiple complex ways (Hsu and Kao 2018).  Blocks differentiation; (Bushweller 2019)  PML—RAR *α* is the hallmark protein of acute promyelocytic leukaemia, a highly malignant subtype of acute myeloid leukaemia that accounts for approximately 10% of all AML cases.(Saeed et al. 2011) | Both PML and STAT1 are important regulators of ITGB1 expression in ECs. Furthermore, antibody experiments show that blocking ITGB1 delays wound healing even in the presence of TNFα and IFNα.( Cheng et al 2012) ATRA inhibits PC regeneration, and decreased RARα expression in wounds after E14 inhibits myoblast migration (Takaya et al 2022) |
| ARID1A | ARID1A loss-of-function mutations are commonly found in human cancer  (Sun et al 2016) | Knockouts faster would closure  (Rahmanto et al 2020, Sun et al 2016)  Arid1a is physiologically suppressed during liver regeneration and wound healing, and that complete ablation leads to improved regeneration (Sun et al 2016). |
| NOTCH | Notch signaling pathway’s oncogenic or tumor-suppressor abilities are highly context dependent. (Lobry et al 2014) | Wnt and Notch signaling pathway involved in wound healing by targeting *c-Myc* and *Hes1* (Shi et al 2015) |
| Evading immune mechanisms | CD47 also known as integrin associated protein is a transmembrane protein  *CD47* | A key anti-phagocytic molecule, enables various types of cancer cells to evade phagocytosis by macrophages (Chikenji et al. 2019) | Epithelial CD47 expression regulates mucosal wound closure in vivo by promoting signaling through a β1 integrin-dependent FAK-Src-p130 Cas pathway (Reed et al. 2019) |
| Immune checkpoint receptors | programmed cell death 1 (PD-1) and cytotoxic T lymphocyte associated protein 4 (CTLA-4) serve as immune checkpoint receptors inactivating macrophages (Barrueto et al. 2020). | Immune regulation by PD-L1 promotes tissue repair (Su et al 2019, Wang et al 2022) |
| Fibroblast activity | platelet-derived growth factors  PDGFRα and -β(PDGFRαalsoknownasCD140α) | Involved in recruitment and phenotypic remodeling of CAFs. Found to be robustly expressed by CAFs in mouse squamous cell carcinoma.(Foster et al. 2018) | PDGFs induce fibroblast reactivity and fibrosis.  Expression associated with fibroblasts involved in organ fibrosis and wound healing in miceand humans. Expressed by dorsal, scar-formingfibroblasts in mice.(Reuterdahl et al. 1993). |
| FSP1 (fibroblast specific protein-1,also known as S100A4) | FSP1-positive cells were increased in human and mouse experimental liver injury including liver cancer. (Österreicher et al. 2011) | FSP1 and α1β1 integrin expression are associated  with a quiescent fibroblast phenotype in mice.FSP1+ fibroblasts are predominant cell types withinexperimental granulation tissue during wound healing at day 22 in a mouse model. (Foster et al. 2018). |
| Vim (vimentin) | Expression necessary for fibroblast initiation of EMTin tumor cells. Also expressed by epithelial cells thathave undergone EMT. | Expressed by quiescent and activated fibroblasts.  Expression critical for fibroblast proliferation. Invim-deficient mouse wounds, fibroblasts do not  proliferate, which inhibits TGF-β1 signaling andSlug, yielding dysfunctional wound healing. Also expressed by other mesenchymal cells. (Foster et al. 2018) |
| Col-I and Col-III | Upregulation in cancer-associated fibroblast CAFs. Mesenchymal stem cells can  differentiate into fibroblastic cells expressing α-SMA and Col-I in human lung tissue. (Foster et al. 2018) | Upregulated in fibroblasts involved in scarformation and fibrosis. Secreted by En1-expressingfibroblasts in mouse wound healing Majorpopulation of human fibroblasts expressing  SFRP2/DPP4 associated with collagen bundles (Foster et al. 2018) |
| Postn (periostin) | Expressed by CAFs in colon cancer. Upregulatedin human pancreatic stellate (fibroblastic) cells;deposition seen at carcinoma cell infiltration sites (Foster et al. 2018) | A tissue repair product; levels in wounds correlatewith activated fibroblast presence in granulation  tissue. (Foster et al. 2018) |
| Desmin | Dysregulated in many types of cancers (Mittal 2020) | Expressed by fibroblasts in hypertrophic stars and fibrosis in humans. (Foster et al. 2018) |
| Podoplanin | Marks a specific CAF population. Prognostically relevant in lung, breast, and SCC. Also expressed by lymphatic endothelial cells. (Foster et al. 2018). | Displayed by human dermal fibroblasts in sclerosis (along with CD 90). (Foster et al. 2018). |
| CD26 (also known as dipeptidyl  peptidase-4 [DPP4]) | Fibroblasts of En1 lineage (expressing CD26/DPP4) contribute to tumor stroma in mouse melanoma.When these fibroblasts are ablated (via diphtheriatoxin), tumor burden decreases.(Foster et al. 2018) | Associated with mouse papillary fibroblastspopulation. Expressed by En1+ fibroblast in themouse dermis. Expressed by human dermal SFRP2+fibroblasts (Foster et al. 2018). |
| CD90 (also known as thymocyte  antigen 1 [Thy1]) | High CD90-expressing CAFs promote tumorsmorethan low CD90-expressing CAFs in human gastric andprostate cancer.(Foster et al. 2018) | Expressed by human dermal fibroblasts. Displayedby dermal fibroblasts in sclerosis (along with  Podoplanin) in humans. (Foster et al. 2018). |
| NG2 (neuron glial antigen-2) | Expressed on normal and intratumoral pericytes. Pericytes distinguished by regulator of G-protein signaling 5 (RGS5) expression, which associates with CD31 rather than α-SMA. (Foster et al. 2018). | Expressed by migratory fibroblasts in response toinjury in vitro. (Foster et al. 2018) |
| Tenascin-C | CAF expression involved in regulating carcinoma cell adhesion.(Foster et al. 2018) | Involved in recruiting fibroblasts to wounds. (Foster et al. 2018) |
| ED-A | Expressed by CAFs, as well as carcinoma cells and tumor blood vessels. Increased urinary ED-A associated with poor prognosis in human bladder cancer.(Foster et al. 2018) | A mesenchymal marker, upregulated in activated fibroblasts (Kohan et al. 2010). |
| E to M transition (EMT) | KLF8, SIX1 RUNX2 | KLF8, SIX1 RUNX2 Regulate EMT (Bushweller 2019) | Runt-related transcription factor 2 (RUNX2) is required for mesenchymal stem cells to differentiate to osteoprogenitor cells. (Sato and Takaoka 2015) |
| platelet-derived growth factors  PDGFRα and -β(PDGFRαalsoknownasCD140α) | Autocrine PDGF signaling has been implicated in various types of malignancies such as gliomas and leukemia. In contrast, paracrine signaling was found in cancers that originate from epithelial cells, where it may be involved in stromal cell recruitment, metastasis, and EMT ( Liu et al 2011) | PDGFRβ is also expressed by normal pericytes. An increased expression of PDGF beta receptor protein was prominent in vessels in the proliferating tissue zone in wounds as early as 1 d after surgery (Reuterdahl et al. 1993) |
| Cell proliferation migration and metastasis | L1CAM  L1 cell adhesion molecule | L1CAM+ cells in human colorectal cancer (CRC) have metastasis-initiating capacity (Ganesh et al. 2020) | L1CAM, appears to be necessary and sufficient in both tissue repair and cancer contexts in the gut  (MacCarthy-Morrogh and Martin 2020) |
| Rho small guanosine triphos-phatase (GTPase) | Misregulated in cancer (MacCarthy-Morrogh and Martin 2020) | Rho family small GTPases are absolutely required for wound re-epithelialization (MacCarthy-Morrogh and Martin 2020) |
| increased production of several proteases | The production of metastasis appears to involve a number of different proteases including the urokinase form of plasminogen activator, cathepsin B, cathepsin D and various metalloproteases (MJ 1992) | wound granulation tissue requires the increased production of several proteases, particularly matrix metalloproteinase 1(MMP1), which may facilitate integrin-matrix adhesion dynamics by locally cleaving various extracellular matrix (ECM) and ECM-associated proteins |
| α-SMA (α-smooth muscle actin,  also known as acta2) | Alpha-SMA is expressed by tumor cells carcinoma. Tumor cells that express α-SMA are predicted to be the cells that have the invasive nature, tend to metastasize, and have poorer prognosis.(Anggorowati et al. 2017) | An intracellular protein expressed by fibroblasts transiently in mouse wound healing. Associated with increased fibroblast contractility. Also expressed by normal fibroblasts, smooth muscle cells, and pericytes.  In healing tissues, fibroblasts acquire a contractile phenotype, characterized by formation of microfilament bundles, and by de novo expression of α-smooth muscle actin (α-SMA). These activated cells, termed “myofibroblasts” participate in the reparative response, by secreting large amounts of extracellular matrix proteins and may be responsible for contraction of healing wounds (Shinde, Humeres, and Frangogiannis 2017)(Tomasek et al. 2005) |
| Nrf2 | The constitutive activation of Nrf2 in various cancers induces pro‐survival genes and promotes cancer cell proliferation by metabolic reprogramming, repression of cancer cell apoptosis, and enhancement of self‐renewal capacity of cancer stem cells.(S. Wu, Lu, and Bai 2019) |  |
|  | aberrant YAP/TAZ activity: *WWTR1* and *YAP1*  Hypermethylation of the promoter region of *LATS1, STK3*, *WWC1* and *TAOK2* | YAP/TAZ are also implicated in metastatic progression — the leading cause of cancer-related death — which involves several events that participate in enhancing the migratory potential of aggressive cancers. (Dey, Varelas, and Guan 2020) | Roles for YAP/TAZ in basal stem cell control are apparent in epidermal development and skin wound repair.(Dey, Varelas, and Guan 2020)  YAP/TAZ promotes wound healing and tissue regeneration, and, under physiological conditions, YAP/TAZ activity is restricted mainly by the LATS1/2 kinases. |
| Micro RNA’s *MiR-31* | Down-regulated [miR-31](https://www.sciencedirect.com/topics/medicine-and-dentistry/microrna-31) in human cancer shows tumor repressive function.  UP-regulated [miR-31](https://www.sciencedirect.com/topics/medicine-and-dentistry/microrna-31) in human cancer showing tumor promotive function.  diverse [signaling pathways](https://www.sciencedirect.com/topics/medicine-and-dentistry/signal-transduction) in which [miR-31](https://www.sciencedirect.com/topics/medicine-and-dentistry/microrna-31) is involved to clarify its different effects on cancer.(Yu et al. 2018) | expression of miR-31 is gradually upregulated in wound edge keratinocytes in the inflammatory(D et al. 2015) (Shi et al. 2018) |
| Heat shock proteins Hsp27 (HSPB1), Hsp72 (HSPA1A HSPA1B), Hsp90 alpha (HSP) | Hsp70 is secreted from prostate carcinoma cells through such a route along with accompanying lysosomal marker proteins. Intracellular HSPs—most notably Hsp27, Hsp72 (the combined product of the HSPA1A and HSPA1B genes) and Hsp90 (product of the HSPC2 and HSPC3 genes)—have been shown to accumulate to high levels in many types of cancer(Calderwood 2018) | Hsp90α is required for normal wound closure. (Bhatia et al. 2018)(Bellaye et al 2014 and Song et al 2014) |
| GADD45 expression | Defects in the GADD45 pathway can be related to the initiation and progression of malignancies.(Tamura et al. 2012) | GADD45 appears to increase the access of repair machinery to damaged DNA, is produced as a consequence of inflammation. (MacCarthy-Morrogh and Martin 2020) |
| Cell fusion | Cell fusion | Two way effects. Hybrids of malignant cells with normal cells become non-tumorigenic Cooper 2000)  “wolf in sheep's clothing” model. The model suggests that a tumor cell becomes metastatic by fusion to normal cells that travel throughout the body freely, such as lymphocytes or macrophages.(Duelli and Lazebnik 2003) | Giant syncytium involved in re-epithelization in drosophila (Losickcurr boil 2013). Cell fusion may enable the stem cells to acquire the program/properties of the target tissue (Dorner et al Int J MolSci 2020) |
| Inducing angiogenesis | Proangiogenic signals, primarily thrombospondin  and vascular endothelial growth factor (VEGF)  Wnt7a signals | vascular endothelial growth factor (VEGF) primarily regulated by the transcription factor nuclear factor NF-kB, which is active in most tumors and is induced by carcinogens (Wu and Chen 2014) | VEGF is unique for its effects on multiple components of the wound healing cascade, including angiogenesis and recently shown epithelization and collagen deposition (Bao et al. 2009) |
| hypoxia inducible factor HIF | HIF-1α is overexpressed in human cancers as a result of intratumoral hypoxia as well as genetic alterations, such as gain-of-function mutations in oncogenes (for xample, *ERBB2*) and loss-of-function mutations in tumour-suppressor genes (MacCarthy-Morrogh and Martin 2020) (Semenza 2003). | Expressed (Cañedo-Dorantes and Cañedo-Ayala 2019).  Hypoxia upregulates tissue expression of VEGF and its receptors, which in turn promote an angiogenic response. (Bao et al. 2009) |
| TNF | TNF is secreted by inflammatory cells, which may be involved in inflammation-associated carcinogenesis. TNF exerts its biological functions through activating distinct signaling pathways such as NFκB and JNK (WANG and LIN 2008) | Expressed (Cañedo-Dorantes and Cañedo-Ayala 2019)  macrophages induce angiogenesis, in part by releasing TNF-α, which may in turn induce VEGF expression in keratinocytes and fibroblasts (Bao et al. 2009) |
| Co-opting cells, coordination and cross talk |  | Cross talk between malignant cells and many other types of cells in the microenvironment, often mediated by microRNA (Pascut et al 2020, Su et al 2021) | Cross talk between many types of cells during wound healing (Brazil et al 2019, Bird et al 2021) |
|  | Neurons interact with tumor cells and facilitate tumor growth (Hanahan and Monje 2023) | Neurons contribute to tissue repair and fine tune the microenvironment (Beura et al 2022) |
| Inflammation and its regulation | receptor CXCR2 | chemokines, including those binding to the receptor CXCR2, act as attractants for neutrophils to clones of preneoplastic cancer cells (MacCarthy-Morrogh and Martin 2020) | chemokines, including those binding to the receptor CXCR2, act as attractants for neutrophils to wounds (MacCarthy-Morrogh and Martin 2020) |
| TGF- β 1 and 2 | TGF-β1 has more complex roles in cancer, being both positively and negatively associated with tumor progression. TGF Beta 1 overexpression of TGF-1 has also been linked to multiple cancers (MacCarthy-Morrogh and Martin 2020) | The TGF-β–related growth factor, activin, also has both protumorigenic activity and considerable effects in a wound repair scenario.(MacCarthy-Morrogh and Martin 2020) |
| CSF-1 (colony-stimulating factor–1) | CSF1 is involved in breast cancer progression through inducing monocyte differentiation and homing (Ding et al 2016) | CSF1 is essential to macrophage survival and function and there are profound macrophage deficiencies in op/op mice carrying an inactive Csf1 gene. (van den Boorn and Hartmann 2014) |
| high mobility group box 1 HMGB1 | Leukocytes to cancer cells (MacCarthy-Morrogh and Martin 2020) | Leukocytes to acute wounds cells (MacCarthy-Morrogh and Martin 2020) |
| Duox | blocking Duox prevents immune cells from homing to growing clones of precancer cells (MacCarthy-Morrogh and Martin 2020) | Ca2+ signal activates the nicotinamide adenine dinucleotide phosphate oxidase (NOX), Duox to generate hydrogen peroxide (MacCarthy-Morrogh and Martin 2020) |
| IL-12 and IL-23 | IL-12 also induces the production of large amounts of IFNγ which itself is cytostatic/cytotoxic, anti-angiogenic and can upregulate MHC I and II expression on tumor cells for enhanced recognition and lysis. Interleukin 12 (IL-12) is a pleiotropic cytokine that plays an essential role in Th1-type immune response against cancer, a condition where cells in a particular part of the body grow and reproduce uncontrollably. (X 2017) | Accelerated wound healing phenotype in Interleukin 12/23 deficient mice  Higher levels of IL-1β and IL-6 during wound healing (Matias et al 2011) |
| Replicative immortality  Cell senescence. |  | Replicative immortality or resistance to the normal senescence of differentiated cells is a hallmark of cancers (Ozturk et al 2006) | Fine tuning and reshaping of senescence mechanisms is observed in wound healing. Mechanisms blocking chronic cell senescence accelerate healing (Wilkinson and Hardman 2020) |
| Human telomerase reverse transcriptase (TERT) | hTERT expression is up-regulated in tumors via multiple genetic and epigenetic mechanisms including hTERT amplifications, hTERT structural variants, hTERT promoter mutations and epigenetic modifications through hTERT promoter methylation.(Leão et al. 2018) | gene delivery of hTERT by adenovirus (Ad-hTERT) dramatically improved ischemic wound healing in an aged rabbit model. |
| Altered energy metabolism | increased glucose metabolism, glycolysis, fatty acid synthesis and glutamine metabolic rates. | Warburg and reverse Warburg effect  ‘the Warburg effect’. Subsequently, the ‘reverse Warburg effect’ proposed that tumor-associated fibroblasts can produce large amounts of lactic acid via aerobic glycolysis, which is provided to adjacent cells in a paracrine manner, causing the activation of mitochondria, increasing OXPHOS in adjacent cells and promoting tumoractivity .(Peng et al. 2021) Generally, ‘the Warburg effect’ and ‘reverse Warburg effect’ play an essential role in the development of cancer. Aberrant glucose metabolism regulates cancer proliferation, cell cycle, drug resistance, and DNA repair (Lin et al. 2019) | the master regulator of inflammatory and metabolic responses (e.g., aerobic glycolysis), is essential for physiological wound healing.  NLRP3-mediated inflammation is activated in keloids, (b) whether Glut1 expression is elevated in burn tissue (Vinaik et al. 2020) glycolysis is prominent. Lactic acid in the interstitial fluids of healing wounds amount up to 5–15 mM. Endogenous lactic acid and exogenous lactate can promote reparative angiogenesis with recruitment of endothelial progenitor cells, activate procollagen factors, and enhance extracellular matrix deposition in mice with ischemic wounds. (Sun et al. 2017) |
| Chromosomal Alterations | Polyploidization, Aneuploidy | The vast majority of cancers show aneuploidy, with around 90% of solid tumors and 75% of hematopoietic cancers having abnormal chromosome numbers. Aneuploidy has been shown to precede transformation in a variety of cancers (Coward and Harding 2014). Ploidy reduction frequently occurred during an early phase of tumorigenesis, and enhanced polyploid-derived cancer development.(Matsumoto et al. 2021). | Both JNK and Hippo signaling are upregulated at the wound ite, suggesting that these pathways regulate the wound response. Hippo signaling, in onjunction with the TOR and insulin/IGF athways, plays an important role in organ size control in both mammals and insects. Yki, the major effector of Hippo signaling, is required for the polyploidization response. Hippo signaling in response to wound damage may activate *cycE*, a gene known to be regulated by Yki in other tissues to stimulate S phase reentry.(Losick, Fox, and Spradling 2013). In *Drosophila* wound-induced polyploidy (WIP) is an essential mechanism to replace tissue mass and restore tissue integrity in the absence of cell division. (Losick 2016b).  Normal tissue has a low level of aneuploidy (Knouse et al 2014) which may be increased when rapid proliferation is the priority. |
| centrosome amplification | CA is associated with oncogenic phenotypes increased invasiveness and aberrant stem cell divisions. The potential mechanisms leading to CA in cancer are numerous and include centriole over duplication, *de ovo* centrosome formation, fragmentation of overly elongated centrioles and cytokinesis failure(Sabat-Pośpiech et al. 2019).  Centrosome amplification is commonly observed in hematologic malignancies and solid tumors, and a clear link exists between centrosome amplification and aneuploidy in a wide variety of cancer cell lines (Vitre et al. 2015) | The reorientation of the microtubule organizing center during cell migration into a wound in the monolayer was observed in living wound-edge cells expressing gamma-tubulin tagged with green fluorescent protein. (Yvon et al. 2002) |
| Genomic instability | Believed to be a unique cancer hallmark (Negrini et al 2010) | Inflammation induced genomic instability mediated by microRNAs in intestinal mucosal injury (Butin-Israeli et al 2019). |
| Neoantigens/ neo-epitopes | RNA splicing leading to novel popypeptides | RNA splicing is involved in carcinogenesis and a potential source of neoantigens in tumors (Anczuków et al 2016, Park and Chung 2019) | Although neoantigens are not known during wound healing the underlying altered splicing mechanisms are present (Jensen et al 2014) |
| indoleamine 2,3-dioxygenase 1 (IDO1) induced ribosomal codon reassignment leading to novel polypeptides | Generation of new antigens through ribosomal codon reassignment induced by the enzyme  indoleamine 2,3-dioxygenase 1 (IDO1), which is induced by IFNγ3–5  (Bartok et al 2021, Pataskar et al 2022). | Although neoantigns have not been demonstrated directly in healing tissue, the pathways responsible are triggered during healing including indoleamine 2,3-dioxygenase (IDO1) activity. (Ito et al 2015) |

References to table 1:

1. Álvarez-Garcia, V., Tawil, Y., Wise, H. M., & Leslie, N. R. (2019). Mechanisms of PTEN loss in cancer: It's all about diversity. *Seminars in cancer biology*, *59*, 66–79. <https://doi.org/10.1016/j.semcancer.2019.02.001>
2. Anczuków, O., & Krainer, A. R. (2016). Splicing-factor alterations in cancers. *RNA (New York, N.Y.)*, *22*(9), 1285–1301. <https://doi.org/10.1261/rna.057919.116>
3. Anggorowati, Nungki, ChatarinaRatnaKurniasari, Karina Damayanti, TitikCahyanti, IrianiwatiWidodo, Ahmad Ghozali, Muhammad MansyurRomi, DwiCahyaniRatna Sari, and NurArfian. 2017. “Histochemical and Immunohistochemical Study of α-SMA, Collagen, and PCNA in Epithelial Ovarian Neoplasm.” *Asian Pacific Journal of Cancer Prevention : APJCP* 18 (3): 667. https://doi.org/10.22034/APJCP.2017.18.3.667.
4. Bao, Philip, Arber Kodra, MarjanaTomic-Canic, Michael S. Golinko, H Paul Ehrlich, and Harold Brem. 2009. “The Role of Vascular Endothelial Growth Factor in Wound Healing.” *The Journal of Surgical Research* 153 (2): 347. https://doi.org/10.1016/J.JSS.2008.04.023.
5. Barrueto, Luisa, FrancheskaCaminero, Lindsay Cash, Courtney Makris, PurushottamLamichhane, and Rahul R. Deshmukh. 2020. “Resistance to Checkpoint Inhibition in Cancer Immunotherapy.” *Translational Oncology* 13 (3). https://doi.org/10.1016/J.TRANON.2019.12.010.
6. Bartok, O., Pataskar, A., Nagel, R., Laos, M., Goldfarb, E., Hayoun, D., Levy, R., Körner, P. R., Kreuger, I. Z. M., Champagne, J., Zaal, E. A., Bleijerveld, O. B., Huang, X., Kenski, J., Wargo, J., Brandis, A., Levin, Y., Mizrahi, O., Alon, M., Lebon, S., … Agami, R. (2021). Anti-tumour immunity induces aberrant peptide presentation in melanoma. *Nature*, *590*(7845), 332–337. <https://doi.org/10.1038/s41586-020-03054-1>
7. Bellaye, P. S., Burgy, O., Causse, S., Garrido, C., &Bonniaud, P. (2014). Heat shock proteins in fibrosis and wound healing: good or evil?. *Pharmacology & therapeutics*, *143*(2), 119–132. <https://doi.org/10.1016/j.pharmthera.2014.02.009>
8. Beura, S. K., Panigrahi, A. R., Yadav, P., Agrawal, S., & Singh, S. K. (2022). Role of Neurons and Glia Cells in Wound Healing as a Novel Perspective Considering Platelet as a Conventional Player. *Molecular neurobiology*, *59*(1), 137–160. <https://doi.org/10.1007/s12035-021-02587-4>
9. Bhatia, Ayesha, Kathryn O’Brien, JiacongGuo, Vadim Lincoln, Chiaki Kajiwara, Mei Chen, David T. Woodley, HeiichiroUdono, and Wei Li. 2018. “Extracellular and Non-Chaperone Function of Heat Shock Protein−90α Is Required for Skin Wound Healing.”*Journal of Investigative Dermatology* 138 (2): 423–33. https://doi.org/10.1016/J.JID.2017.08.043.
10. Bhattacharjee S, Hamberger F, Ravichandra A, Miller M, Nair A, Affo S, Filliol A, Chin L, Savage TM, Yin D, Wirsik NM, Mehal A, Arpaia N, Seki E, Mack M, Zhu D, Sims PA, Kalluri R, Stanger BZ, Olive KP, Schmidt T, Wells RG, Mederacke I, Schwabe RF. Tumor restriction by type I collagen opposes tumor-promoting effects of cancer-associated fibroblasts. J Clin Invest. 2021 Jun 1;131(11):e146987. doi: 10.1172/JCI146987.
11. Bird L. (2021). Healing powers of neuron-macrophage crosstalk. *Nature reviews. Immunology*, *21*(7), 408–409. https://doi.org/10.1038/s41577-021-00573-4
12. Blagih, J., Buck, M. D., &Vousden, K. H. (2020). p53, cancer and the immune response. *Journal of cell science*, *133*(5), jcs237453. https://doi.org/10.1242/jcs.237453
13. Braicu, C., Buse, M., Busuioc, C., Drula, R., Gulei, D., Raduly, L., Rusu, A., Irimie, A., Atanasov, A. G., Slaby, O., Ionescu, C., &Berindan-Neagoe, I. (2019). A Comprehensive Review on MAPK: A Promising Therapeutic Target in Cancer. *Cancers*, *11*(10), 1618. <https://doi.org/10.3390/cancers11101618>
14. Brazil, J. C., Quiros, M., Nusrat, A., & Parkos, C. A. (2019). Innate immune cell-epithelial crosstalk during wound repair. *The Journal of clinical investigation*, *129*(8), 2983–2993. https://doi.org/10.1172/JCI124618
15. Bushweller, John H. 2019. “Targeting Transcription Factors in Cancer — from Undruggable to Reality.” *Nature Reviews Cancer* 19 (11): 611–24. https://doi.org/10.1038/S41568-019-0196-7.
16. Butin-Israeli, V., Bui, T. M., Wiesolek, H. L., Mascarenhas, L., Lee, J. J., Mehl, L. C., Knutson, K. R., Adam, S. A., Goldman, R. D., Beyder, A., Wiesmuller, L., Hanauer, S. B., &Sumagin, R. (2019). Neutrophil-induced genomic instability impedes resolution of inflammation and wound healing. *The Journal of clinical investigation*, *129*(2), 712–726. <https://doi.org/10.1172/JCI122085>
17. Byun, Jung S., and Kevin Gardner. 2013. “Wounds That Will Not Heal: Pervasive Cellular Reprogramming in Cancer.” *The American Journal of Pathology* 182 (4): 1055–64. https://doi.org/10.1016/J.AJPATH.2013.01.009.
18. Calderwood, Stuart K. 2018. “Heat Shock Proteins and Cancer: Intracellular Chaperones or Extracellular Signalling Ligands?” *Philosophical Transactions of the Royal Society B: Biological Sciences* 373 (1738). https://doi.org/10.1098/RSTB.2016.0524.
19. Cañedo-Dorantes, Luis, and Mara Cañedo-Ayala. 2019. “Skin Acute Wound Healing: A Comprehensive Review.” *International Journal of Inflammation* 2019. https://doi.org/10.1155/2019/3706315.
20. Cao, L., Graue-Hernandez, E. O., Tran, V., Reid, B., Pu, J., Mannis, M. J., & Zhao, M. (2011). Downregulation of PTEN at corneal wound sites accelerates wound healing through increased cell migration. *Investigative ophthalmology & visual science*, *52*(5), 2272–2278. <https://doi.org/10.1167/iovs.10-5972>
21. Chen, Jianchun, Fenghua Zeng, Steven J. Forrester, Satoru Eguchi, Ming-Zhi Zhang, and Raymond C. Harris. 2016. “Expression and Function of the Epidermal Growth Factor Receptor in Physiology and Disease.” *Https://Doi.Org/10.1152/Physrev.00030.2015* 96 (3): 1025–69. https://doi.org/10.1152/PHYSREV.00030.2015.
22. Cheng, X., Liu, Y., Chu, H., & Kao, H. Y. (2012). Promyelocytic leukemia protein (PML) regulates endothelial cell network formation and migration in response to tumor necrosis factor α (TNFα) and interferon α (IFNα). *The Journal of biological chemistry*, *287*(28), 23356–23367. <https://doi.org/10.1074/jbc.M112.340505>
23. Chikenji, Takako S., Yuki Saito, Naoto Konari, Masako Nakano, Yuka Mizue, Miho Otani, and MinekoFujimiya. 2019. “P16INK4A-Expressing Mesenchymal Stromal Cells Restore the Senescence–Clearance–Regeneration Sequence That Is Impaired in Chronic Muscle Inflammation.” *EBioMedicine* 44 (1–6): 86–97. https://doi.org/10.1016/J.EBIOM.2019.05.012.
24. Coward, Jermaine, and Angus Harding. 2014. “Size Does Matter: Why Polyploid Tumor Cells Are Critical Drug Targets in the War on Cancer.” *Frontiers in Oncology* 0: 123. https://doi.org/10.3389/FONC.2014.00123.
25. D, Li, Li XI, Wang A, Meisgen F, Pivarcsi A, Sonkoly E, Ståhle M, and Landén NX. 2015. “MicroRNA-31 Promotes Skin Wound Healing by Enhancing Keratinocyte Proliferation and Migration.” *The Journal of Investigative Dermatology* 135 (6): 1676–85. https://doi.org/10.1038/JID.2015.48.
26. Dauer, Daniel J, Bernadette Ferraro, Lanxi Song, Bin Yu, Linda Mora, Ralf Buettner, Steve Enkemann, Richard Jove, and Eric B Haura. 2005 “Stat3 Regulates Genes Common to Both Wound Healing and Cancer.” *Oncogene 2005 24:21* 24 (21): 3397–3408. <https://doi.org/10.1038/sj.onc.1208469>.
27. Dey, Anwesha, XaralabosVarelas, and Kun-Liang Guan. 2020. “Targeting the Hippo Pathway in Cancer, Fibrosis, Wound Healing and Regenerative Medicine.” *Nature Reviews Drug Discovery 2020 19:7* 19 (7): 480–94. https://doi.org/10.1038/s41573-020-0070-z.
28. Di Fiore, R., Marcatti, M., Drago-Ferrante, R., D'Anneo, A., Giuliano, M., Carlisi, D., De Blasio, A., Querques, F., Pastore, L., Tesoriere, G., & Vento, R. (2014). Mutant p53 gain of function can be at the root of dedifferentiation of human osteosarcoma MG63 cells into 3AB-OS cancer stem cells. *Bone*, *60*, 198–212. https://doi.org/10.1016/j.bone.2013.12.021
29. Dias, Matheus Henrique, and René Bernards. 2021. “Playing Cancer at Its Own Game: Activating Mitogenic Signaling as a Paradoxical Intervention.” *Molecular Oncology* 15 (8): 1975–85. https://doi.org/10.1002/1878-0261.12979.
30. Ding, J., Guo, C., Hu, P., Chen, J., Liu, Q., Wu, X., Cao, Y., & Wu, J. (2016). CSF1 is involved in breast cancer progression through inducing monocyte differentiation and homing. *International journal of oncology*, *49*(5), 2064–2074. <https://doi.org/10.3892/ijo.2016.3680>
31. Dörnen J, Sieler M, Weiler J, Keil S, Dittmar T. Cell Fusion-Mediated Tissue Regeneration as an Inducer of Polyploidy and Aneuploidy. Int J Mol Sci. 2020 Mar 6;21(5):1811. doi: 10.3390/ijms21051811.
32. Duelli, Dominik, and Yuri Lazebnik. 2003. “Cell Fusion: A Hidden Enemy?” *Cancer Cell* 3 (5): 445–48. <https://doi.org/10.1016/S1535-6108(03)00114-4>.
33. Ehrenreiter, K., Piazzolla, D., Velamoor, V., Sobczak, I., Small, J. V., Takeda, J., Leung, T., &Baccarini, M. (2005). Raf-1 regulates Rho signaling and cell migration. *The Journal of cell biology*, *168*(6), 955–964. <https://doi.org/10.1083/jcb.200409162>
34. Filippini, S. E., & Vega, A. (2013). Breast cancer genes: beyond BRCA1 and BRCA2. *Frontiers in bioscience (Landmark edition)*, *18*(4), 1358–1372. https://doi.org/10.2741/4185
35. Flores M, Goodrich DW. Retinoblastoma Protein Paralogs and Tumor Suppression. Front Genet. 2022 Mar 18;13:818719. doi: 10.3389/fgene.2022.818719. PMID: 35368709; PMCID: PMC8971665.
36. Foster, Deshka S., R. Ellen Jones, Ryan C. Ransom, Michael T. Longaker, and Jeffrey A. Norton. 2018. “The Evolving Relationship of Wound Healing and Tumor Stroma.” *JCI Insight* 3 (18). <https://doi.org/10.1172/JCI.INSIGHT.99911>.
37. Ganesh, K., Basnet, H., Kaygusuz, Y., Laughney, A. M., He, L., Sharma, R., O'Rourke, K. P., Reuter, V. P., Huang, Y. H., Turkekul, M., Er, E. E., Masilionis, I., Manova-Todorova, K., Weiser, M. R., Saltz, L. B., Garcia-Aguilar, J., Koche, R., Lowe, S. W., Pe'er, D., Shia, J., … Massagué, J. (2020). L1CAM defines the regenerative origin of metastasis-initiating cells in colorectal cancer. *Nature cancer*, *1*(1), 28–45. <https://doi.org/10.1038/s43018-019-0006-x>
38. Goodrich, D. The retinoblastoma tumor-suppressor gene, the exception that proves the rule. *Oncogene* 25, 5233–5243 (2006). <https://doi.org/10.1038/sj.onc.1209616>.
39. Hanahan, D., and Monje, M. (2023) Cancer hallmarks intersect with neuroscience in the cancer microenvironment. *Cancer cell 41(3),* 573-580 <https://www.cell.com/cancer-cell/fulltext/S1535-6108(23)00040-5>
40. Hsu, KS., Kao, HY. 2018. PML: Regulation and multifaceted function beyond tumor suppression. *Cell Biosci* **8**, 5. <https://doi.org/10.1186/s13578-018-0204-8>
41. Hu, X., Zhai, Y., Shi, R., Qian, Y., Cui, H., Yang, J., Bi, Y., Yan, T., Yang, J., Ma, Y., Zhang, L., Liu, Y., Li, G., Zhang, M., Cui, Y., Kong, P., & Cheng, X. (2018). FAT1 inhibits cell migration and invasion by affecting cellular mechanical properties in esophageal squamous cell carcinoma. *Oncology reports*, *39*(5), 2136–2146. https://doi.org/10.3892/or.2018.6328
42. Ito, H., Ando, T., Ogiso, H., Arioka, Y., Saito, K., &Seishima, M. (2015). Inhibition of indoleamine 2,3-dioxygenase activity accelerates skin wound healing. *Biomaterials*, *53*, 221–228. https://doi.org/10.1016/j.biomaterials.2015.02.098
43. Ito, M., Nakayama, T., Naito, S., Matsuu, M., Shichijo, K., &Sekine, I. (1998). Expression of Ets-1 transcription factor in relation to angiogenesis in the healing process of gastric ulcer. *Biochemical and biophysical research communications*, *246*(1), 123–127. <https://doi.org/10.1006/bbrc.1998.8585>
44. Jensen, M. A., Wilkinson, J. E., & Krainer, A. R. (2014). Splicing factor SRSF6 promotes hyperplasia of sensitized skin. *Nature structural & molecular biology*, *21*(2), 189–197. <https://doi.org/10.1038/nsmb.2756>
45. JirinaBartkova, BirgitteGrøn, Erik Dabelsteen, Jiri Bartek, Cell-cycle regulatory proteins in human wound healing, Archives of Oral Biology,
46. Julianna Blagih, Michael D. Buck, Karen H. Vousden, Ana-Maria Lennon-Duménil; p53, cancer and the immune response. *J Cell Sci* 1 March 2020; 133 (5): jcs237453. doi: <https://doi.org/10.1242/jcs.237453>
47. Ketomäki, Tuomo, Maria Vähätupa, Ulrike May, ToiniPemmari, Ella Ruikka, JussiHietamo, PirkkaKaipiainen, et al. 2019. “R-Ras Regulates Vascular Permeability, but Not Overall Healing in Skin Wounds.” *Experimental Dermatology* 28 (2): 202–6. https://doi.org/10.1111/EXD.13851.
48. Klaas, M., Mäemets-Allas, K., Heinmäe, E., Lagus, H., Arak, T., Eller, M., Kingo, K., Kankuri, E., &Jaks, V. (2022). Olfactomedin-4 improves cutaneous wound healing by promoting skin cell proliferation and migration through POU5F1/OCT4 and ESR1 signalling cascades. *Cellular and molecular life sciences : CMLS*, *79*(3), 157. <https://doi.org/10.1007/s00018-022-04202-8>
49. Knouse, K. A., Wu, J., Whittaker, C. A., &Amon, A. (2014). Single cell sequencing reveals low levels of aneuploidy across mammalian tissues. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(37), 13409–13414. <https://doi.org/10.1073/pnas.1415287111>
50. Kohan, M., Muro, A. F., White, E. S., & Berkman, N. (2010). EDA-containing cellular fibronectin induces fibroblast differentiation through binding to alpha4beta7 integrin receptor and MAPK/Erk 1/2-dependent signaling. *FASEB journal : official publication of the Federation of American Societies for Experimental Biology*, *24*(11), 4503–4512. https://doi.org/10.1096/fj.10-154435
51. L, MacCarthy-Morrogh, and Martin P. 2020. “The Hallmarks of Cancer Are Also the Hallmarks of Wound Healing.” *Science Signaling* 13 (648). https://doi.org/10.1126/SCISIGNAL.AAY8690.
52. Leão, Ricardo, Joana Dias Apolónio, Donghyun Lee, ArnaldoFigueiredo, Uri Tabori, and Pedro Castelo-Branco. 2018. “Mechanisms of Human Telomerase Reverse Transcriptase (HTERT) Regulation: Clinical Impacts in Cancer.” *Journal of Biomedical Science 2018 25:1* 25 (1): 1–12. https://doi.org/10.1186/S12929-018-0422-8.
53. Lee, JH, C Lee, SH Park, KM Choe - Journal of cell science, and undefined 2017. 2017. “Spatiotemporal Regulation of Cell Fusion by JNK and JAK/STAT Signaling during Drosophila Wound Healing.” *Journals.Biologists.Com*. https://doi.org/10.1242/jcs.187658.
54. Lin Cao, Enrique O. Graue-Hernandez, Vu Tran, Brian Reid, Jin Pu, Mark J. Mannis, Min Zhao; Downregulation of PTEN at Corneal Wound Sites Accelerates Wound Healing through Increased Cell Migration. *Invest. Ophthalmol. Vis. Sci.* 2011;52(5):2272-2278. doi: <https://doi.org/10.1167/iovs.10-5972>.
55. Lin, Jinguan, Longzheng Xia, Jiaxin Liang, Yaqian Han, Heran Wang, Linda Oyang, Shiming Tan, et al. 2019. “The Roles of Glucose Metabolic Reprogramming in Chemo- and Radio-Resistance.” *Journal of Experimental & Clinical Cancer Research 2019 38:1* 38 (1): 1–13. https://doi.org/10.1186/S13046-019-1214-Z.
56. Liu, K. W., Hu, B., & Cheng, S. Y. (2011). Platelet-derived growth factor signaling in human malignancies. *Chinese journal of cancer*, *30*(9), 581–584. https://doi.org/10.5732/cjc.011.10300
57. Liu, Y., Ao, X., Ding, W. *et al.* Critical role of FOXO3a in carcinogenesis. *Mol Cancer* 17, 104 (2018).
58. Liu, Y., Ao, X., Ding, W. *et al.* Critical role of FOXO3a in carcinogenesis. *Mol Cancer* 17, 104 (2018). https://doi.org/10.1186/s12943-018-0856-3
59. Lobry, C., Oh, P., Mansour, M. R., Look, A. T., &Aifantis, I. (2014). Notch signaling: switching an oncogene to a tumor suppressor. *Blood*, *123*(16), 2451–2459. <https://doi.org/10.1182/blood-2013-08-355818>
60. López-Cortés, Andrés, EstefaníaAbarca, Leonardo Silva, Erick Velastegui, Ariana León-Sosa, Germania Karolys, Francisco Cabrera, and Andrés Caicedo. 2021. “Identification of Key Proteins in the Signaling Crossroads between Wound Healing and Cancer Hallmark Phenotypes.” *Scientific Reports 2021 11:1* 11 (1): 1–16. https://doi.org/10.1038/s41598-021-96750-5.
61. Losick, Vicki P. 2016a. “Wound-Induced Polyploidy Is Required for Tissue Repair.” *Advances in Wound Care* 5 (6): 271. https://doi.org/10.1089/WOUND.2014.0545.
62. Losick, Vicki P., Donald T. Fox, and Allan C. Spradling. 2013. “Polyploidization and Cell Fusion Contribute to Wound Healing in the Adult Drosophila Epithelium.” *Current Biology* 23 (22): 2224–32. https://doi.org/10.1016/J.CUB.2013.09.029.
63. Lu, Y., Liu, B., Liu, Y., Yu, X., & Cheng, G. (2020). Dual effects of active ERK in cancer: A potential target for enhancing radiosensitivity. *Oncology letters*, *20*(2), 993–1000. <https://doi.org/10.3892/ol.2020.11684>
64. Mathew-Steiner, S. S., Roy, S., &Sen, C. K. (2021). Collagen in Wound Healing. *Bioengineering (Basel, Switzerland)*, *8*(5), 63. https://doi.org/10.3390/bioengineering8050063
65. Matias, Marie AT, Jodi M Saunus, SasoIvanovski, Laurence J Walsh, and Camile S Farah. 2011. “Accelerated Wound Healing Phenotype in Interleukin 12/23 Deficient Mice.” *Journal of Inflammation (London, England)* 8 (1): 39. https://doi.org/10.1186/1476-9255-8-39.
66. Matsumoto, Tomonori, Leslie Wakefield, Alexander Peters, Myron Peto, Paul Spellman, and Markus Grompe. 2021. “Proliferative Polyploid Cells Give Rise to Tumors via Ploidy Reduction.” *Nature Communications 2021 12:1* 12 (1): 1–11. https://doi.org/10.1038/s41467-021-20916-y.
67. Mechanisms of PTEN loss in cancer: It’s all about diversity, Seminars in Cancer Biology, Volume 59, 2019, Pages 66-79, ISSN 1044-579X,
68. Miao, C., Li, Y. and Zhang, X. (2019), The functions of FoxO transcription factors in epithelial wound healing. Australas J Dermatol, 60: 105-109. <https://doi.org/10.1111/ajd.12952>.
69. Minde, D. P., Anvarian, Z., Rüdiger, S. G., & Maurice, M. M. (2011). Messing up disorder: how do missense mutations in the tumor suppressor protein APC lead to cancer?. *Molecular cancer*, *10*, 101. https://doi.org/10.1186/1476-4598-10-101
70. Mittal, Balraj. Desmindysregulation in gall bladder cancer. Indian Journal of Medical Research 151(4):p 273-274, April 2020. | DOI: 10.4103/ijmr.IJMR\_1540\_19.
71. MJ, Duffy. 1992. “The Role of Proteolytic Enzymes in Cancer Invasion and Metastasis.” *Clinical & Experimental Metastasis* 10 (3): 145–55. <https://doi.org/10.1007/BF00132746>.
72. Molina, J. R., & Adjei, A. A. (2006). The Ras/Raf/MAPK pathway. *Journal of thoracic oncology : official publication of the International Association for the Study of Lung Cancer*, *1*(1), 7–9.
73. Mutolo, M. J., Morris, K. J., Leir, S. H., Caffrey, T. C., Lewandowska, M. A., Hollingsworth, M. A., & Harris, A. (2012). Tumor suppression by collagen XV is independent of the restin domain. *Matrix biology : journal of the International Society for Matrix Biology*, *31*(5), 285–289. https://doi.org/10.1016/j.matbio.2012.03.003
74. Naini, FereshtehBaghai, PouyanAminiShakib, AlirezaAbdollahi, MahshidHodjat, HadisehMohammadpour, and NedaKardouniKhoozestani. 2019. “Relative Expression of OCT4, SOX2 and NANOG in Oral Squamous Cell Carcinoma Versus Adjacent Non- Tumor Tissue.” *Asian Pacific Journal of Cancer Prevention : APJCP* 20 (6): 1649. https://doi.org/10.31557/APJCP.2019.20.6.1649.
75. Natarajan, Easwar, John D. Omobono, Jonathan C. Jones, and James G. Rheinwald. 2005. “Co-Expression of P16INK4A and Laminin 5 by Keratinocytes: A Wound-Healing Response Coupling Hypermotility with Growth Arrest That Goes Awry During Epithelial Neoplastic Progression.” *Journal of Investigative Dermatology Symposium Proceedings* 10 (2): 72–85. <https://doi.org/10.1111/J.1087-0024.2005.200415.X>.
76. Negrini, S., Gorgoulis, V. G., & Halazonetis, T. D. (2010). Genomic instability--an evolving hallmark of cancer. *Nature reviews. Molecular cell biology*, *11*(3), 220–228. <https://doi.org/10.1038/nrm2858>
77. Österreicher, Christoph H., MelittaPenz-Österreicher, Sergei I. Grivennikov, Monica Guma, Ekaterina K. Koltsova, Christian Datz, Roman Sasik, Gary Hardiman, Michael Karin, and David A. Brenner. 2011. “Fibroblast-Specific Protein 1 Identifies an Inflammatory Subpopulation of Macrophages in the Liver.” *Proceedings of the National Academy of Sciences* 108 (1): 308–13. <https://doi.org/10.1073/PNAS.1017547108>.
78. Ozturk, N., Erdal, E., Mumcuoglu, M., Akcali, K. C., Yalcin, O., Senturk, S., Arslan-Ergul, A., Gur, B., Yulug, I., Cetin-Atalay, R., Yakicier, C., Yagci, T., Tez, M., & Ozturk, M. (2006). Reprogramming of replicative senescence in hepatocellular carcinoma-derived cells. *Proceedings of the National Academy of Sciences of the United States of America*, *103*(7), 2178–2183. <https://doi.org/10.1073/pnas.0510877103>
79. Park, J., & Chung, Y. J. (2019). Identification of neoantigens derived from alternative splicing and RNA modification. *Genomics & informatics*, *17*(3), e23. https://doi.org/10.5808/GI.2019.17.3.e23
80. Pascut, Devis, Muhammad Yogi Pratama, Niem V.T. Vo, Rina Masadah, and Claudio Tiribelli. 2020. "The Crosstalk between Tumor Cells and the Microenvironment in Hepatocellular Carcinoma: The Role of Exosomal microRNAs and Their Clinical Implications" Cancers 12, no. 4: 823. https://doi.org/10.3390/cancers12040823
81. Peng, Jinghui, Yangyang Cui, ShipengXu, Xiaowei Wu, Yue Huang, Wenbin Zhou, Shui Wang, Ziyi Fu, and HuiXie. 2021. “Altered Glycolysis Results in Drug-resistant in Clinical Tumor Therapy (Review).” *Oncology Letters* 21 (5): 1–14. https://doi.org/10.3892/OL.2021.12630.
82. Pensa, Sara, Gabriella Regis, Daniela Boselli, Francesco Novelli, and Valeria Poli. 2013. “STAT1 and STAT3 in Tumorigenesis: Two Sides of the Same Coin?” https://www.ncbi.nlm.nih.gov/books/NBK6568/.
83. Philip Owens, Erin Engelking, Gangwen Han, Sarah M. Haeger, Xiao-Jing Wang, Epidermal Smad4 Deletion Results in Aberrant Wound Healing,The American Journal of Pathology,Volume 176, Issue 1,2010,Pages 122-133, <https://doi.org/10.2353/ajpath.2010.090081>
84. Rajendran, Naresh Kumar, SathishSundarDhilip Kumar, Nicolette NadeneHoureld, and Heidi Abrahamse. 2019. “Understanding the Perspectives of Forkhead Transcription Factors in Delayed Wound Healing.” *Journal of Cell Communication and Signaling* 13 (2): 151. https://doi.org/10.1007/S12079-018-0484-0.
85. Reed, Michelle, Anny-Claude Luissint, Veronica Azcutia, Shuling Fan, Monique N. O’Leary, Miguel Quiros, Jennifer Brazil, AsmaNusrat, and Charles A. Parkos. 2019. “Epithelial CD47 Is Critical for Mucosal Repair in the Murine Intestine in Vivo.” *Nature Communications 2019 10:1* 10 (1): 1–13. https://doi.org/10.1038/s41467-019-12968-y.
86. Reuterdahl, C, C Sundberg, K Rubin, K Funa, and B Gerdin. 1993. “Tissue Localization of Beta Receptors for Platelet-Derived Growth Factor and Platelet-Derived Growth Factor B Chain during Wound Repair in Humans.” *The Journal of Clinical Investigation* 91 (5): 2065–75. https://doi.org/10.1172/JCI116429.
87. Romagosa, C, S Simonetti, L López-Vicente, AMazo, M E Lleonart, J Castellvi, and S Ramon y Cajal. 2011. “P16Ink4a Overexpression in Cancer: A Tumor Suppressor Gene Associated with Senescence and High-Grade Tumors.” *Oncogene 2011 30:18* 30 (18): 2087–97. <https://doi.org/10.1038/onc.2010.614>.
88. Rømer, A. M. A., Thorseth, M. L., & Madsen, D. H. (2021). Immune Modulatory Properties of Collagen in Cancer. *Frontiers in immunology*, *12*, 791453. <https://doi.org/10.3389/fimmu.2021.791453>
89. Sabat-Pośpiech, Dorota, Kim Fabian-Kolpanowicz, Ian A. Prior, Judy M. Coulson, and Andrew B. Fielding. 2019. “Targeting Centrosome Amplification, an Achilles’ Heel of Cancer.” *Biochemical Society Transactions* 47 (5): 1209. https://doi.org/10.1042/BST20190034.
90. Saeed, S, C Logie, H G Stunnenberg, and J H A Martens. 2011. “Genome-Wide Functions of PML–RARα in Acute PromyelocyticLeukaemia.” *British Journal of Cancer* 104 (4): 554. <https://doi.org/10.1038/SJ.BJC.6606095>.
91. Sato, H., & Takaoka, Y. (2015). RUNX2 expression during early healing of tooth-extraction wounds in rats. *Journal of oral science*, *57*(4), 319–325. https://doi.org/10.2334/josnusd.57.319
92. Schiller M, Javelaud D, Mauviel A. TGF-beta-induced SMAD signaling and gene regulation: consequences for extracellular matrix remodeling and wound healing. J Dermatol Sci. 2004 Aug;35(2):83-92. doi: 10.1016/j.jdermsci.2003.12.006.
93. Semenza, Gregg L. 2003. “Targeting HIF-1 for Cancer Therapy.” *Nature Reviews Cancer 2003 3:10* 3 (10): 721–32. <https://doi.org/10.1038/nrc1187>
94. Shi, Jianyun, Xianghui Ma, Yang Su, Yongli Song, YuhuaTian, Shukai Yuan, Xiuqing Zhang, et al. 2018. “MiR-31 Mediates Inflammatory Signaling to Promote Re-Epithelialization during Skin Wound Healing.” *Journal of Investigative Dermatology* 138 (10): 2253–63. <https://doi.org/10.1016/J.JID.2018.03.1521>.
95. Shi, Y., Shu, B., Yang, R., Xu, Y., Xing, B., Liu, J., Chen, L., Qi, S., Liu, X., Wang, P., Tang, J., & Xie, J. (2015). Wnt and Notch signaling pathway involved in wound healing by targeting c-Myc and Hes1 separately. *Stem cell research & therapy*, *6*(1), 120. <https://doi.org/10.1186/s13287-015-0103-4>
96. Shin, K. O., Choe, S. J., Uchida, Y., Kim, I., Jeong, Y., & Park, K. (2018). Ginsenoside Rb1 Enhances Keratinocyte Migration by a Sphingosine-1-Phosphate-Dependent Mechanism. *Journal of medicinal food*, *21*(11), 1129–1136. <https://doi.org/10.1089/jmf.2018.4246>
97. Shinde, Arti v., Claudio Humeres, and Nikolaos G. Frangogiannis. 2017. “The Role of α-Smooth Muscle Actin in Fibroblast-Mediated Matrix Contraction and Remodeling.” *BiochimicaetBiophysicaActa (BBA) - Molecular Basis of Disease* 1863 (1): 298–309. https://doi.org/10.1016/J.BBADIS.2016.11.006.
98. Song, I. S., Kang, S. S., Kim, E. S., Park, H. M., Choi, C. Y., Tchah, H., & Kim, J. Y. (2014). Heat shock protein 27 phosphorylation is involved in epithelial cell apoptosis as well as epithelial migration during corneal epithelial wound healing. *Experimental eye research*, *118*, 36–41. <https://doi.org/10.1016/j.exer.2013.11.002>
99. Su, D., Tsai, H. I., Xu, Z., Yan, F., Wu, Y., Xiao, Y., Liu, X., Wu, Y., Parvanian, S., Zhu, W., Eriksson, J. E., Wang, D., Zhu, H., Chen, H., & Cheng, F. (2019). Exosomal PD-L1 functions as an immunosuppressant to promote wound healing. *Journal of extracellular vesicles*, *9*(1), 1709262. <https://doi.org/10.1080/20013078.2019.1709262>
100. Su, T., Zhang, P., Zhao, F., & Zhang, S. (2021). Exosomal MicroRNAs Mediating Crosstalk Between Cancer Cells With Cancer-Associated Fibroblasts and Tumor-Associated Macrophages in the Tumor Microenvironment. *Frontiers in oncology*, *11*, 631703. <https://doi.org/10.3389/fonc.2021.631703>
101. Sun, S. Li H, Chen J, and Qian Q. 2017. “Lactic Acid: No Longer an Inert and End-Product of Glycolysis.” *Physiology (Bethesda, Md.)* 32 (6): 453–63. https://doi.org/10.1152/PHYSIOL.00016.2017.
102. Sun, X., Chuang, J. C., Kanchwala, M., Wu, L., Celen, C., Li, L., Liang, H., Zhang, S., Maples, T., Nguyen, L. H., Wang, S. C., Signer, R. A., Sorouri, M., Nassour, I., Liu, X., Xu, J., Wu, M., Zhao, Y., Kuo, Y. C., Wang, Z., … Zhu, H. (2016). Suppression of the SWI/SNF Component Arid1a Promotes Mammalian Regeneration. *Cell stem cell*, *18*(4), 456–466. https://doi.org/10.1016/j.stem.2016.03.001
103. Sundaram, Gopinath M., Shan Quah, and PrabhaSampath. 2018. “Cancer: The Dark Side of Wound Healing.” *The FEBS Journal* 285 (24): 4516–34. https://doi.org/10.1111/FEBS.14586.
104. Takaya, K., Aramaki-Hattori, N., Sakai, S., Okabe, K., Asou, T., &Kishi, K. (2022). Effect of All-trans Retinoic Acid on PanniculusCarnosus Muscle Regeneration in Fetal Mouse Wound Healing. *Plastic and reconstructive surgery. Global open*, *10*(9), e4533. https://doi.org/10.1097/GOX.0000000000004533
105. Tamura, Rodrigo Esaki, Jaíra Ferreira de Vasconcellos, Devanand Sarkar, Towia A Libermann, Paul B Fisher, and Luiz Fernando Zerbini. 2012. “GADD45 Proteins: Central Players in Tumorigenesis.” *Current Molecular Medicine* 12 (5): 634. /pmc/articles/PMC3797964/.
106. Thuraisingam, T., Xu, Y. Z., Eadie, K., Heravi, M., Guiot, M. C., Greemberg, R., Gaestel, M., & Radzioch, D. (2010). MAPKAPK-2 signaling is critical for cutaneous wound healing. *The Journal of investigative dermatology*, *130*(1), 278–286. <https://doi.org/10.1038/jid.2009.209>.
107. Tomasek, James J., Joel McRae, Gary K. Owens, and Carol J. Haaksma. 2005. “Regulation of α-Smooth Muscle Actin Expression in Granulation Tissue Myofibroblasts Is Dependent on the IntronicCArG Element and the Transforming Growth Factor-Β1 Control Element.” *The American Journal of Pathology* 166 (5): 1343. https://doi.org/10.1016/S0002-9440(10)62353-X.
108. Tscharntke, M., Pofahl, R., Krieg, T., &Haase, I. (2005). Ras-induced spreading and wound closure in human epidermal keratinocytes. *FASEB journal : official publication of the Federation of American Societies for Experimental Biology*, *19*(13), 1836–1838. https://doi.org/10.1096/fj.04-3327fje
109. Uchiyama, A., Nayak, S., Graf, R., Cross, M., Hasneen, K., Gutkind, J. S., Brooks, S. R., &Morasso, M. I. (2019). SOX2 Epidermal Overexpression Promotes Cutaneous Wound Healing via Activation of EGFR/MEK/ERK Signaling Mediated by EGFR Ligands. *The Journal of investigative dermatology*, *139*(8), 1809–1820.e8. <https://doi.org/10.1016/j.jid.2019.02.004>
110. van den Boorn, J. G., & Hartmann, G. (2014). Therapeutic tissue regeneration by a macrophage colony-stimulating factor Fc conjugate. *Molecular therapy : the journal of the American Society of Gene Therapy*, *22*(9), 1577–1579. <https://doi.org/10.1038/mt.2014.150>.
111. Vinaik, Roohi, Dalia Barayan, Christopher Auger, AbdikarimAbdullahi, and Marc G. Jeschke. 2020. “Regulation of Glycolysis and the Warburg Effect in Wound Healing.” *JCI Insight* 5 (17). https://doi.org/10.1172/JCI.INSIGHT.138949.
112. Vitre, B., Holland, A. J., Kulukian, A., Shoshani, O., Hirai, M., Wang, Y., Maldonado, M., Cho, T., Boubaker, J., Swing, D. A., Tessarollo, L., Evans, S. M., Fuchs, E., & Cleveland, D. W. (2015). Chronic centrosome amplification without tumorigenesis. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(46), E6321–E6330. https://doi.org/10.1073/pnas.1519388112
113. Wang, X. H., Guo, W., Qiu, W., Ao, L. Q., Yao, M. W., Xing, W., Yu, Y., Chen, Q., Wu, X. F., Li, Z., Hu, X. T., &Xu, X. (2022). Fibroblast-like cells Promote Wound Healing via PD-L1-mediated Inflammation Resolution. *International journal of biological sciences*, *18*(11), 4388–4399. <https://doi.org/10.7150/ijbs.69890>
114. WANG, Xia, and Yong LIN. 2008. “Tumor Necrosis Factor and Cancer, Buddies or Foes?” *ActaPharmacologicaSinica* 29 (11): 1275. <https://doi.org/10.1111/J.1745-7254.2008.00889.X>.
115. Wilkinson, H. N., & Hardman, M. J. (2020). Senescence in Wound Repair: Emerging Strategies to Target Chronic Healing Wounds. *Frontiers in cell and developmental biology*, *8*, 773. <https://doi.org/10.3389/fcell.2020.00773>
116. Wu, Shijia, Hong Lu, and YonghengBai. 2019. “Nrf2 in Cancers: A Double‐edged Sword.”*Cancer Medicine* 8 (5): 2252. https://doi.org/10.1002/CAM4.2101.
117. Wu, Yu-Sheng, and Shiu-Nan Chen. 2014. “Apoptotic Cell: Linkage of Inflammation and Wound Healing.” *Frontiers in Pharmacology* 0: 1. https://doi.org/10.3389/FPHAR.2014.00001.
118. X, Lu. 2017. “Impact of IL-12 in Cancer.” *Current Cancer Drug Targets* 17 (8). <https://doi.org/10.2174/1568009617666170427102729>
119. Xu, S., Xu, H., Wang, W., Li, S., Li, H., Li, T., Zhang, W., Yu, X., & Liu, L. (2019). The role of collagen in cancer: from bench to bedside. *Journal of translational medicine*, *17*(1), 309. https://doi.org/10.1186/s12967-019-2058-1
120. Xue M, Jackson CJ. Extracellular Matrix Reorganization During Wound Healing and Its Impact on Abnormal Scarring. Adv Wound Care (New Rochelle). 2015 Mar 1;4(3):119-136. doi: 10.1089/wound.2013.0485.
121. Yin, D., Zhang, X., Jiang, Q., Luo, S., Luo, Y., Cheng, P., Jin, G., & Liu, C. (2022). Epidermal stem cells participate in the repair of scalds via Nanog and Myc regulation. *Molecular medicine reports*, *26*(6), 364. <https://doi.org/10.3892/mmr.2022.12881>
122. Yu, Tao, Pei Ma, Deqin Wu, YongqianShu, and Wen Gao. 2018. “Functions and Mechanisms of MicroRNA-31 in Human Cancers.” *Biomedicine & Pharmacotherapy* 108 (December): 1162–69. <https://doi.org/10.1016/J.BIOPHA.2018.09.132>.
123. Yvon, AM Walker JW, Danowski B, Fagerstrom C, Khodjakov A, and Wadsworth P. 2002. “Centrosome Reorientation in Wound-Edge Cells Is Cell Type Specific.” *Molecular Biology of the Cell* 13 (6): 1871–80. https://doi.org/10.1091/MBC.01-11-0539.
124. Zehra, M., Mushtaq, S., Ghulam Musharraf, S., Ghani, R., & Ahmed, N. (2019). Association of Cyclin Dependent Kinase 10 and Transcription Factor 2 during Human Corneal Epithelial Wound Healing in vitro model. *Scientific reports*, *9*(1), 11802. <https://doi.org/10.1038/s41598-019-48092-6>
125. Zhao M. (2007). PTEN: a promising pharmacological target to enhance epithelial wound healing. *British journal of pharmacology*, *152*(8), 1141–1144. <https://doi.org/10.1038/sj.bjp.0707503>
126. Zhao R, Lin H, Bereza-Malcolm L, Clarke E, Jackson CJ, Xue M. Activated Protein C in Cutaneous Wound Healing: From Bench to Bedside. Int J Mol Sci. 2019 Feb 19;20(4):903. doi: 10.3390/ijms20040903.
127. Zhao, M., Mishra, L., & Deng, C. X. (2018). The role of TGF-β/SMAD4 signaling in cancer. *International journal of biological sciences*, *14*(2), 111–123. https://doi.org/10.7150/ijbs.23230
128. Zhao, M., Mishra, L., & Deng, C. X. (2018). The role of TGF-β/SMAD4 signaling in cancer. *International journal of biological sciences*, *14*(2), 111–123. <https://doi.org/10.7150/ijbs.23230>

Supplementary table 2:

**Wound healing functions of the cancer related genes**: We searched literature for the genes listed by COSMIC catalogue of somatic mutations in cancer (<https://cancer.sanger.ac.uk/cosmic/curation>) which is a list of genes that are somatically mutated and causally implicated in different types of cancers in humans. The genes already covered in supplementary table 1 are omitted from table 2. The reference giving evidence for some role of the gene in normal wound healing process is tabulated. It can be seen that out of the 264 genes listed by COSMOS, only for 21 (i.e. less than 8%), we did not find evidence for a direct role in wound healing. Out of the 21, eight are known to be involved in DNA repair (marked by \*).

Tabulated below are the genes from the catalogue, not covered by table 1 and at least 1 reference to literature for evidence of its involvement in wound healing.

|  |  |
| --- | --- |
| 1. ABL1 | Zulueta-Coarasa et al 2014 |
| 1. ACVR1 | Sorkin et al 2017 |
| 1. ACVR1B | Qiu et al 2011 |
| 1. ACVR2A | Munz et al 1999 |
| 1. AKT1 | Somnath et al 2008 |
| 1. ALK | Wallace et al 2013 |
| 1. AMER1/WTX | Li et al 2020 |
| 1. AR | Ashcroft 2002, Lai 2012 |
| 1. ARHGAP26 | Yao et al 2015 |
| 1. ARID1A | Sun et al 2016 |
| 1. ARID1B | Sun et al 2016 |
| 1. ARID2 | Sun et al 2016 |
| 1. AFXL1 | Wang et al 2021 |
| 1. ATM | Eickmeier et al 2014 |
| 1. ATP1A1 | Wu et al 2016 |
| 1. ATP2B3 | Talarico and Mangini 2007 |
| 1. ATR | Sharma et al 2023 |
| 1. ATRX | Danussi et al 2022 |
| 1. AXIN1 | Qin et al 2020, Peng et al 2021 |
| 1. AXIN2 | Whyte et al 2013 |
| 1. B2M | Sun et al 2016, Wang et al 2020, Molenaar et al 2021 |
| 1. BAP1 | Liu et al 2022, Yeu et al 2019. |
| 1. BARD1\* |  |
| 1. BCL9L | Sannino et al 2016, Zhang et al 2020 |
| 1. BCOR | Manjur et al 2021 |
| 1. BCORL1 | Xu et al 2018 |
| 1. BIRC3 | Riwaldt et al 2017 |
| 1. BLM | Chen 2016 |
| 1. BRAF | Escuin-Ordinas et al 2021 |
| 1. BRCA1 | Wei et al 2020, Portier et al 2021 |
| 1. BRCA2\* |  |
| 1. BTK | Yang et al 2019 |
| 1. CACNA1D |  |
| 1. CALR | Kepp 2020, |
| 1. CARD11 |  |
| 1. CASP8 | Lee et al 2009 |
| 1. CBL | Rush et al 2014 |
| 1. CBLB | Li et al 2022 |
| 1. CBLC | Li et al 2022 |
| 1. CD79A |  |
| 1. CD79B |  |
| 1. CDC73 | Yu et al 2022 |
| 1. CDH1 | Hwang et al 2012 |
| 1. CDK12 | DNA repair |
| 1. CDKN1B | Bencivenga et aL 2021 |
| 1. CDKN2A | liu w et.al 2020 |
| 1. CDKN2C |  |
| 1. CEBPA | Guo et al 2018 |
| 1. CHD4 | Shao et al 2020 |
| 1. CHEK2 |  |
| 1. CIC | Da Via 2020 |
| 1. CNOT3 |  |
| 1. COL2A1 | Almeida et al 2015 |
| 1. CREBBP | Holmstrom et al 2019 |
| 1. CRLF2 | Jiang et al 2019 |
| 1. CSF1R | Mac Donald et al 2010 |
| 1. CSF3R | Meier et al 2022 |
| 1. CTCF | Deonarine et al 2007 |
| 1. CTNNA1 | Chin et al 2022 |
| 1. CTNNB1 | Zhou et al 2021, Liu et al 2020 |
| 1. CUX1 | Latreille et al 2017 |
| 1. CXCR4 | Deonarine et al 2007, Chen et al 2021 |
| 1. CYLD | Lim et al 2012 |
| 1. DAXX | Deonarine et al 2007 |
| 1. DDB2 | Dardare et al 2022 |
| 1. DDR2 | Olaso et al 2011 |
| 1. DDX3X | Chen et al 2015 |
| 1. DGCR8 | Yi et al 2009 |
| 1. DICER1 | Ghatak et al 2015, Braun 2021 |
| 1. DNM2 | Willis et al 2021 |
| 1. DNMT3A | Bhatt et al 2022 |
| 1. DROSHA | Kuehbacher 2007 |
| 1. ELF3 | Oliver et al 2011 |
| 1. EP300 | Ring et al 2020 |
| 1. EPAS1 | Takeda 2004 |
| 1. ERBB3 | Okwueze et al 2007 |
| 1. ERBB4 | Frey et al 2009 |
| 1. ERCC2\* |  |
| 1. ERCC3\* |  |
| 1. ERCC5\* |  |
| 1. ESR1 | Qi et al 2020 |
| 1. ETNK1 | Li et al 2019 |
| 1. EZH2 | Osokine et al 2022, Jin et al 2022 |
| 1. FAS | Kou et al 2018, Guan et al 2000 |
| 1. FAT1 | Peng et al 2021 |
| 1. FAT4 | Jiang et al 2017 |
| 1. FBXO11 | Jin et al 2015 |
| 1. FBXW7 | Zhong et al 2021 |
| 1. FEN1 | Zhang et al 2020 |
| 1. FES |  |
| 1. FGFR1 | Prudovsky 2021 |
| 1. FGFR2 | Prudovsky 2021 |
| 1. FGFR3 | Prudovsky 2021 |
| 1. FGFR4 | Prudovsky 2021 |
| 1. FLT3 | Aydin 2016 |
| 1. FLT4 | Godfraind 2013 |
| 1. FOXA1 | Liu et al 2022 |
| 1. FOXL2 | Marongiu 2016 |
| 1. FUBP1 | Zhang et al 2021 |
| 1. GATA1 | Zhang et al 2016 |
| 1. GATA2 | Chiang 2014 |
| 1. GNA11 | Doçi et al 2017 |
| 1. GNAQ | Doçi et al 2017 |
| 1. GNAS | Jin et al 2019 |
| 1. GRIN2A |  |
| 1. H3F3A | Sun et al 2022 |
| 1. H3F3B | Chen et al 2021 |
| 1. HIF1A | Botusan et al 2008, Deonarine et al 2007 |
| 1. HIST1H3B | Gomes et al 2019 |
| 1. HNF1A | Zhu et al 2017 |
| 1. HRAS | Sugita et al 2018 |
| 1. IDH1 | Shen et al.2020 |
| 1. IDH2 | kim et al 2019 |
| 1. IKBKB | Ramirez et al 2018 |
| 1. IK2F1 |  |
| 1. IL6ST | hunter et al 2015 |
| 1. IL7R | Kim et al 2018 , Wee et al 2022 |
| 1. IRS4 | Kuai et al 2022 |
| 1. JAK2 | Wang et al 2022, Takahash et al 2021 |
| 1. JAK3 | Mishra et al 2013 |
| 1. KCNJ5 | Rezania et al 2016 |
| 1. KDM5C | Xiao et al 2022 |
| 1. KDM6A | Ni et al 2019 |
| 1. KDR | Santos et al 2007 |
| 1. KEAP-1 | Rabbani et al 2017 |
| 1. KIT | Huttunen et al 2002 |
| 1. KMT2A | Zhang et al 2017 |
| 1. KMT2C | Chiappetta et al 2019 |
| 1. KMT2D | Lv et al 2018 |
| 1. LEF1 | Phan et al 2020 |
| 1. LRP1B | Ni et al 2013 |
| 1. LZTRI | Ye et al 2023 |
| 1. MAP2K1 | Deonarine et al 2007 |
| 1. MAP2K2 | Halbrook et al 2017 |
| 1. MAP2K4 | Liu et al 2021 |
| 1. MAP3K1 | Wang et al 2022 |
| 1. MAP3K13 | Chen et al 2018 |
| 1. MAPK1 | Jin et al 2022 |
| 1. MAX |  |
| 1. MED12 | Li et al 2020 |
| 1. MEN1 | Luo et al 2021 |
| 1. MLH1 | Fukuhara etal 2014 |
| 1. MPL |  |
| 1. MSH2\* |  |
| 1. MSH6 | Chen et al 2019 |
| 1. MTOR | Squarize et al 2010 |
| 1. MUC6 | Buisine et al 2001 |
| 1. MYC |  |
| 1. MYCN | Hasan et al 2013 , Sradhanjali et al 2021 |
| 1. MYD88 | Macedo et al 2007 |
| 1. MYOD1 | Wu et al 2020 |
| 1. NCOA2 | Mullany et al 2021 |
| 1. NCOR1 | Geiger et al 2020 |
| 1. NCOR2 | Wu et al 2018 |
| 1. NF1 | Kolvunen et al 2005 |
| 1. NF2 | Jia et al 2022 |
| 1. NFE2L2 | Hiebert P. and Werner S. 2019 |
| 1. NFKBIE | Qian et al 2022 |
| 1. NOTCH1 | Shao et al 2020 |
| 1. NOTCH2 | Kimtall et al 2017 |
| 1. NPM1 | Loubeau et al 2014 |
| 1. NRAS | Liu et al 2017 |
| 1. NTSC2 | Li et al 2022 |
| 1. NTRK3 | Xiong et al 2016 |
| 1. PAX5 | Hosokawa K et al 2021 |
| 1. PBRM1 | Mota et al 2019 |
| 1. PDGFRA | Yao et al 2022 |
| 1. PHF6 | Zhuang et al 2021 |
| 1. PHOX3B |  |
| 1. PIK3CA | Kim et al 2020 |
| 1. PIK3CB | Wang et al 2022 |
| 1. PIK3R1 | Ai et al 2018 |
| 1. PLCG1 | Seo et al 2022 |
| 1. POLD1 | Shen et al 2017 |
| 1. POLE\* |  |
| 1. POLQ | Pan et al 2021 |
| 1. POTI\* |  |
| 1. PPM1D | Lu et al 2020 |
| 1. PPP2R1A | Shi et al 2022 |
| 1. PPP6C | Wang et al 2020 |
| 1. PRDM1 | Ranoni et al 2021 |
| 1. PREX2 | Yang et al 2019 |
| 1. PRKACA | Simpson et al 2008 |
| 1. PRKAR1A |  |
| 1. PRKD1 | Luef et al 2016 |
| 1. PTCH1 | Lisovsky et al 2016 |
| 1. PTK6 | Ito et al 2016, Qiu et al 2018 |
| 1. PTPN11 | Xu et al 2022 |
| 1. PTPN13 | Hamyeh et al 2020 |
| 1. PTPRB | Weng et al 2019 |
| 1. PTPRT | Wang et al 2019 |
| 1. OKI | Wang et al 2021 |
| 1. RAC1 | Tang et al 2020 ,Dipersio C.M 2007 |
| 1. RAD21 | Gou et al 2022 |
| 1. RBM10 | Cao et al 2023 , Cao et al 2022 |
| 1. RECQL4 | Guo et al 2020 |
| 1. RET | Lisse et al 2020 |
| 1. RHOA | Desai et al 2004 |
| 1. RNF43 | Radaszkiewicz et al 2021 |
| 1. RPL10 | Heter et al 2019 |
| 1. RPL5 | Zhang et al 2022 |
| 1. RUNX1 | Li et al 2019 |
| 1. SALL4 | Erickson et al 2016 |
| 1. SDHA |  |
| 1. SETBP1 | Kimball et al 2019 |
| 1. SETD2 | Li et al 2021 |
| 1. SETDB1 | Han et al 2020, Zakharova et al 2022 |
| 1. SF3B1 | Guo et al 2022, Randazzo et al 2021 |
| 1. SH2B3 | Toma et al 2022 |
| 1. SIX2 | Noizet et al 2016 |
| 1. SMAD2 | Tomikawa et al 2012 |
| 1. SMAD3 | Ashcroft et al 1999 |
| 1. SMARCA4 | Kim et al 2021 |
| 1. SMARCB1 | Hong et al 2021 |
| 1. SMARCD1 | Tamai et al 2022 |
| 1. SMO | Frech et al 2022 |
| 1. SOCS1 | Feng et al 2016 |
| 1. SPEN | Li et al 2020 |
| 1. SPOP | Tan et al 2019 , Chen et al 2022 |
| 1. SRSF2 | Yu et al 2020 |
| 1. STAG2 | Surdez et al 2021 |
| 1. STAT5B | Bernaciak et al 2009 |
| 1. STK11 | Malhotra et al 2022 |
| 1. SUFU | Yang et al 2020 |
| 1. TBL1XR1 | Liu et al 2015 |
| 1. TBX3 | Ichijo et al 2017, Ichijo et al 2021 |
| 1. TENT5C | Kazazian et al 2020 |
| 1. TET2 | Tan et al 2016 |
| 1. TGFBR2 | Tauriello et al |
| 1. TNFAIP3 | Shamilov et al 2020 |
| 1. TNFRSF14 | Li et al 2021 |
| 1. TP63 | Harazono et al 2022 |
| 1. TRAF7 | Zhang et al 2021 |
| 1. TRRAP | Huang et al 2021 |
| 1. TSC1 | Squarize et al 2010 |
| 1. TSC2 | Larson et al 2010 |
| 1. TSHR | Feng et al 2021 |
| 1. U2AF1 |  |
| 1. UBR5 | Shin et al 2020 |
| 1. USP8 | Shin et al 2020 |
| 1. WT1 | Lopez-Baez 2018 |
| 1. XPO1 | Wang and Liu 2019 |
| 1. ZFHX3 | Dayoub et al 2022 |
| 1. ZRSR2 |  |

References to table 2:

1. Ai, X., Xiang, L., Huang, Z. *et al.* Overexpression of *PIK3R1* promotes hepatocellular carcinoma progression. *Biol Res* **51**, 52 (2018). <https://doi.org/10.1186/s40659-018-0202-7>
2. Alexander Willis, Seth J. Corey, Carlos A. Murga-Zamalloa, Saman Karimi, Karam Khaddour, Elizabeth A. Eklund, Yolande Chen, Dynamin-2 Deficiency Causes Neutropenia and Dysplastic Bone Marrow Changes in an Age and Sex Dependent Manner in Mice, Blood,Volume 138, Supplement 1,2021,Page 992,ISSN 0006-4971,<https://doi.org/10.1182/blood-2021-154010>.
3. Almeida, L., Oliveira, J., Guimarães, L. H., Carvalho, E. M., Blackwell, J. M., & Castellucci, L. (2015). Wound healing genes and susceptibility to cutaneous leishmaniasis in Brazil: role of COL1A1. *Infection, genetics and evolution : journal of molecular epidemiology and evolutionary genetics in infectious diseases*, *30*, 225–229. <https://doi.org/10.1016/j.meegid.2014.12.034>
4. Ashcroft, G. S., & Mills, S. J. (2002). Androgen receptor-mediated inhibition of cutaneous wound healing. The Journal of clinical investigation, 110(5), 615–624. <https://doi.org/10.1172/JCI15704>
5. Ashcroft, G. S., Mills, S. J., Flanders, K. C., Lyakh, L. A., Anzano, M. A., Gilliver, S. C., & Roberts, A. B. (2003). Role of Smad3 in the hormonal modulation of in vivo wound healing responses. *Wound repair and regeneration : official publication of the Wound Healing Society [and] the European Tissue Repair Society*, *11*(6), 468–473. <https://doi.org/10.1046/j.1524-475x.2003.11614.x>
6. Ashcroft, G. S., Yang, X., Glick, A. B., Weinstein, M., Letterio, J. L., Mizel, D. E., Anzano, M., Greenwell-Wild, T., Wahl, S. M., Deng, C., & Roberts, A. B. (1999). Mice lacking Smad3 show accelerated wound healing and an impaired local inflammatory response. *Nature cell biology*, *1*(5), 260–266. <https://doi.org/10.1038/12971>
7. Aydin, M. M., Bayin, N. S., Acun, T., Yakicier, M. C., & Akçali, K. C. (2016). Role of FLT3 in the proliferation and aggressiveness of hepatocellular carcinoma. Turkish journal of medical sciences, 46(2), 572–581. <https://doi.org/10.3906/sag-1501-173>
8. Bencivenga, D., Stampone, E., Aulitto, A., Tramontano, A., Barone, C., Negri, A., Roberti, D., Perrotta, S., Della Ragione, F., & Borriello, A. (2021). A cancer-associated CDKN1B mutation induces p27 phosphorylation on a novel residue: a new mechanism for tumor suppressor loss-of-function. Molecular oncology, 15(4), 915–941. <https://doi.org/10.1002/1878-0261.12881>
9. Bernaciak, T. M., Zareno, J., Parsons, J. T., & Silva, C. M. (2009). A novel role for signal transducer and activator of transcription 5b (STAT5b) in beta1-integrin-mediated human breast cancer cell migration. *Breast cancer research : BCR*, *11*(4), R52. <https://doi.org/10.1186/bcr2341>
10. Bhatt T, Dey R, Hegde A, et al. Initiation of wound healing is regulated by the convergence of mechanical and epigenetic cues. PLoS Biol. 2022;20(9):e3001777. Published 2022 Sep 16. doi:10.1371/journal.pbio.3001777
11. Botusan, I. R., Sunkari, V. G., Savu, O., Catrina, A. I., Grünler, J., Lindberg, S., Pereira, T., Ylä-Herttuala, S., Poellinger, L., Brismar, K., & Catrina, S. B. (2008). Stabilization of HIF-1alpha is critical to improve wound healing in diabetic mice. Proceedings of the National Academy of Sciences of the United States of America, 105(49), 19426–19431. <https://doi.org/10.1073/pnas.0805230105>
12. Braun H, Hauke M, Ripperger A, et al. Impact of DICER1 and DROSHA on the Angiogenic Capacity of Human Endothelial Cells. Int J Mol Sci. 2021;22(18):9855. Published 2021 Sep 12. doi:10.3390/ijms22189855
13. Buisine, M. P., Desreumaux, P., Leteurtre, E., Copin, M. C., Colombel, J. F., Porchet, N., & Aubert, J. P. (2001). Mucin gene expression in intestinal epithelial cells in Crohn's disease. *Gut*, *49*(4), 544–551. https://doi.org/10.1136/gut.49.4.544
14. Cao, Y., Di, X., Cong, S., Tian, C., Wang, Y., Jin, X., Zhao, M., Zhou, X., Li, R., & Wang, K. (2023). RBM10 recruits METTL3 to induce N6-methyladenosine-MALAT1-dependent modification, inhibiting the invasion and migration of NSCLC. *Life sciences*, *315*, 121359. <https://doi.org/10.1016/j.lfs.2022.121359>
15. Cao, Y., Geng, J., Wang, X., Meng, Q., Xu, S., Lang, Y., Zhou, Y., Qi, L., Wang, Z., Wei, Z., Yu, Y., Jin, S., & Pan, B. (2022). RNA-binding motif protein 10 represses tumor progression through the Wnt/β- catenin pathway in lung adenocarcinoma. *International journal of biological sciences*, *18*(1), 124–139. https://doi.org/10.7150/ijbs.63598
16. Chen HH, Yu HI, Cho WC, Tarn WY. DDX3 modulates cell adhesion and motility and cancer cell metastasis via Rac1-mediated signaling pathway. Oncogene. 2015;34(21):2790-2800. doi:10.1038/onc.2014.190
17. Chen, H., Li, G., Liu, Y., Ji, S., Li, Y., Xiang, J., Zhou, L., Gao, H., Zhang, W., Sun, X., Fu, X., & Li, B. (2021). Pleiotropic Roles of CXCR4 in Wound Repair and Regeneration. Frontiers in immunology, 12, 668758. <https://doi.org/10.3389/fimmu.2021.668758>
18. Chen, K. J., Li, Q., Wen, C. M., Duan, Z. X., Zhang, J. Y., Xu, C., & Wang, J. M. (2016). Bleomycin (BLM) Induces Epithelial-to-Mesenchymal Transition in Cultured A549 Cells via the TGF-β/Smad Signaling Pathway. Journal of Cancer, 7(11), 1557–1564. <https://doi.org/10.7150/jca.15566>
19. Chen, M., Geoffroy, C. G., Meves, J. M., Narang, A., Li, Y., Nguyen, M. T., Khai, V. S., Kong, X., Steinke, C. L., Carolino, K. I., Elzière, L., Goldberg, M. P., Jin, Y., & Zheng, B. (2018). Leucine Zipper-Bearing Kinase Is a Critical Regulator of Astrocyte Reactivity in the Adult Mammalian CNS. *Cell reports*, *22*(13), 3587–3597. <https://doi.org/10.1016/j.celrep.2018.02.102>
20. Chen, Y., Liu, P., Sun, P., Jiang, J., Zhu, Y., Dong, T., Cui, Y., Tian, Y., An, T., Zhang, J., Li, Z., & Yang, X. (2019). Oncogenic MSH6-CXCR4-TGFB1 Feedback Loop: A Novel Therapeutic Target of Photothermal Therapy in Glioblastoma Multiforme. *Theranostics*, *9*(5), 1453–1473. <https://doi.org/10.7150/thno.29987>
21. Chen, Y., Song, S., Zhang, L., & Zhang, Y. (2021). Circular RNA hsa\_circ\_0091579 facilitates the Warburg effect and malignancy of hepatocellular carcinoma cells via the miR-624/H3F3B axis. Clinical & translational oncology : official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico, 23(11), 2280–2292. <https://doi.org/10.1007/s12094-021-02627-4>
22. Chen, Z., Li, Z., Li, C., Li, B., Wang, H., Nong, D., Li, X., Huang, G., Lin, J., & Li, W. (2022). Speckle-type POZ protein could play a potential inhibitory role in human renal cell carcinoma. *BMC cancer*, *22*(1), 1277. https://doi.org/10.1186/s12885-022-10340-w
23. Chi, Q., Xu, H., Song, D., Wang, Z., Wang, Z., & Ma, G. (2020). α-E-Catenin (CTNNA1) Inhibits Cell Proliferation, Invasion and EMT of Bladder Cancer. Cancer management and research, 12, 12747–12758. <https://doi.org/10.2147/CMAR.S259269>
24. Chiang, Y. T., Wang, K., Fazli, L., Qi, R. Z., Gleave, M. E., Collins, C. C., Gout, P. W., & Wang, Y. (2014). GATA2 as a potential metastasis-driving gene in prostate cancer. Oncotarget, 5(2), 451–461. <https://doi.org/10.18632/oncotarget.1296>
25. Chiappetta, C., Carletti, R., Della Rocca, C., & Di Cristofano, C. (2019). KMT2C modulates migration and invasion processes in osteosarcoma cell lines. Pathology, research and practice, 215(10), 152534. <https://doi.org/10.1016/j.prp.2019.152534>
26. Da Vià, M. C., Solimando, A. G., Garitano-Trojaola, A., Barrio, S., Munawar, U., Strifler, S., Haertle, L., Rhodes, N., Teufel, E., Vogt, C., Lapa, C., Beilhack, A., Rasche, L., Einsele, H., & Kortüm, K. M. (2020). CIC Mutation as a Molecular Mechanism of Acquired Resistance to Combined BRAF-MEK Inhibition in Extramedullary Multiple Myeloma with Central Nervous System Involvement. *The oncologist*, *25*(2), 112–118. <https://doi.org/10.1634/theoncologist.2019-0356>
27. Danussi, C., Bose, P., Parthasarathy, P. T., Silberman, P. C., Van Arnam, J. S., Vitucci, M., Tang, O. Y., Heguy, A., Wang, Y., Chan, T. A., Riggins, G. J., Sulman, E. P., Lang, F. F., Creighton, C. J., Deneen, B., Miller, C. R., Picketts, D. J., Kannan, K., & Huse, J. T. (2022). Author Correction: Atrx inactivation drives disease-defining phenotypes in glioma cells of origin through global epigenomic remodeling. Nature communications, 13(1), 190. <https://doi.org/10.1038/s41467-021-27820-5>
28. Dardare, J., Witz, A., Betz, M., Francois, A., Meras, M., Lamy, L., Lambert, A., Grandemange, S., Husson, M., Rouyer, M., Demange, J., Merlin, J. L., Harlé, A., & Gilson, P. (2022). DDB2 represses epithelial-to-mesenchymal transition and sensitizes pancreatic ductal adenocarcinoma cells to chemotherapy. *Frontiers in oncology*, *12*, 1052163. https://doi.org/10.3389/fonc.2022.1052163
29. Dayoub, A., Fokin, A. I., Lomakina, M. E., James, J., Plays, M., Jacquin, T., Novikov, N. M., Vorobyov, R. S., Schegoleva, A. A., Rysenkova, K. D., Gaboriaud, J., Leonov, S. V., Denisov, E. V., Gautreau, A. M., & Alexandrova, A. Y. (2022). Inactivation of PTEN and ZFHX3 in Mammary Epithelial Cells Alters Patterns of Collective Cell Migration. *International journal of molecular sciences*, *24*(1), 313. https://doi.org/10.3390/ijms24010313
30. Dayoub, A., Fokin, A. I., Lomakina, M. E., James, J., Plays, M., Jacquin, T., Novikov, N. M., Vorobyov, R. S., Schegoleva, A. A., Rysenkova, K. D., Gaboriaud, J., Leonov, S. V., Denisov, E. V., Gautreau, A. M., & Alexandrova, A. Y. (2022). Inactivation of PTEN and ZFHX3 in Mammary Epithelial Cells Alters Patterns of Collective Cell Migration. International journal of molecular sciences, 24(1), 313.<https://doi.org/10.3390/ijms24010313>
31. Deonarine, K., Panelli, M. C., Stashower, M. E., Jin, P., Smith, K., Slade, H. B., Norwood, C., Wang, E., Marincola, F. M., & Stroncek, D. F. (2007). Gene expression profiling of cutaneous wound healing. Journal of translational medicine, 5, 11. https://doi.org/10.1186/1479-5876-5-11
32. Desai, L. P., Aryal, A. M., Ceacareanu, B., Hassid, A., & Waters, C. M. (2004). RhoA and Rac1 are both required for efficient wound closure of airway epithelial cells. *American journal of physiology. Lung cellular and molecular physiology*, *287*(6), L1134–L1144. https://doi.org/10.1152/ajplung.00022.2004
33. DiPersio C. M. (2007). Double duty for Rac1 in epidermal wound healing. *Science's STKE : signal transduction knowledge environment*, *2007*(391), pe33. <https://doi.org/10.1126/stke.3912007pe33>
34. Doçi, C. L., Mikelis, C. M., Callejas-Valera, J. L., Hansen, K. K., Molinolo, A. A., Inoue, A., Offermanns, S., & Gutkind, J. S. (2017). Epidermal loss of Gαq confers a migratory and differentiation defect in keratinocytes. PloS one, 12(3), e0173692. <https://doi.org/10.1371/journal.pone.0173692>
35. Eickmeier, O., Kim, S. Y., Herrmann, E., Döring, C., Duecker, R., Voss, S., Wehner, S., Hölscher, C., Pietzner, J., Zielen, S., & Schubert, R. (2014). Altered mucosal immune response after acute lung injury in a murine model of Ataxia Telangiectasia. *BMC pulmonary medicine*, *14*, 93. <https://doi.org/10.1186/1471-2466-14-93>
36. Erickson, J. R., Gearhart, M. D., Honson, D. D., Reid, T. A., Gardner, M. K., Moriarity, B. S., & Echeverri, K. (2016). A novel role for SALL4 during scar-free wound healing in axolotl. *NPJ Regenerative medicine*, *1*, 16016–. https://doi.org/10.1038/npjregenmed.2016.16
37. Escuin-Ordinas, H., Liu, Y., Sun, L., Hugo, W., Dimatteo, R., Huang, R. R., Krystofinski, P., Azhdam, A., Lee, J., Comin-Anduix, B., Cochran, A. J., Lo, R. S., Segura, T., Scumpia, P. O., & Ribas, A. (2021). Wound healing with topical BRAF inhibitor therapy in a diabetic model suggests tissue regenerative effects. PloS one, 16(6), e0252597. <https://doi.org/10.1371/journal.pone.0252597>
38. Feng, F., Han, H., Wu, S., & Wang, H. (2021). Crosstalk Between Abnormal TSHR Signaling Activation and PTEN/PI3K in the Dedifferentiation of Thyroid Cancer Cells. Frontiers in oncology, 11, 718578. <https://doi.org/10.3389/fonc.2021.718578>
39. Feng, Y., Sanders, A. J., Ruge, F., Morris, C. A., Harding, K. G., & Jiang, W. G. (2016). Expression of the SOCS family in human chronic wound tissues: Potential implications for SOCS in chronic wound healing. *International journal of molecular medicine*, *38*(5), 1349–1358. <https://doi.org/10.3892/ijmm.2016.2733>
40. Frech, S., Forsthuber, A., Korosec, A., Lipp, K., Kozumov, V., & Lichtenberger, B. M. (2022). Hedgehog Signaling in Papillary Fibroblasts Is Essential for Hair Follicle Regeneration during Wound Healing. *The Journal of investigative dermatology*, *142*(6), 1737–1748.e5. <https://doi.org/10.1016/j.jid.2021.11.026>
41. Frey MR, Edelblum KL, Mullane MT, Liang D, Polk DB. The ErbB4 growth factor receptor is required for colon epithelial cell survival in the presence of TNF. Gastroenterology. 2009;136(1):217-226. doi:10.1053/j.gastro.2008.09.023
42. Fukuhara, S., Chang, I., Mitsui, Y., Chiyomaru, T., Yamamura, S., Majid, S., Saini, S., Hirata, H., Deng, G., Gill, A., Wong, D. K., Shiina, H., Nonomura, N., Dahiya, R., & Tanaka, Y. (2014). DNA mismatch repair gene MLH1 induces apoptosis in prostate cancer cells. Oncotarget, 5(22), 11297–11307. https://doi.org/10.18632/oncotarget.2315
43. Geiger, M. A., Guillaumon, A. T., Paneni, F., Matter, C. M., & Stein, S. (2020). Role of the Nuclear Receptor Corepressor 1 (NCOR1) in Atherosclerosis and Associated Immunometabolic Diseases. *Frontiers in immunology*, *11*, 569358. <https://doi.org/10.3389/fimmu.2020.569358>
44. Ghatak S, Chan YC, Khanna S, et al. Barrier Function of the Repaired Skin Is Disrupted Following Arrest of Dicer in Keratinocytes. Mol Ther. 2015;23(7):1201-1210. doi:10.1038/mt.2015.65
45. Godfraind, C., Calicchio, M. L., & Kozakewich, H. (2013). Pyogenic granuloma, an impaired wound healing process, linked to vascular growth driven by FLT4 and the nitric oxide pathway. Modern pathology : an official journal of the United States and Canadian Academy of Pathology, Inc, 26(2), 247–255. <https://doi.org/10.1038/modpathol.2012.148>
46. Gomes, A. P., Ilter, D., Low, V., Rosenzweig, A., Shen, Z. J., Schild, T., Rivas, M. A., Er, E. E., McNally, D. R., Mutvei, A. P., Han, J., Ou, Y. H., Cavaliere, P., Mullarky, E., Nagiec, M., Shin, S., Yoon, S. O., Dephoure, N., Massagué, J., Melnick, A. M., … Blenis, J. (2019). Dynamic Incorporation of Histone H3 Variants into Chromatin Is Essential for Acquisition of Aggressive Traits and Metastatic Colonization. *Cancer cell*, *36*(4), 402–417.e13. <https://doi.org/10.1016/j.ccell.2019.08.006>
47. Guo, L., Li, Y., Zhao, C., Peng, J., Song, K., Chen, L., Zhang, P., Ma, H., Yuan, C., Yan, S., Fang, Y., & Kong, B. (2020). RECQL4, Negatively Regulated by miR-10a-5p, Facilitates Cell Proliferation and Invasion via MAFB in Ovarian Cancer. *Frontiers in oncology*, *10*, 524128. https://doi.org/10.3389/fonc.2020.524128
48. Gou, R., Li, X., Dong, H., Hu, Y., Liu, O., Liu, J., & Lin, B. (2022). RAD21 Confers Poor Prognosis and Affects Ovarian Cancer Sensitivity to Poly(ADP-Ribose)Polymerase Inhibitors Through DNA Damage Repair. *Frontiers in oncology*, *12*, 936550. <https://doi.org/10.3389/fonc.2022.936550>
49. Guan DW, Ohshima T, Kondo T. Immunohistochemical study on Fas and Fas ligand in skin wound healing. Histochem J. 2000;32(2):85-91. doi:10.1023/a:1004058010500
50. Guo, J., Li, C., Fang, Q., Liu, Y., Wang, D., Chen, Y., Xie, W., & Zhang, Y. (2022). The SF3B1R625H mutation promotes prolactinoma tumor progression through aberrant splicing of DLG1. *Journal of experimental & clinical cancer research : CR*, *41*(1), 26. <https://doi.org/10.1186/s13046-022-02245-0>
51. Guo, Y., Ma, Y., Hu, X., Song, R., Zhu, L., & Zhong, M. (2018). Long non-coding RNA CEBPA-AS1 correlates with poor prognosis and promotes tumorigenesis via CEBPA/Bcl2 in oral squamous cell carcinoma. Cancer biology & therapy, 19(3), 205–213. <https://doi.org/10.1080/15384047.2017.1416276>
52. Halbrook, C. J., Wen, H. J., Ruggeri, J. M., Takeuchi, K. K., Zhang, Y., di Magliano, M. P., & Crawford, H. C. (2017). Mitogen-activated Protein Kinase Kinase Activity Maintains Acinar-to-Ductal Metaplasia and Is Required for Organ Regeneration in Pancreatitis. Cellular and molecular gastroenterology and hepatology, 3(1), 99–118. <https://doi.org/10.1016/j.jcmgh.2016.09.009>
53. Hamyeh, M., Bernex, F., Larive, R. M., Naldi, A., Urbach, S., Simony-Lafontaine, J., Puech, C., Bakhache, W., Solassol, J., Coopman, P. J., Hendriks, W. J. A. J., & Freiss, G. (2020). PTPN13 induces cell junction stabilization and inhibits mammary tumor invasiveness. *Theranostics*, *10*(3), 1016–1032. <https://doi.org/10.7150/thno.38537>
54. Han, S., Zhen, W., Guo, T., Zou, J., & Li, F. (2020). SETDB1 promotes glioblastoma growth via CSF-1-dependent macrophage recruitment by activating the AKT/mTOR signaling pathway. *Journal of experimental & clinical cancer research : CR*, *39*(1), 218. https://doi.org/10.1186/s13046-020-01730-8 (Retraction published J Exp Clin Cancer Res. 2022 Sep 21;41(1):280)
55. Harazono, Yosuke & Morita, Keiichi & Tonouchi, Erina & Anzai, Eri & Takahara, Namiaki & Kohmoto, Tomohiro & Imoto, Issei & Yoda, Tetsuya. (2022). TP63 mutation mapping information in TP63 mutation-associated syndromes. Advances in Oral and Maxillofacial Surgery. 5. 100253. 10.1016/j.adoms.2022.100253.
56. Hasan, M. K., Nafady, A., Takatori, A., Kishida, S., Ohira, M., Suenaga, Y., Hossain, S., Akter, J., Ogura, A., Nakamura, Y., Kadomatsu, K., & Nakagawara, A. (2013). ALK is a MYCN target gene and regulates cell migration and invasion in neuroblastoma. *Scientific reports*, *3*, 3450. https://doi.org/10.1038/srep03450
57. Herter, E. K., Li, D., Toma, M. A., Vij, M., Li, X., Visscher, D., Wang, A., Chu, T., Sommar, P., Blomqvist, L., Berglund, D., Ståhle, M., Wikstrom, J. D., & Xu Landén, N. (2019). WAKMAR2, a Long Noncoding RNA Downregulated in Human Chronic Wounds, Modulates Keratinocyte Motility and Production of Inflammatory Chemokines. *The Journal of investigative dermatology*, *139*(6), 1373–1384. https://doi.org/10.1016/j.jid.2018.11.033
58. Hiebert, P., & Werner, S. (2019). Regulation of Wound Healing by the NRF2 Transcription Factor-More Than Cytoprotection. *International journal of molecular sciences*, *20*(16), 3856. <https://doi.org/10.3390/ijms20163856>
59. Holmstrom, S. R., Wijayatunge, R., McCrum, K., Mgbemena, V. E., & Ross, T. S. (2019). Functional Interaction of BRCA1 and CREBBP in Murine Hematopoiesis. iScience, 19, 809–820. <https://doi.org/10.1016/j.isci.2019.08.031>
60. Hong, S. H., Son, K. H., Ha, S. Y., Wee, T. I., Choi, S. K., Won, J. E., Han, H. D., Ro, Y., Park, Y. M., Eun, J. W., Nam, S. W., Han, J. W., Kang, K., & You, J. S. (2021). Nucleoporin 210 Serves a Key Scaffold for SMARCB1 in Liver Cancer. *Cancer research*, *81*(2), 356–370. https://doi.org/10.1158/0008-5472.CAN-20-0568
61. Hosokawa, K., Ishimaru, H., Watanabe, T., & Fujimuro, M. (2021). Pax5 mediates the transcriptional activation of the CD81 gene. *Scientific reports*, *11*(1), 22919. https://doi.org/10.1038/s41598-021-02082-9
62. Huang, X., Tang, T., Zhang, G., & Liang, T. (2021). Identification of tumor antigens and immune subtypes of cholangiocarcinoma for mRNA vaccine development. *Molecular cancer*, *20*(1), 50. https://doi.org/10.1186/s12943-021-01342-6
63. Hunter, C. A., & Jones, S. A. (2015). IL-6 as a keystone cytokine in health and disease. Nature immunology, 16(5), 448–457. <https://doi.org/10.1038/ni.3153>
64. Huttunen, M., Naukkarinen, A., Horsmanheimo, M. et al. Transient production of stem cell factor in dermal cells but increasing expression of Kit receptor in mast cells during normal wound healing. Arch Dermatol Res 294, 324–330 (2002). <https://doi.org/10.1007/s00403-002-0331-1>
65. Hwang, S., Zimmerman, N. P., Agle, K. A., Turner, J. R., Kumar, S. N., & Dwinell, M. B. (2012). E-cadherin is critical for collective sheet migration and is regulated by the chemokine CXCL12 protein during restitution. The Journal of biological chemistry, 287(26), 22227–22240. <https://doi.org/10.1074/jbc.M112.367979>
66. Ichijo, R., Kabata, M., Kidoya, H., Muramatsu, F., Ishibashi, R., Abe, K., Tsutsui, K., Kubo, H., Iizuka, Y., Kitano, S., Miyachi, H., Kubota, Y., Fujiwara, H., Sada, A., Yamamoto, T., & Toyoshima, F. (2021). Vasculature-driven stem cell population coordinates tissue scaling in dynamic organs. *Science advances*, *7*(7), eabd2575. <https://doi.org/10.1126/sciadv.abd2575>
67. Ichijo, R., Kobayashi, H., Yoneda, S., Iizuka, Y., Kubo, H., Matsumura, S., Kitano, S., Miyachi, H., Honda, T., & Toyoshima, F. (2017). Tbx3-dependent amplifying stem cell progeny drives interfollicular epidermal expansion during pregnancy and regeneration. *Nature communications*, *8*(1), 508. <https://doi.org/10.1038/s41467-017-00433-7>
68. Ito, K., Park, S. H., Nayak, A., Byerly, J. H., & Irie, H. Y. (2016). PTK6 Inhibition Suppresses Metastases of Triple-Negative Breast Cancer via SNAIL-Dependent E-Cadherin Regulation. *Cancer research*, *76*(15), 4406–4417. <https://doi.org/10.1158/0008-5472.CAN-15-3445>
69. Jensen MA, Wilkinson JE, Krainer AR. 2014. Splicing factor SRSF6 promotes hyperplasia of sensitized skin. Nat Struct Mol Biol 21: 189–197
70. Jia, Z., Yang, S., Li, M., Lei, Z., Ding, X., Fan, M., Wang, D., Xie, D., Zhou, H., Qiu, Y., Zhuang, Q., Li, D., Yang, W., Qi, X., Cang, X., Zhao, J. W., Wang, W., Lin, A., & Yan, Q. (2022). A novel NF2 splicing mutant causes neurofibromatosis type 2 via liquid-liquid phase separation with large tumor suppressor and Hippo pathway. *iScience*, *25*(11), 105275. <https://doi.org/10.1016/j.isci.2022.105275>
71. Jiang X, Liu Z, Xia Y, et al. Low FAT4 expression is associated with a poor prognosis in gastric cancer patients. Oncotarget. 2017;9(4):5137-5154. Published 2017 Dec 26. doi:10.18632/oncotarget.23702
72. Jiang, M., Zou, X., & Lu, L. (2019). Potential efficacy and prognosis of silencing the CRLF2‑mediated AKT/mTOR pathway in pediatric acute B‑cell lymphoblastic leukemia. Oncology reports, 41(2), 885–894. <https://doi.org/10.3892/or.2018.6917>
73. Jin F, Li M, Li X, et al. PlncRNA-1 stimulates hair follicle stem cell differentiation in wound healing via the EZH2/ZEB1/MAPK1 axis [published online ahead of print, 2022 Jan 5]. J Gene Med. 2022;e3408. doi:10.1002/jgm.3408
74. Jin, X., Zhu, L., Cui, Z., Tang, J., Xie, M., & Ren, G. (2019). Elevated expression of GNAS promotes breast cancer cell proliferation and migration via the PI3K/AKT/Snail1/E-cadherin axis. Clinical & translational oncology : official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico, 21(9), 1207–1219. <https://doi.org/10.1007/s12094-019-02042-w>
75. Jin, Y., Shenoy, A. K., Doernberg, S., Chen, H., Luo, H., Shen, H., Lin, T., Tarrash, M., Cai, Q., Hu, X., Fiske, R., Chen, T., Wu, L., Mohammed, K. A., Rottiers, V., Lee, S. S., & Lu, J. (2015). FBXO11 promotes ubiquitination of the Snail family of transcription factors in cancer progression and epidermal development. Cancer letters, 362(1), 70–82. <https://doi.org/10.1016/j.canlet.2015.03.037>
76. Kepp, O., Liu, P., Zhao, L., Plo, I., & Kroemer, G. (2020). Surface-exposed and soluble calreticulin: conflicting biomarkers for cancer prognosis. Oncoimmunology, 9(1), 1792037. https://doi.org/10.1080/2162402X.2020.1792037
77. Kim, J., Jang, G., Sim, S. H., Park, I. H., Kim, K., & Park, C. (2021). *SMARCA4* Depletion Induces Cisplatin Resistance by Activating YAP1-Mediated Epithelial-to-Mesenchymal Transition in Triple-Negative Breast Cancer. *Cancers*, *13*(21), 5474. <https://doi.org/10.3390/cancers13215474>
78. Kim, K. J., Kim, J. W., Sung, J. H., Suh, K. J., Lee, J. Y., Kim, S. H., Lee, J. O., Kim, J. W., Kim, Y. J., Kim, J. H., Bang, S. M., Lee, J. S., Kim, H. K., & Lee, K. W. (2020). PI3K-targeting strategy using alpelisib to enhance the antitumor effect of paclitaxel in human gastric cancer. *Scientific reports*, *10*(1), 12308. https://doi.org/10.1038/s41598-020-68998-w
79. Kim, K. J., Kim, J. W., Sung, J. H., Suh, K. J., Lee, J. Y., Kim, S. H., Lee, J. O., Kim, J. W., Kim, Y. J., Kim, J. H., Bang, S. M., Lee, J. S., Kim, H. K., & Lee, K. W. (2020). PI3K-targeting strategy using alpelisib to enhance the antitumor effect of paclitaxel in human gastric cancer. *Scientific reports*, *10*(1), 12308. <https://doi.org/10.1038/s41598-020-68998-w>
80. Kim, M. J., Choi, S. K., Hong, S. H., Eun, J. W., Nam, S. W., Han, J. W., & You, J. S. (2018). Oncogenic IL7R is downregulated by histone deacetylase inhibitor in esophageal squamous cell carcinoma via modulation of acetylated FOXO1. *International journal of oncology*, *53*(1), 395–403. <https://doi.org/10.3892/ijo.2018.4392>
81. Kim, S. H., & Park, J. W. (2019). IDH2 deficiency impairs cutaneous wound healing via ROS-dependent apoptosis. Biochimica et biophysica acta. Molecular basis of disease, 1865(11), 165523. <https://doi.org/10.1016/j.bbadis.2019.07.017>
82. Kimball, A. S., Joshi, A. D., Boniakowski, A. E., Schaller, M., Chung, J., Allen, R., Bermick, J., Carson, W. F., 4th, Henke, P. K., Maillard, I., Kunkel, S. L., & Gallagher, K. A. (2017). Notch Regulates Macrophage-Mediated Inflammation in Diabetic Wound Healing. *Frontiers in immunology*, *8*, 635. <https://doi.org/10.3389/fimmu.2017.00635>
83. Kimball, A. S., Davis, F. M., denDekker, A., Joshi, A. D., Schaller, M. A., Bermick, J., Xing, X., Burant, C. F., Obi, A. T., Nysz, D., Robinson, S., Allen, R., Lukacs, N. W., Henke, P. K., Gudjonsson, J. E., Moore, B. B., Kunkel, S. L., & Gallagher, K. A. (2019). The Histone Methyltransferase Setdb2 Modulates Macrophage Phenotype and Uric Acid Production in Diabetic Wound Repair. *Immunity*, *51*(2), 258–271.e5. <https://doi.org/10.1016/j.immuni.2019.06.015>
84. Koivunen, J., Karvonen, S. L., Ylä-Outinen, H., Aaltonen, V., Oikarinen, A., & Peltonen, J. (2005). NF1 tumor suppressor in epidermal wound healing with special focus on wound healing in patients with type 1 neurofibromatosis. *Archives of dermatological research*, *296*(12), 547–554. <https://doi.org/10.1007/s00403-005-0564-x>
85. Kou X, Xu X, Chen C, et al. The Fas/Fap-1/Cav-1 complex regulates IL-1RA secretion in mesenchymal stem cells to accelerate wound healing. Sci Transl Med. 2018;10(432):eaai8524. doi:10.1126/scitranslmed.aai8524
86. Kuai, L., Xiang, Y. W., Chen, Q. L., Ru, Y., Yin, S. Y., Li, W., Jiang, J. S., Luo, Y., Song, J. K., Lu, B., Luo, Y., & Li, B. (2022). PD-L1 Triggered by Binding eIF3I Contributes to the Amelioration of Diabetes-Associated Wound Healing Defects by Regulating IRS4. The Journal of investigative dermatology, 142(1), 220–231.e8. <https://doi.org/10.1016/j.jid.2021.06.028>
87. Kuehbacher A, Urbich C, Zeiher AM, and Dimmeler S. Role of Dicer and Drosha for endothelial microRNA expression and angiogenesis. Circ Res 101: 59-68, 2007
88. Kumar, S., Ingle, H., Mishra, S., Mahla, R. S., Kumar, A., Kawai, T., Akira, S., Takaoka, A., Raut, A. A., & Kumar, H. (2015). IPS-1 differentially induces TRAIL, BCL2, BIRC3 and PRKCE in type I interferons-dependent and -independent anticancer activity. Cell death & disease, 6(5), e1758. <https://doi.org/10.1038/cddis.2015.122>
89. Lai, J. J., Lai, K. P., Zeng, W., Chuang, K. H., Altuwaijri, S., & Chang, C. (2012). Androgen receptor influences on body defense system via modulation of innate and adaptive immune systems: lessons from conditional AR knockout mice. The American journal of pathology, 181(5), 1504–1512. <https://doi.org/10.1016/j.ajpath.2012.07.008>
90. Larson, Y., Liu, J., Stevens, P. D., Li, X., Li, J., Evers, B. M., &Gao, T. (2010). Tuberous sclerosis complex 2 (TSC2) regulates cell migration and polarity through activation of CDC42 and RAC1. The Journal of biological chemistry, 285(32), 24987–24998. <https://doi.org/10.1074/jbc.M109.096917>
91. Latreille, R., Servant, R., Darsigny, M., Marcoux, S., Jones, C., Perreault, N., & Boudreau, F. (2017). Transcription factor CUX1 is required for intestinal epithelial wound healing and targets the VAV2-RAC1 Signalling complex. Biochimica et biophysica acta. Molecular cell research, 1864(12), 2347–2355. <https://doi.org/10.1016/j.bbamcr.2017.09.005>
92. Lee, P., Lee, D. J., Chan, C., Chen, S. W., Ch'en, I., & Jamora, C. (2009). Dynamic expression of epidermal caspase 8 simulates a wound healing response. Nature, 458(7237), 519–523. <https://doi.org/10.1038/nature07687>
93. Li, J., Ye, D., Shen, P. et al. Mir-20a-5p induced WTX deficiency promotes gastric cancer progressions through regulating PI3K/AKT signaling pathway. J Exp Clin Cancer Res 39, 212 (2020). <https://doi.org/10.1186/s13046-020-01718-4>
94. Li, J., Zhang, W., Gao, J., Du, M., Li, H., Li, M., Cong, H., Fang, Y., Liang, Y., Zhao, D., Xiang, G., Ma, X., Yao, M., Tu, H., & Gan, Y. (2021). E3 Ubiquitin Ligase UBR5 Promotes the
95. Li, L., Mou, Y. P., Wang, Y. Y., Wang, H. J., & Mou, X. Z. (2019). miR-199a-3p targets ETNK1 to promote invasion and migration in gastric cancer cells and is associated with poor prognosis. *Pathology, research and practice*, *215*(9), 152511. <https://doi.org/10.1016/j.prp.2019.152511>
96. Li, Q., Lai, Q., He, C. *et al.* RUNX1 promotes tumour metastasis by activating the Wnt/β-catenin signalling pathway and EMT in colorectal cancer. *J Exp Clin Cancer Res* **38**, 334 (2019). <https://doi.org/10.1186/s13046-019-1330-9>
97. Li, R., Liu, R., Zheng, S., Liu, W., Li, H., & Li, D. (2022). Comprehensive Analysis of Prognostic Value and Immune Infiltration of the NT5DC Family in Hepatocellular Carcinoma. *Journal of oncology*, *2022*, 2607878. <https://doi.org/10.1155/2022/2607878>
98. Li, S., Dong, C., Chen, J., Gao, X., Xie, X., & Zhang, X. (2021). Identification of an immune checkpoint gene signature that accurately predicts prognosis and immunotherapy response in endometrial carcinoma. *Aging*, *13*(12), 16696–16712. <https://doi.org/10.18632/aging.203189>
99. Li, W., Lei, T., Song, X., Deng, C., Lu, J., Zhang, W., Kuang, Z., He, Y., Zhou, Q., Luo, Z., Mo, F., Yang, H., Hang, J., Xiao, B., & Li, L. (2022). CBLC inhibits the proliferation and metastasis of breast cancer cells via ubiquitination and degradation of CTTN. Journal of receptor and signal transduction research, 42(6), 588–598. https://doi.org/10.1080/10799893.2022.2116049Yao, F., Kausalya, J. P., Sia, Y. Y., Teo, A. S., Lee, W. H., Ong, A. G., Zhang, Z., Tan, J. H., Li, G., Bertrand, D., Liu, X., Poh, H. M., Guan, P., Zhu, F., Pathiraja, T. N., Ariyaratne, P. N., Rao, J., Woo, X. Y., Cai, S., Mulawadi, F. H., … Hillmer, A. M. (2015). Recurrent Fusion Genes in Gastric Cancer: CLDN18-ARHGAP26 Induces Loss of Epithelial Integrity. Cell reports, 12(2), 272–285. <https://doi.org/10.1016/j.celrep.2015.06.020>
100. Li, X., Liu, C., Zhu, Y., Rao, H., Liu, M., Gui, L., Feng, W., Tang, H., Xu, J., Gao, W. Q., & Li, L. (2021). SETD2 epidermal deficiency promotes cutaneous wound healing via activation of AKT/mTOR Signalling. *Cell proliferation*, *54*(6), e13045. <https://doi.org/10.1111/cpr.13045>
101. Li, Y., Lv, Y., Cheng, C., Huang, Y., Yang, L., He, J., Tao, X., Hu, Y., Ma, Y., Su, Y., Wu, L., Yu, G., Jiang, Q., Liu, S., Liu, X., & Liu, Z. (2020). SPEN induces miR-4652-3p to target HIPK2 in nasopharyngeal carcinoma. *Cell death & disease*, *11*(7), 509. <https://doi.org/10.1038/s41419-020-2699-2>
102. Li, Y., Qiang, W., Griffin, B. B., Gao, T., Chakravarti, D., Bulun, S., Kim, J. J., & Wei, J. J. (2020). HMGA2-mediated tumorigenesis through angiogenesis in leiomyoma. *Fertility and sterility*, *114*(5), 1085–1096. <https://doi.org/10.1016/j.fertnstert.2020.05.036>
103. Lim, J. H., Jono, H., Komatsu, K., Woo, C. H., Lee, J., Miyata, M., Matsuno, T., Xu, X., Huang, Y., Zhang, W., Park, S. H., Kim, Y. I., Choi, Y. D., Shen, H., Heo, K. S., Xu, H., Bourne, P., Koga, T., Xu, H., Yan, C., … Li, J. D. (2012). CYLD negatively regulates transforming growth factor-β-signalling via deubiquitinating Akt. Nature communications, 3, 771. <https://doi.org/10.1038/ncomms1776>
104. Lisse, Thomas & Sharma, Manju & Vishlaghi, Neda & Pullagura, Sri & Braun, Robert. (2020). GDNF promotes hair formation and cutaneous wound healing by targeting bulge stem cells. npj Regenerative Medicine. 5. 10.1038/s41536-020-0098-z.
105. Lisovsky, A., & Sefton, M. V. (2016). Shh pathway in wounds in non-diabetic Shh-Cre-eGFP/Ptch1-LacZ mice treated with MAA beads. *Biomaterials*, *102*, 198–208. https://doi.org/10.1016/j.biomaterials.2016.06.027
106. Liu W, Zhuang C, Huang T, et al. Loss of CDKN2A at chromosome 9 has a poor clinical prognosis and promotes lung cancer progression. Mol Genet Genomic Med. 2020;8(12):e1521. doi:10.1002/mgg3.1521
107. Liu, J., Zeng, S., Wang, Y., Yu, J., Ouyang, Q., Hu, L., Zhou, D., Lin, G., & Sun, Y. (2020). Essentiality of CTNNB1 in Malignant Transformation of Human Embryonic Stem Cells under Long-Term Suboptimal Conditions. Stem cells international, 2020, 5823676. <https://doi.org/10.1155/2020/5823676>
108. Liu, L., Lin, C., Liang, W., Wu, S., Liu, A., Wu, J., Zhang, X., Ren, P., Li, M., & Song, L. (2015). TBL1XR1 promotes lymphangiogenesis and lymphatic metastasis in esophageal squamous cell carcinoma. *Gut*, *64*(1), 26–36. <https://doi.org/10.1136/gutjnl-2013-306388>
109. Liu, R. J., Xu, Z. P., Li, S. Y., Yu, J. J., Feng, N. H., Xu, B., & Chen, M. (2022). BAP1-Related ceRNA (NEAT1/miR-10a-5p/SERPINE1) Promotes Proliferation and Migration of Kidney Cancer Cells. Frontiers in oncology, 12, 852515. <https://doi.org/10.3389/fonc.2022.852515>
110. Liu, S., Gao, G., Yan, D., Chen, X., Yao, X., Guo, S., Li, G., & Zhao, Y. (2017). Effects of miR-145-5p through NRAS on the cell proliferation, apoptosis, migration, and invasion in melanoma by inhibiting MAPK and PI3K/AKT pathways. *Cancer medicine*, *6*(4), 819–833. https://doi.org/10.1002/cam4.1030 (Retraction published Cancer Med. 2022 Sep 8;:
111. Liu, X. D., Zhang, Z. W., Wu, H. W., & Liang, Z. Y. (2021). A new prognosis prediction model combining TNM stage with MAP2K4 and JNK in postoperative pancreatic cancer patients. *Pathology, research and practice*, *217*, 153313. <https://doi.org/10.1016/j.prp.2020.153313>
112. Liu, Z., Wang, Y., Aizimuaji, Z., Ma, S., & Xiao, T. (2022). Elevated FOXA1 Expression Indicates Poor Prognosis in Liver Cancer due to Its Effects on Cell Proliferation and Metastasis. Disease markers, 2022, 3317315. https://doi.org/10.1155/2022/3317315
113. Loubeau, G., Boudra, R., Maquaire, S., Lours-Calet, C., Beaudoin, C., Verrelle, P., & Morel, L. (2014). NPM1 silencing reduces tumour growth and MAPK signalling in prostate cancer cells. *PloS one*, *9*(5), e96293. https://doi.org/10.1371/journal.pone.0096293
114. Lu, Z. W., Wen, D., Wei, W. J., Han, L. T., Xiang, J., Wang, Y. L., Wang, Y., Liao, T., & Ji, Q. H. (2020). Silencing of PPM1D inhibits cell proliferation and invasion through the p38 MAPK and p53 signaling pathway in papillary thyroid carcinoma. *Oncology reports*, *43*(3), 783–794. <https://doi.org/10.3892/or.2020.7458>
115. Luef, B., Handle, F., Kharaishvili, G., Hager, M., Rainer, J., Janetschek, G., Hruby, S., Englberger, C., Bouchal, J., Santer, F. R., & Culig, Z. (2016). The AR/NCOA1 axis regulates prostate cancer migration by involvement of PRKD1. *Endocrine-related cancer*, *23*(6), 495–508. https://doi.org/10.1530/ERC-16-0160
116. Luo, Y., Vlaeminck-Guillem, V., Baron, S., Dallel, S., Zhang, C. X., & Le Romancer, M. (2021). MEN1 silencing aggravates tumorigenic potential of AR-independent prostate cancer cells through nuclear translocation and activation of JunD and β-catenin. *Journal of experimental & clinical cancer research : CR*, *40*(1), 270. <https://doi.org/10.1186/s13046-021-02058-7>
117. Lv, S., Ji, L., Chen, B., Liu, S., Lei, C., Liu, X., Qi, X., Wang, Y., Lai-Han Leung, E., Wang, H., Zhang, L., Yu, X., Liu, Z., Wei, Q., & Lu, L. (2018). Histone methyltransferase KMT2D sustains prostate carcinogenesis and metastasis via epigenetically activating LIFR and KLF4. Oncogene, 37(10), 1354–1368. <https://doi.org/10.1038/s41388-017-0026-x>
118. MacDonald, K. P., Palmer, J. S., Cronau, S., Seppanen, E., Olver, S., Raffelt, N. C., Kuns, R., Pettit, A. R., Clouston, A., Wainwright, B., Branstetter, D., Smith, J., Paxton, R. J., Cerretti, D. P., Bonham, L., Hill, G. R., & Hume, D. A. (2010). An antibody against the colony-stimulating factor 1 receptor depletes the resident subset of monocytes and tissue- and tumor-associated macrophages but does not inhibit inflammation. Blood, 116(19), 3955–3963. <https://doi.org/10.1182/blood-2010-02-266296>
119. Macedo, L., Pinhal-Enfield, G., Alshits, V., Elson, G., Cronstein, B. N., & Leibovich, S. J. (2007). Wound healing is impaired in MyD88-deficient mice: a role for MyD88 in the regulation of wound healing by adenosine A2A receptors. *The American journal of pathology*, *171*(6), 1774–1788. https://doi.org/10.2353/ajpath.2007.061048
120. Malhotra, J., Ryan, B., Patel, M., Chan, N., Guo, Y., Aisner, J., Jabbour, S. K., & Pine, S. (2022). Clinical outcomes and immune phenotypes associated with *STK11* co-occurring mutations in non-small cell lung cancer. *Journal of thoracic disease*, *14*(6), 1772–1783. https://doi.org/10.21037/jtd-21-1377
121. Manjur, A. B. M. K., Lempiäinen, J. K., Malinen, M., Varjosalo, M., Palvimo, J. J., & Niskanen, E. A. (2021). BCOR modulates transcriptional activity of a subset of glucocorticoid receptor target genes involved in cell growth and mobility. The Journal of steroid biochemistry and molecular biology, 210, 105873. https://doi.org/10.1016/j.jsbmb.2021.105873
122. Marongiu, M., Deiana, M., Marcia, L., Sbardellati, A., Asunis, I., Meloni, A., Angius, A., Cusano, R., Loi, A., Crobu, F., Fotia, G., Cucca, F., Schlessinger, D., & Crisponi, L. (2016). Novel action of FOXL2 as mediator of Col1a2 gene autoregulation. Developmental biology, 416(1), 200–211. <https://doi.org/10.1016/j.ydbio.2016.05.022>
123. Meier, A. B., Basheer, F., Sertori, R., Laird, M., Liongue, C., & Ward, A. C. (2022). Granulocyte Colony-Stimulating Factor Mediated Regulation of Early Myeloid Cells in Zebrafish. *Frontiers in bioscience (Landmark edition)*, *27*(4), 110. <https://doi.org/10.31083/j.fbl2704110>
124. Metastasis of Pancreatic Cancer via Destabilizing F-Actin Capping Protein CAPZA1. Frontiers in oncology, 11, 634167. https://doi.org/10.3389/fonc.2021.634167
125. Miller, A., Jeyapalina, S., Agarwal, J., Mansel, M., & Beck, J. P. (2022). A preliminary, observational study using whole-blood RNA sequencing reveals differential expression of inflammatory and bone markers post-implantation of percutaneous osseointegrated prostheses. PloS one, 17(5), e0268977. <https://doi.org/10.1371/journal.pone.0268977>
126. Mishra, J., Verma, R. K., Alpini, G., Meng, F., & Kumar, N. (2013). Role of Janus kinase 3 in mucosal differentiation and predisposition to colitis. The Journal of biological chemistry, 288(44), 31795–31806. <https://doi.org/10.1074/jbc.M113.504126>
127. Molenaar, B., Timmer, L. T., Droog, M., Perini, I., Versteeg, D., Kooijman, L., Monshouwer-Kloots, J., de Ruiter, H., Gladka, M. M., & van Rooij, E. (2021). Single-cell transcriptomics following ischemic injury identifies a role for B2M in cardiac repair. Communications biology, 4(1), 146. <https://doi.org/10.1038/s42003-020-01636-3>
128. Mota, S. T. S., Vecchi, L., Zóia, M. A. P., Oliveira, F. M., Alves, D. A., Dornelas, B. C., Bezerra, S. M., Andrade, V. P., Maia, Y. C. P., Neves, A. F., Goulart, L. R., & Araújo, T. G. (2019). New Insights into the Role of Polybromo-1 in Prostate Cancer. *International journal of molecular sciences*, *20*(12), 2852. <https://doi.org/10.3390/ijms20122852>
129. Mullany, L. K., Lonard, D. M., & O'Malley, B. W. (2021). Wound Healing-related Functions of the p160 Steroid Receptor Coactivator Family. *Endocrinology*, *162*(3), bqaa232. <https://doi.org/10.1210/endocr/bqaa232>
130. Munz, B., Smola, H., Engelhardt, F., Bleuel, K., Brauchle, M., Lein, I., Evans, L. W., Huylebroeck, D., Balling, R., & Werner, S. (1999). Overexpression of activin A in the skin of transgenic mice reveals new activities of activin in epidermal morphogenesis, dermal fibrosis and wound repair. The EMBO journal, 18(19), 5205–5215. <https://doi.org/10.1093/emboj/18.19.5205>
131. Ni, S., Hu, J., Duan, Y., Shi, S., Li, R., Wu, H., Qu, Y., & Li, Y. (2013). Down expression of LRP1B promotes cell migration via RhoA/Cdc42 pathway and actin cytoskeleton remodeling in renal cell cancer. *Cancer science*, *104*(7), 817–825. <https://doi.org/10.1111/cas.12157>
132. Ni, S., Luo, Z., Jiang, L., Guo, Z., Li, P., Xu, X., Cao, Y., Duan, C., Wu, T., Li, C., Lu, H., & Hu, J. (2019). UTX/KDM6A Deletion Promotes Recovery of Spinal Cord Injury by Epigenetically Regulating Vascular Regeneration. Molecular therapy : the journal of the American Society of Gene Therapy, 27(12), 2134–2146. [https://doi.org/10.1016/j.ymthe.2019.08.00](https://doi.org/10.1016/j.ymthe.2019.08.009)
133. Noizet, M., Lagoutte, E., Gratigny, M., Bouschbacher, M., Lazareth, I., Roest Crollius, H., Darzacq, X., & Dugast-Darzacq, C. (2016). Master regulators in primary skin fibroblast fate reprogramming in a human ex vivo model of chronic wounds. *Wound repair and regeneration : official publication of the Wound Healing Society [and] the European Tissue Repair Society*, *24*(2), 247–262. <https://doi.org/10.1111/wrr.12392>
134. Okwueze MI, Cardwell NL, Pollins AC, Nanney LB. Modulation of porcine wound repair with a transfected ErbB3 gene and relevant EGF-like ligands. J Invest Dermatol. 2007;127(5):1030-1041. doi:10.1038/sj.jid.5700637
135. Olaso, E., Lin, H. C., Wang, L. H., & Friedman, S. L. (2011). Impaired dermal wound healing in discoidin domain receptor 2-deficient mice associated with defective extracellular matrix remodeling. Fibrogenesis & tissue repair, 4(1), 5. <https://doi.org/10.1186/1755-1536-4-5>
136. Oliver JR, Kushwah R, Wu J, et al. Elf3 plays a role in regulating bronchiolar epithelial repair kinetics following Clara cell-specific injury. Lab Invest. 2011;91(10):1514-1529. doi:10.1038/labinvest.2011.100
137. Osokine I, Siewiera J, Rideaux D, Ma S, Tsukui T, Erlebacher A. Gene silencing by EZH2 suppresses TGF-β activity within the decidua to avert pregnancy-adverse wound healing at the maternal-fetal interface. Cell Rep. 2022;38(5):110329. doi:10.1016/j.celrep.2022.110329
138. Pan, Q., Wang, L., Liu, Y., Li, M., Zhang, Y., Peng, W., Deng, T., Peng, M. L., Jiang, J. Q., Tang, J., Wang, J., Duan, H. X., & Fan, S. S. (2021). Knockdown of POLQ interferes the development and progression of hepatocellular carcinoma through regulating cell proliferation, apoptosis and migration. *Cancer cell international*, *21*(1), 482. https://doi.org/10.1186/s12935-021-02178-2
139. Paskal, W., Kopka, M., Stachura, A., Paskal, A. M., Pietruski, P., Pełka, K., Woessner, A. E., Quinn, K. P., Galus, R., Wejman, J., & Włodarski, P. (2021). Single Dose of N-Acetylcysteine in Local Anesthesia Increases Expression of HIF1α, MAPK1, TGFβ1 and Growth Factors in Rat Wound Healing. *International journal of molecular sciences*, *22*(16), 8659. https://doi.org/10.3390/ijms22168659
140. Peng Z, Gong Y, Liang X. Role of FAT1 in health and disease. Oncol Lett. 2021;21(5):398. doi:10.3892/ol.2021.12659
141. Peng, Y., Xu, Y., Zhang, X., Deng, S., Yuan, Y., Luo, X., Hossain, M. T., Zhu, X., Du, K., Hu, F., Chen, Y., Chang, S., Feng, X., Fan, X., Ashktorab, H., Smoot, D., Meltzer, S. J., Hou, G., Wei, Y., Li, S., … Jin, Z. (2021). A novel protein AXIN1-295aa encoded by circAXIN1 activates the Wnt/β-catenin signaling pathway to promote gastric cancer progression. Molecular cancer, 20(1), 158. <https://doi.org/10.1186/s12943-021-01457->
142. Perucca, P., Mocchi, R., Guardamagna, I., Bassi, E., Sommatis, S., Nardo, T., Prosperi, E., Stivala, L. A., & Cazzalini, O. (2018). A damaged DNA binding protein 2 mutation disrupting interaction with proliferating-cell nuclear antigen affects DNA repair and confers proliferation advantage. Biochimica et biophysica acta. Molecular cell research, 1865(6), 898–907. <https://doi.org/10.1016/j.bbamcr.2018.03.012>
143. Phan, Q. M., Fine, G. M., Salz, L., Herrera, G. G., Wildman, B., Driskell, I. M., & Driskell, R. R. (2020). Lef1 expression in fibroblasts maintains developmental potential in adult skin to regenerate wounds. eLife, 9, e60066. <https://doi.org/10.7554/eLife.60066>
144. Portier, L., Desterke, C., Chaker, D., Oudrhiri, N., Asgarova, A., Dkhissi, F., Turhan, A. G., Bennaceur-Griscelli, A., & Griscelli, F. (2021). iPSC-Derived Hereditary Breast Cancer Model Reveals the BRCA1-Deleted Tumor Niche as a New Culprit in Disease Progression. International journal of molecular sciences, 22(3), 1227. <https://doi.org/10.3390/ijms22031227>
145. Prudovsky I. (2021). Cellular Mechanisms of FGF-Stimulated Tissue Repair. Cells, 10(7), 1830. https://doi.org/10.3390/cells10071830
146. Qi S, Han Q, Xing D, et al. Functional Analysis of Estrogen Receptor 1 in Diabetic Wound Healing: A Knockdown Cell-Based and Bioinformatic Study. Med Sci Monit. 2020;26:e928788. Published 2020 Dec 18. doi:10.12659/MSM.928788
147. Qian L, Li H, Tu J, et al. NFKBIE Is a Predictive Factor of Survival and Is Correlated With Immune Infiltration, Antigen Processing, And Presentation In Hepatocellular Carcinoma. Research Square; 2022. DOI: 10.21203/rs.3.rs-2146706/v1
148. Qin, A., Wu, J., Zhai, M., Lu, Y., Huang, B., Lu, X., Jiang, X., & Qiao, Z. (2020). Axin1 inhibits proliferation, invasion, migration and EMT of hepatocellular carcinoma by targeting miR-650. American journal of translational research, 12(3), 1114–1122.
149. Qiu, L., Levine, K., Gajiwala, K. S., Cronin, C. N., Nagata, A., Johnson, E., Kraus, M., Tatlock, J., Kania, R., Foley, T., & Sun, S. (2018). Small molecule inhibitors reveal PTK6 kinase is not an oncogenic driver in breast cancers. *PloS one*, *13*(6), e0198374. <https://doi.org/10.1371/journal.pone.0198374>
150. Qiu, S., Jia, Y., Sun, Y., Han, P., Xu, J., Wen, G., & Chai, Y. (2019). Von Hippel-Lindau (VHL) Protein Antagonist VH298 Improves Wound Healing in Streptozotocin-Induced Hyperglycaemic Rats by Activating Hypoxia-Inducible Factor- (HIF-) 1 Signalling. Journal of diabetes research, 2019, 1897174. https://doi.org/10.1155/2019/1897174
151. Qiu, W., Li, X., Tang, H., Huang, A. S., Panteleyev, A. A., Owens, D. M., & Su, G. H. (2011). Conditional activin receptor type 1B (Acvr1b) knockout mice reveal hair loss abnormality. The Journal of investigative dermatology, 131(5), 1067–1076. <https://doi.org/10.1038/jid.2010.400>
152. Rabbani, P. S., Zhou, A., Borab, Z. M., Frezzo, J. A., Srivastava, N., More, H. T., Rifkin, W. J., David, J. A., Berens, S. J., Chen, R., Hameedi, S., Junejo, M. H., Kim, C., Sartor, R. A., Liu, C. F., Saadeh, P. B., Montclare, J. K., & Ceradini, D. J. (2017). Novel lipoproteoplex delivers Keap1 siRNA based gene therapy to accelerate diabetic wound healing. Biomaterials, 132, 1–15. https://doi.org/10.1016/j.biomaterials.2017.04.001
153. Rácz, E., Kurek, D., Kant, M., Baerveldt, E. M., Florencia, E., Mourits, S., de Ridder, D., Laman, J. D., van der Fits, L., & Prens, E. P. (2011). GATA3 expression is decreased in psoriasis and during epidermal regeneration; induction by narrow-band UVB and IL-4. PloS one, 6(5), e19806. https://doi.org/10.1371/journal.pone.0019806
154. Radaszkiewicz, T., Nosková, M., Gömöryová, K., Vondálová Blanářová, O., Radaszkiewicz, K. A., Picková, M., Víchová, R., Gybeľ, T., Kaiser, K., Demková, L., Kučerová, L., Bárta, T., Potěšil, D., Zdráhal, Z., Souček, K., & Bryja, V. (2021). RNF43 inhibits WNT5A-driven signaling and suppresses melanoma invasion and resistance to the targeted therapy. *eLife*, *10*, e65759. <https://doi.org/10.7554/eLife.65759>
155. Ramirez, H. A., Pastar, I., Jozic, I., Stojadinovic, O., Stone, R. C., Ojeh, N., Gil, J., Davis, S. C., Kirsner, R. S., & Tomic-Canic, M. (2018). Staphylococcus aureus Triggers Induction of miR-15B-5P to Diminish DNA Repair and Deregulate Inflammatory Response in Diabetic Foot Ulcers. *The Journal of investigative dermatology*, *138*(5), 1187–1196. <https://doi.org/10.1016/j.jid.2017.11.038>
156. Randazzo, O., Cascioferro, S. M., Pecoraro, C., Iddouch, W. A., Avan, A., Parrino, B., Carbone, D., Perricone, U., Peters, G. J., Diana, P., & Giovannetti, E. (2021). SF3B1 modulators affect key genes in metastasis and drug influx: a new approach to fight pancreatic cancer chemoresistance. *Cancer drug resistance (Alhambra, Calif.)*, *4*(4), 904–922. <https://doi.org/10.20517/cdr.2021.61>
157. Ranzoni, A. M., Tangherloni, A., Berest, I., Riva, S. G., Myers, B., Strzelecka, P. M., Xu, J., Panada, E., Mohorianu, I., Zaugg, J. B., & Cvejic, A. (2021). Integrative Single-Cell RNA-Seq and ATAC-Seq Analysis of Human Developmental Hematopoiesis. *Cell stem cell*, *28*(3), 472–487.e7. <https://doi.org/10.1016/j.stem.2020.11.015>
158. Rezania, S., Kammerer, S., Li, C., Steinecker-Frohnwieser, B., Gorischek, A., DeVaney, T. T., Verheyen, S., Passegger, C. A., Tabrizi-Wizsy, N. G., Hackl, H., Platzer, D., Zarnani, A. H., Malle, E., Jahn, S. W., Bauernhofer, T., & Schreibmayer, W. (2016). Overexpression of KCNJ3 gene splice variants affects vital parameters of the malignant breast cancer cell line MCF-7 in an opposing manner. BMC cancer, 16, 628. <https://doi.org/10.1186/s12885-016-2664-8>
159. Ring A, Kaur P, Lang JE. EP300 knockdown reduces cancer stem cell phenotype, tumor growth and metastasis in triple negative breast cancer. BMC Cancer. 2020;20(1):1076. Published 2020 Nov 10. doi:10.1186/s12885-020-07573-y
160. Riwaldt, S., Monici, M., Graver Petersen, A., Birk Jensen, U., Evert, K., Pantalone, D., Utpatel, K., Evert, M., Wehland, M., Krüger, M., Kopp, S., Frandsen, S., Corydon, T., Sahana, J., Bauer, J., Lützenberg, R., Infanger, M., & Grimm, D. (2017). Preparation of A Spaceflight: Apoptosis Search in Sutured Wound Healing Models. *International journal of molecular sciences*, *18*(12), 2604. <https://doi.org/10.3390/ijms18122604>
161. Rush, J. S., Boeving, M. A., Berry, W. L., & Ceresa, B. P. (2014). Antagonizing c-Cbl enhances EGFR-dependent corneal epithelial homeostasis. Investigative ophthalmology & visual science, 55(8), 4691–4699. <https://doi.org/10.1167/iovs.14-14133>
162. Sannino, G., Armbruster, N., Bodenhöfer, M., Haerle, U., Behrens, D., Buchholz, M., Rothbauer, U., Sipos, B., & Schmees, C. (2016). Role of BCL9L in transforming growth factor-β (TGF-β)-induced epithelial-to-mesenchymal-transition (EMT) and metastasis of pancreatic cancer. Oncotarget, 7(45), 73725–73738. <https://doi.org/10.18632/oncotarget.12455>
163. Santos, S. C., Miguel, C., Domingues, I., Calado, A., Zhu, Z., Wu, Y., & Dias, S. (2007). VEGF and VEGFR-2 (KDR) internalization is required for endothelial recovery during wound healing. Experimental cell research, 313(8), 1561–1574. <https://doi.org/10.1016/j.yexcr.2007.02.020>
164. Seo, E. B., Jang, H. J., Kwon, S. H., Kwon, Y. J., Kim, S. K., Lee, S. H., Jeong, A. J., Shin, H. M., Kim, Y. N., Ma, S., Kim, H., Lee, Y. H., Suh, P. G., & Ye, S. K. (2022). Loss of phospholipase Cγ1 suppresses hepatocellular carcinogenesis through blockade of STAT3-mediated cancer development. *Hepatology communications*, *6*(11), 3234–3246. <https://doi.org/10.1002/hep4.2077>
165. Shamilov, R., Ackley, T. W., & Aneskievich, B. J. (2020). Enhanced Wound Healing- and Inflammasome-Associated Gene Expression in TNFAIP3-Interacting Protein 1- (TNIP1-) Deficient HaCaT Keratinocytes Parallels Reduced Reepithelialization. *Mediators of inflammation*, *2020*, 5919150. https://doi.org/10.1155/2020/5919150
166. Shao, H., Li, Y., Pastar, I., Xiao, M., Prokupets, R., Liu, S., Yu, K., Vazquez-Padron, R. I., Tomic-Canic, M., Velazquez, O. C., & Liu, Z. J. (2020). Notch1 signaling determines the plasticity and function of fibroblasts in diabetic wounds. *Life science alliance*, *3*(12), e202000769. <https://doi.org/10.26508/lsa.202000769>
167. Shao, S., Cao, H., Wang, Z., Zhou, D., Wu, C., Wang, S., Xia, D., & Zhang, D. (2020). CHD4/NuRD complex regulates complement gene expression and correlates with CD8 T cell infiltration in human hepatocellular carcinoma. Clinical epigenetics, 12(1), 31. <https://doi.org/10.1186/s13148-020-00827-3>
168. SharmaRB, KumarG,Thakur H, Tomar S, (2023) Nanoemulgel:ANovel Approach forTopicalDelivery SystemSharmaRB, KumarG,Thakur H, Tomar S, (2023) Nanoemulgel:ANovel Approach forTopicalDelivery SystemInt Updated review J Drug Dev Res J, Vol. 15 No. 1: 988.
169. Shen, X., Wu, S., Zhang, J., Li, M., Xu, F., Wang, A., Lei, Y., & Zhu, G. (2020). Wild‑type IDH1 affects cell migration by modulating the PI3K/AKT/mTOR pathway in primary glioblastoma cells. Molecular medicine reports, 22(3), 1949–1957. <https://doi.org/10.3892/mmr.2020.11250>
170. Shen, Y., Liu, P., Jiang, T., Hu, Y., Au, F. K. C., & Qi, R. Z. (2017). The catalytic subunit of DNA polymerase δ inhibits γTuRC activity and regulates Golgi-derived microtubules. *Nature communications*, *8*(1), 554. <https://doi.org/10.1038/s41467-017-00694-2>
171. Shi, Y., Shu, B., Yang, R., Xu, Y., Xing, B., Liu, J., Chen, L., Qi, S., Liu, X., Wang, P., Tang, J., & Xie, J. (2015). Wnt and Notch signaling pathway involved in wound healing by targeting c-Myc and Hes1 separately. *Stem cell research & therapy*, *6*(1), 120. <https://doi.org/10.1186/s13287-015-0103-4>
172. Shi, X., Wang, J., Zhang, X., Yang, S., Luo, W., Wang, S., Huang, J., Chen, M., Cheng, Y., & Chao, J. (2022). GREM1/PPP2R3A expression in heterogeneous fibroblasts initiates pulmonary fibrosis. *Cell & bioscience*, *12*(1), 123. <https://doi.org/10.1186/s13578-022-00860-0>
173. Shin, S., Kim, K., Kim, H. R., Ylaya, K., Do, S. I., Hewitt, S. M., Park, H. S., Roe, J. S., Chung, J. Y., & Song, J. (2020). Deubiquitylation and stabilization of Notch1 intracellular domain by ubiquitin-specific protease 8 enhance tumorigenesis in breast cancer. Cell death and differentiation, 27(4), 1341–1354. <https://doi.org/10.1038/s41418-019-0419-1>
174. Simpson, K. J., Selfors, L. M., Bui, J., Reynolds, A., Leake, D., Khvorova, A., & Brugge, J. S. (2008). Identification of genes that regulate epithelial cell migration using an siRNA screening approach. *Nature cell biology*, *10*(9), 1027–1038. <https://doi.org/10.1038/ncb1762>
175. Somanath, P. R., Chen, J., & Byzova, T. V. (2008). Akt1 is necessary for the vascular maturation and angiogenesis during cutaneous wound healing. Angiogenesis, 11(3), 277–288. <https://doi.org/10.1007/s10456-008-9111-7>
176. Sorkin, M., Agarwal, S., Ranganathan, K., Loder, S., Cholok, D., Fireman, D., Li, J., Li, S., Zhao, B., Mishina, Y., Cederna, P., & Levi, B. (2017). Hair follicle specific ACVR1/ALK2 critically affects skin morphogenesis and attenuates wound healing. Wound repair and regeneration : official publication of the Wound Healing Society [and] the European Tissue Repair Society, 25(3), 521–525. <https://doi.org/10.1111/wrr.12549>
177. Squarize, C. H., Castilho, R. M., Bugge, T. H., & Gutkind, J. S. (2010). Accelerated wound healing by mTOR activation in genetically defined mouse models. PloS one, 5(5), e10643. https://doi.org/10.1371/journal.pone.0010643
178. Sradhanjali, S., Rout, P., Tripathy, D., Kaliki, S., Rath, S., Modak, R., Mittal, R., Chowdary, T. K., & Reddy, M. M. (2021). The Oncogene *MYCN* Modulates Glycolytic and Invasive Genes to Enhance Cell Viability and Migration in Human Retinoblastoma. *Cancers*, *13*(20), 5248. <https://doi.org/10.3390/cancers13205248>
179. Sugita, S., Enokida, H., Yoshino, H., Miyamoto, K., Yonemori, M., Sakaguchi, T., Osako, Y., & Nakagawa, M. (2018). HRAS as a potential therapeutic target of salirasib RAS inhibitor in bladder cancer. International journal of oncology, 53(2), 725–736. <https://doi.org/10.3892/ijo.2018.4435>
180. Sun, W., Gui, L., Zuo, X., Zhang, L., Zhou, D., Duan, X., Ren, W., & Xu, G. (2016). Human epithelial-type ovarian tumour marker beta-2-microglobulin is regulated by the TGF-β signaling pathway. Journal of translational medicine, 14, 75. <https://doi.org/10.1186/s12967-016-0832-x>
181. Sun, X., Chuang, J. C., Kanchwala, M., Wu, L., Celen, C., Li, L., Liang, H., Zhang, S., Maples, T., Nguyen, L. H., Wang, S. C., Signer, R. A., Sorouri, M., Nassour, I., Liu, X., Xu, J., Wu, M., Zhao, Y., Kuo, Y. C., Wang, Z., … Zhu, H. (2016). Suppression of the SWI/SNF Component Arid1a Promotes Mammalian Regeneration. Cell stem cell, 18(4), 456–466. https://doi.org/10.1016/j.stem.2016.03.001
182. Sun, Z., Zhu, Y., Feng, X., Liu, X., Zhou, K., Wang, Q., Zhang, H., & Shi, H. (2022). H3F3A K27M Mutation Promotes the Infiltrative Growth of High-Grade Glioma in Adults by Activating β-Catenin/USP1 Signaling. Cancers, 14(19), 4836. https://doi.org/10.3390/cancers14194836
183. Surdez, D., Zaidi, S., Grossetête, S., Laud-Duval, K., Ferre, A. S., Mous, L., Vourc'h, T., Tirode, F., Pierron, G., Raynal, V., Baulande, S., Brunet, E., Hill, V., & Delattre, O. (2021). STAG2 mutations alter CTCF-anchored loop extrusion, reduce cis-regulatory interactions and EWSR1-FLI1 activity in Ewing sarcoma. *Cancer cell*, *39*
184. Takahashi, M., Umehara, Y., Yue, H., Trujillo-Paez, J. V., Peng, G., Nguyen, H. L. T., Ikutama, R., Okumura, K., Ogawa, H., Ikeda, S., & Niyonsaba, F. (2021). The Antimicrobial Peptide Human β-Defensin-3 Accelerates Wound Healing by Promoting Angiogenesis, Cell Migration, and Proliferation Through the FGFR/JAK2/STAT3 Signaling Pathway. Frontiers in immunology, 12, 712781. <https://doi.org/10.3389/fimmu.2021.712781>
185. Takeda N, Maemura K, Imai Y, et al. Endothelial PAS domain protein 1 gene promotes angiogenesis through the transactivation of both vascular endothelial growth factor and its receptor, Flt-1. Circ Res. 2004;95(2):146-153. doi:10.1161/01.RES.0000134920.10128.b4
186. Talarico, E. F., Jr, & Mangini, N. J. (2007). Alternative splice variants of plasma membrane calcium-ATPases in human corneal epithelium. Experimental eye research, 85(6), 869–879. <https://doi.org/10.1016/j.exer.2007.08.023>
187. Tamai, M., Tatarano, S., Okamura, S., Fukumoto, W., Kawakami, I., Osako, Y., Sakaguchi, T., Sugita, S., Yonemori, M., Yamada, Y., Nakagawa, M., Enokida, H., & Yoshino, H. (2022). microRNA-99a-5p induces cellular senescence in gemcitabine-resistant bladder cancer by targeting SMARCD1. *Molecular oncology*, *16*(6), 1329–1346. <https://doi.org/10.1002/1878-0261.13192>
188. Tan, P., Xu, Y., Du, Y., Wu, L., Guo, B., Huang, S., Zhu, J., Li, B., Lin, F., & Yao, L. (2019). SPOP suppresses pancreatic cancer progression by promoting the degradation of NANOG. *Cell death & disease*, *10*(11), 794. <https://doi.org/10.1038/s41419-019-2017-z>
189. Tan, Q., Wang, W., Yang, C., Zhang, J., Sun, K., Luo, H. C., Mai, L. F., Lao, Y., Yan, L., & Ren, M. (2016). α-ketoglutarate is associated with delayed wound healing in diabetes. *Clinical endocrinology*, *85*(1), 54–61. https://doi.org/10.1111/cen.1304
190. Tang, H., Wang, X., Zhang, M., Yan, Y., Huang, S., Ji, J., Xu, J., Zhang, Y., Cai, Y., Yang, B., Lan, W., Huang, M., & Zhang, L. (2020). MicroRNA-200b/c-3p regulate epithelial plasticity and inhibit cutaneous wound healing by modulating TGF-β-mediated RAC1 signaling. *Cell death & disease*, *11*(10), 931. https://doi.org/10.1038/s41419-020-03132-2
191. Tauriello, D. V. F., Sancho, E., & Batlle, E. (2022). Overcoming TGFβ-mediated immune evasion in cancer. *Nature reviews. Cancer*, *22*(1), 25–44. https://doi.org/10.1038/s41568-021-00413-6
192. Toma, M. A., Liu, Z., Wang, Q., Zhang, L., Li, D., Sommar, P., & Landén, N. X. (2022). Circular RNA Signatures of Human Healing and Nonhealing Wounds. *The Journal of investigative dermatology*, *142*(10), 2793–2804.e26. <https://doi.org/10.1016/j.jid.2022.03.024>
193. Tomikawa, K., Yamamoto, T., Shiomi, N., Shimoe, M., Hongo, S., Yamashiro, K., Yamaguchi, T., Maeda, H., & Takashiba, S. (2012). Smad2 decelerates re-epithelialization during gingival wound healing. *Journal of dental research*, *91*(8), 764–770. <https://doi.org/10.1177/0022034512451449>
194. Wallace, G. C., 4th, Dixon-Mah, Y. N., Vandergrift, W. A., 3rd, Ray, S. K., Haar, C. P., Mittendorf, A. M., Patel, S. J., Banik, N. L., Giglio, P., & Das, A. (2013). Targeting oncogenic ALK and MET: a promising therapeutic strategy for glioblastoma. *Metabolic brain disease*, *28*(3), 355–366. <https://doi.org/10.1007/s11011-013-9401-7>.
195. Wang, A. Y., & Liu, H. (2019). The past, present, and future of CRM1/XPO1 inhibitors. Stem cell investigation, 6, 6. https://doi.org/10.21037/sci.2019.02.03
196. Wang, C., Shang, H., Cui, W., Zhou, F., Zhang, S., Wang, X., Gao, P., Wei, K., & Zhu, R. (2022). Pine pollen polysaccharides promote cell proliferation and accelerate wound healing by activating the JAK2-STAT3 signaling pathway. International journal of biological macromolecules, 210, 579–587. <https://doi.org/10.1016/j.ijbiomac.2022.04.210>
197. Wang, F., Gao, Y., Yuan, Y., Du, R., Li, P., Liu, F., Tian, Y., Wang, Y., Zhang, R., Zhao, B., & Wang, C. (2020). MicroRNA-31 Can Positively Regulate the Proliferation, Differentiation and Migration of Keratinocytes. *Biomedicine hub*, *5*(2), 93–104. <https://doi.org/10.1159/000508612>
198. Wang, J., Xiao, B., Kimura, E., Mongan, M., & Xia, Y. (2022). The combined effects of Map3k1 mutation and dioxin on differentiation of keratinocytes derived from mouse embryonic stem cells. *Scientific reports*, *12*(1), 11482. <https://doi.org/10.1038/s41598-022-15760-z>
199. Wang, K. Q., Ye, M. L., Qiao, X., Yu, Z. W., Wu, C. X., & Zheng, J. F. (2022). Circular RNA Fibroblast Growth Factor Receptor 1 Promotes Pancreatic Cancer Progression by Targeting MicroRNA-532-3p/PIK3CB Axis. *Pancreas*, *51*(8), 930–942. <https://doi.org/10.1097/MPA.0000000000002119>
200. Wang, L., Lyu, Y., Li, Y., Li, K., Wen, H., Feng, C., & Li, N. (2021). ASXL1 promotes adrenocortical carcinoma and is associated with chemoresistance to EDP regimen. Aging, 13(18), 22286–22297. <https://doi.org/10.18632/aging.203534>
201. Wang, S., Tong, X., Li, C., Jin, E., Su, Z., Sun, Z., Zhang, W., Lei, Z., & Zhang, H. T. (2021). Quaking 5 suppresses TGF-β-induced EMT and cell invasion in lung adenocarcinoma. *EMBO reports*, *22*(6), e52079. <https://doi.org/10.15252/embr.202052079>
202. Wang, X., Lu, M., Tian, X., Ren, Y., Li, Y., Xiang, M., & Chen, S. (2020). Diminished expression of major histocompatibility complex facilitates the use of human induced pluripotent stem cells in monkey. Stem cell research & therapy, 11(1), 334. <https://doi.org/10.1186/s13287-020-01847-9>
203. Wang, Y., Yang, Z., Wang, L., Sun, L., Liu, Z., Li, Q., Yao, B., Chen, T., Wang, C., Yang, W., Liu, Q., & Han, S. (2019). miR-532-3p promotes hepatocellular carcinoma progression by targeting PTPRT. *Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie*, *109*, 991–999. <https://doi.org/10.1016/j.biopha.2018.10.145>
204. Wee, W. K. J., Low, Z. S., Ooi, C. K., Henategala, B. P., Lim, Z. G. R., Yip, Y. S., Vos, M. I. G., Tan, W. W. R., Cheng, H. S., & Tan, N. S. (2022). Single-cell analysis of skin immune cells reveals an Angptl4-ifi20b axis that regulates monocyte differentiation during wound healing. *Cell death & disease*, *13*(2), 180. https://doi.org/10.1038/s41419-022-04638-7
205. Wei, X., Liu, X., Liu, H., He, X., Zhuang, H., Tang, Y., & Wang, B. (2020). BRCA1-associated protein induced proliferation and migration of gastric cancer cells through MAPK pathway. Surgical oncology, 35, 191–199. https://doi.org/10.1016/j.suronc.2020.08.007
206. Weng, X., Chen, W., Hu, W., Xu, K., Qi, L., Chen, J., Lu, D., Shao, Y., Zheng, X., Ye, C., & Zheng, S. (2019). PTPRB promotes metastasis of colorectal carcinoma via inducing epithelial-mesenchymal transition. *Cell death & disease*, *10*(5), 352. <https://doi.org/10.1038/s41419-019-1554-9>
207. Whyte, J. L., Smith, A. A., Liu, B., Manzano, W. R., Evans, N. D., Dhamdhere, G. R., Fang, M. Y., Chang, H. Y., Oro, A. E., & Helms, J. A. (2013). Augmenting endogenous Wnt signaling improves skin wound healing. PloS one, 8(10), e76883. <https://doi.org/10.1371/journal.pone.0076883>
208. Wu, F., Qin, Y., Jiang, Q., Zhang, J., Li, F., Li, Q., Wang, X., Gao, Y., Miao, J., Guo, C., Yang, Y., Ni, L., Liu, L., Zhang, S., & Huang, C. (2020). MyoD1 suppresses cell migration and invasion by inhibiting FUT4 transcription in human gastric cancer cells. *Cancer gene therapy*, *27*(10-11), 773–784. https://doi.org/10.1038/s41417-019-0153-3
209. Wu, I. C., Chen, Y. K., Wu, C. C., Cheng, Y. J., Chen, W. C., Ko, H. J., Liu, Y. P., Chai, C. Y., Lin, H. S., Wu, D. C., & Wu, M. T. (2016). Overexpression of ATPase Na+/+ transporting alpha 1 polypeptide, ATP1A1, correlates with clinical diagnosis and progression of esophageal squamous cell carcinoma. Oncotarget, 7(51), 85244–85258. <https://doi.org/10.18632/oncotarget.13267>
210. Wu, Y., Zhou, Y., Huan, L., Xu, L., Shen, M., Huang, S., & Liang, L. (2019). LncRNA MIR22HG inhibits growth, migration and invasion through regulating the miR-10a-5p/NCOR2 axis in hepatocellular carcinoma cells. *Cancer science*, *110*(3), 973–984. <https://doi.org/10.1111/cas.13950>
211. Xiao, Q., Wang, CY., Gao, C. et al. Regulation of KDM5C stability and enhancer reprogramming in breast cancer. Cell Death Dis 13, 843 (2022). <https://doi.org/10.1038/s41419-022-05296-5>
212. Xiong, D., Sheng, Y., Ding, S., Chen, J., Tan, X., Zeng, T., Qin, D., Zhu, L., Huang, A., & Tang, H. (2016). LINC00052 regulates the expression of NTRK3 by miR-128 and miR-485-3p to strengthen HCC cells invasion and migration. *Oncotarget*, *7*(30), 47593–47608. <https://doi.org/10.18632/oncotarget.10250>
213. Xu KP, Riggs A, Ding Y, Yu FS. Role of ErbB2 in Corneal Epithelial Wound Healing. Invest Ophthalmol Vis Sci. 2004;45(12):4277-4283. doi:10.1167/iovs.04-0119
214. Xu, Q., Zhu, Q., Zhou, Z., Wang, Y., Liu, X., Yin, G., Tong, X., & Tu, K. (2018). MicroRNA-876-5p inhibits epithelial-mesenchymal transition and metastasis of hepatocellular carcinoma by targeting BCL6 corepressor like 1. Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie, 103, 645–652. <https://doi.org/10.1016/j.biopha.2018.04.037>
215. Xu, Z. Q., Chen, W. C., Li, Y. J., Suo, M. J., Tian, G. X., Sheng, W., & Huang, G. Y. (2022). PTPN11 Gene Mutations and Its Association with the Risk of Congenital Heart Disease. *Disease markers*, *2022*, 8290779. https://doi.org/10.1155/2022/8290779
216. Xun, G., Hu, W., & Li, B. (2021). PTEN loss promotes oncogenic function of STMN1 via PI3K/AKT pathway in lung cancer. Scientific reports, 11(1), 14318. <https://doi.org/10.1038/s41598-021-93815-3>
217. Yang, B. B., Zheng, Y. X., Yan, B. X., Cao, H. L., Landeck, L., Chen, J. Q., Li, W., Min, M., Wang, P., Cai, S. Q., Zheng, M., & Man, X. Y. (2020). Suppressor of Fused Inhibits Skin Wound Healing. *Advances in wound care*, *9*(5), 233–244. <https://doi.org/10.1089/wound.2018.08>
218. Yang, M. H., Yen, C. H., Chen, Y. F., Fang, C. C., Li, C. H., Lee, K. J., Lin, Y. H., Weng, C. H., Liu, T. T., Huang, S. F., Teh, B. T., & Chen, Y. A. (2019). Somatic mutations of PREX2 gene in patients with hepatocellular carcinoma. *Scientific reports*, *9*(1), 2552. <https://doi.org/10.1038/s41598-018-36810-5>
219. Yang, X., Cao, Z., Wu, P., & Li, Z. (2019). Effect and Mechanism of the Bruton Tyrosine Kinase (Btk) Inhibitor Ibrutinib on Rat Model of Diabetic Foot Ulcers. Medical science monitor :international medical journal of experimental and clinical research, 25, 7951–7957. <https://doi.org/10.12659/MSM.916950>
220. Yao, L., Rathnakar, B. H., Kwon, H. R., Sakashita, H., Kim, J. H., Rackley, A., Tomasek, J. J., Berry, W. L., & Olson, L. E. (2022). Temporal control of PDGFRα regulates the fibroblast-to-myofibroblast transition in wound healing. *Cell reports*, *40*(7), 111192. <https://doi.org/10.1016/j.celrep.2022.111192>
221. Yi R , Pasolli HA , Landthaler M , Hafner M , Ojo T , Sheridan R , Sander C , O'Carroll D , Stoffel M , Tuschl T , Fuchs E. DGCR8-dependent microRNA biogenesis is essential for skin development. Proc Natl Acad Sci USA 106: 498–502, 2009
222. Yu, B., Qu, L., Wu, T., Yan, B., Kan, X., Zhao, X., Yang, L., Li, Y., Liu, M., Tian, L., Sun, Y., & Li, Q. (2020). A Novel LncRNA, AC091729.7 Promotes Sinonasal Squamous Cell Carcinomas Proliferation and Invasion Through Binding SRSF2. *Frontiers in oncology*, *9*, 1575. <https://doi.org/10.3389/fonc.2019.01575>
223. Yu, B., Qu, L., Wu, T., Yan, B., Kan, X., Zhao, X., Yang, L., Li, Y., Liu, M., Tian, L., Sun, Y., & Li, Q. (2020). A Novel LncRNA, AC091729.7 Promotes Sinonasal Squamous Cell Carcinomas Proliferation and Invasion Through Binding SRSF2. Frontiers in oncology, 9, 1575.<https://doi.org/10.3389/fonc.2019.01575>
224. Yu Z, Xue D, Song M, et al. Targeting UBR5 inhibits postsurgical breast cancer lung metastases by inducing apoptosis mediated by CDC73 and p53. Research Square; 2022. DOI: 10.21203/rs.3.rs-2288884/v1.
225. Yue, H., Meng, F. X., Qian, J., Xu, B. B., Li, G., & Wu, J. H. (2019). Calpastatin participates in the regulation of cell migration in BAP1-deficient uveal melanoma cells. International journal of ophthalmology, 12(11), 1680–1687. <https://doi.org/10.18240/ijo.2019.11.03>
226. Zakharova, V. V., Magnitov, M. D., Del Maestro, L., Ulianov, S. V., Glentis, A., Uyanik, B., Williart, A., Karpukhina, A., Demidov, O., Joliot, V., Vassetzky, Y. S., Mège, R. M., Piel, M., Razin, S. V., & Ait-Si-Ali, S. (2022). SETDB1 fuels the lung cancer phenotype by modulating epigenome, 3D genome organization and chromatin mechanical properties. *Nucleic acids research*, *50*(8), 4389–4413. <https://doi.org/10.1093/nar/gkac234>
227. Zhang, C., Song, C., Liu, T., Tang, R., Chen, M., Gao, F., Xiao, B., Qin, G., Shi, F., Li, W., Li, Y., Fu, X., Shi, D., Xiao, X., Kang, L., Huang, W., Wu, X., Tang, B., & Deng, W. (2017). KMT2A promotes melanoma cell growth by targeting hTERT signaling pathway. Cell death & disease, 8(7), e2940. <https://doi.org/10.1038/cddis.2017.285>
228. Zhang, H., Liu, J., Dang, Q., Wang, X., Chen, J., Lin, X., Yang, N., Du, J., Shi, H., Liu, Y., & Han, J. (2022). Ribosomal protein RPL5 regulates colon cancer cell proliferation and migration through MAPK/ERK signaling pathway. *BMC molecular and cell biology*, *23*(1), 48. <https://doi.org/10.1186/s12860-022-00448-z>
229. Zhang, Q., Zhang, X., & Dong, W. (2021). TRAF7 contributes to tumor progression by promoting ubiquitin-proteasome mediated degradation of P53 in hepatocellular carcinoma. *Cell death discovery*, *7*(1), 352. https://doi.org/10.1038/s41420-021-00749-w
230. Zhang, S., Chen, H., Liu, W., Fang, L., Qian, Z., Kong, R., Zhang, Q., Li, J., & Cao, X. (2020). miR-766-3p Targeting BCL9L Suppressed Tumorigenesis, Epithelial-Mesenchymal Transition, and Metastasis Through the β-Catenin Signaling Pathway in Osteosarcoma Cells. Frontiers in cell and developmental biology, 8, 594135. <https://doi.org/10.3389/fcell.2020.594135>
231. Zhang, Y., Chen, J., Zhou, N., Lu, Y., Lu, J., Xing, X., Chen, H., & Zhang, X. (2021). FUBP1 mediates the growth and metastasis through TGFβ/Smad signaling in pancreatic adenocarcinoma. International journal of molecular medicine, 47(5), 66. https://doi.org/10.3892/ijmm.2021.4899.
232. Zhang, Y., Liu, X., Liu, L., Chen, J., Hu, Q., Shen, S., Zhou, Y., Chen, S., Xue, C., Cui, G., & Yu, Z. (2020). Upregulation of FEN1 Is Associated with the Tumor Progression and Prognosis of Hepatocellular Carcinoma. Disease markers, 2020, 2514090. <https://doi.org/10.1155/2020/2514090>
233. Zhong, L., Pan, Y., & Shen, J. (2021). FBXW7 inhibits invasion, migration and angiogenesis in ovarian cancer cells by suppressing VEGF expression through inactivation of β-catenin signaling. Experimental and therapeutic medicine, 21(5), 514. https://doi.org/10.3892/etm.2021.9945
234. Zhou, C., Jin, H., Li, W., Zhao, R., & Chen, C. (2021). CTNNB1 S37C mutation causing cells proliferation and migration coupled with molecular mechanisms in lung adenocarcinoma. Annals of translational medicine, 9(8), 681. <https://doi.org/10.21037/atm-21-1146>
235. Zhu, W., Zhuang, P., Song, W., Duan, S., Xu, Q., Peng, M., & Zhou, J. (2017). Knockdown of lncRNA HNF1A-AS1 inhibits oncogenic phenotypes in colorectal carcinoma. Molecular medicine reports, 16(4), 4694–4700. <https://doi.org/10.3892/mmr.2017.7175>
236. Zhuang, M., Deng, Y., Zhang, W., Zhu, B., Yan, H., Lou, J., Zhang, P., Cui, Q., Tang, H., Sun, H., & Sun, Y. (2021). LncRNA Bmp1 promotes the healing of intestinal mucosal lesions via the miR-128-3p/PHF6/PI3K/AKT pathway. *Cell death & disease*, *12*(6), 595. https://doi.org/10.1038/s41419-021-03879-2

Supplementary material table 3a:

Genes differentially expressed during various stages of wound healing (Cooper et al 2005) namely activation phase, early effecter, late effecter, stop signal, early inflammatory, late inflammatory and related inflammatory and their involvement in cancer: References giving evidence for involvement in cancer (at least one each) are tabulated.

Cooper, L., Johnson, C., Burslem, F., & Martin, P. (2005). Wound healing and inflammation genes revealed by array analysis of 'macrophageless' PU.1 null mice. *Genome biology*, *6*(1), R5. https://doi.org/10.1186/gb-2004-6-1-r5

|  |  |
| --- | --- |
| Activation | |
| 2510002C21Rik |  |
| Actc1 | Suresh, R., & Diaz, R. J. (2021). |
| Adh1 | Li et al 2007 |
| Adrb | Fjæstad et al 2022 |
| Agxt | Sun et al 2019 |
| Ak1 | Jan et al 2019 |
| Alox12b | Jiang et al 2020 |
| Atf3 | Thompson et al 2009 |
| Bcl10 | Kuo et al 2021 |
| Bhlhb2 |  |
| Bpgm | Li et al 2022 |
| Capn6 | Chen et al 2020 |
| Casp7 | Chaudhary et al 2016 |
| Ccne1 | Xu et al 2021 |
| Ccr4 | Li et al 2012 |
| Cirbp | Lu et al 2018 |
| Cish2 |  |
| Col5a2 | Wang et al 2021 |
| Col6a2 | Li et al 2022 |
| Col6a3 | Li et al 2018 |
| Csf1 | Richardsen et al 2015 |
| Csf3 | Saunders, et al 2021 |
| Csrp2 | Chen et al 2020 |
| Csrp3 | Zhuo et al 2022 |
| Cyr61 | Shi et al 2019 |
| Dusp1 | Liu et al 2014 |
| Egr1 | Saha et al 2021 |
| Fbln1 | Xiao et al 2014 |
| Figf | Marconcini et al 1999 |
| Fkbp5 | Li et al 2011 |
| Fosb | Tang et al 2016 |
| Fosl1 | Sobolev et al 2022 |
| Gatm | Zhang et al 2021 |
| Gem |  |
| Glns | Yu et al 2021 |
| Gsto1 | Manupati et al 2019 |
| H1f2 |  |
| Has1 | Liu et al 2015 |
| Hegfl |  |
| Hexa |  |
| Hspb2 | Yu et al 2020 |
| Icam1 | Reina et al 2017 |
| Ier2 | Kyjacova et al 2021 |
| Irf1 | Karki et al 2020 |
| Irs2 | Jeong et al 2018 |
| Junb | Konish et al 2008. |
| Klf9 | Zhong et al 2018 |
| Mail |  |
| Mest | Wang et al 2021 |
| Mfap2 | Xu et al 2022 |
| Mkrn1 | Ko et al 2012 |
| Myc | Duffy et al 2021 |
| Nfkbia | Bredel et al 2013 |
| Nr4a1 | Hedrick et al 2015 |
| Per1 | Liu et al 2021 |
| Per2 | Xiong et al 2018 |
| Prom | Saha et al 2020 |
| Pscd3 | Nagahama et al 2010 |
| Ptgs2 | Saindane et al 2020 |
| Sele | Li et al 2021 |
| Serpinh1 | Wang et al 2022 |
| Snca | Wu et al 2022 |
| Tnni1 | Cong et al 2022 |
| Zfp36 | Chen et al 2020 |
| EARLY EFFECTOR | |
| Acadl | Zhao et al 2020 |
| Adar | Xu et al 2018 |
| Adcy4 | Fan et al 2019 |
| Aldh1a3 | Yamashita et al 2020 |
| Ankrd2 | Bean et al 2014 |
| Areg | Xu et al 2016 |
| Car2 | Jie et al 2021 |
| Car4 |  |
| Cenpb | McGovern et al 2012 |
| Crabp2 | Feng et al 2019 |
| Crap |  |
| Ctla2a | Feng et al 2019 |
| Ddef1 | Justis P et al 2005 |
| Dnajc3 |  |
| Eps8 | Li et al 2013 |
| Ereg | cheng et al 2021 |
| Ets1 | Kim et al 2018 |
| Fgfrp |  |
| Fgl2 | Feng et al 2020 |
| Fin14 |  |
| Fth | Hu et al 2021 |
| Fv1 | Geisen et al 2015 |
| Fxyd5 | Raman et al 2015 |
| Galgt1 | Singhal et al 2015 |
| Gch |  |
| Gjb6 | Son et al 2020 |
| Gp38 | Del et al 2014 |
| Gpx3 | Nirgude et al 2021 |
| H2-T22 | Mei et al 2021 |
| Hck | Musumeci et al 2015 |
| Hif1a | Wu et al 2019 |
| Hmga2 | Mansoori et al 2021 |
| Hmgcr | Göbel et al 2019 |
| Hnrpdl | Zhang et al 2018 |
| Igh-8 | Waugh et al 2008 |
| Il1r2 | Zhang et al 2019 |
| Il4ra | Bednarz-Misa et al 2020 |
| Il8rb | Sun et al 2022 |
| Itga6 | Brooks et al 2016 |
| Klc1 | Moamer et al 2019 |
| Lama3 | Feng et al 2021 |
| Lamb3 | Zhu et al 2020 |
| Lamc2 | Liu et al 2021 |
| Lbp | Meng et al 2021 |
| Lgals9 | Armenta-Castro et al 2020 |
| Ltbr | Lau et al 2014 |
| Ly6a | Upadhyay et al 2019 |
| Ly6e | Yeom et al 2016 |
| Mal | Lara-Lemus R.2019 |
| Map3k1 | Pham et al 2013 |
| Map4k4 | Gao et al 2017 |
| Mapk6 | Cai et al 2021 |
| Mmp11 | Gobin et al 2019 |
| Mt1 | Si et al 2018 |
| Myd88 | Zhu et al 2020 |
| Myf6 | Arons et al 2020 |
| Nat2 | Zhu et 2021 |
| Nfh |  |
| Osp94 |  |
| Pdgfra | Wu et al 2022 |
| Pex5 | Dahabieh et al 2018 |
| Pfkp | Shen et al 2020 |
| Plaur | Liu et al 2021 |
| Pld1 | Zhang et al 2014 |
| Pp11r |  |
| Pros1 | Al Kafri, N., &Hafizi, S.2019 |
| Ptges | Wang et al 2019 |
| Ptgis | Sadler et al 2016 |
| Rbp1 | Gao et al 2020 |
| Rnase4 | Vanli et al 2022 |
| Rock2 | Dourado et al 2018 |
| S100a6 | Wang et al 2021 |
| S3-12 |  |
| Saa1 | Takehara et al 2020 |
| Samhd1 | Schott et al 2022 |
| Sdcbp | Das et al 2020 |
| Serpina3c |  |
| Serpinb2 | Chen et al 2022 |
| Serpinb4 | Izuhara et al 2018 |
| Serpine1 | Wang et al 2022 |
| Serping1 | Peng et al 2018 |
| Sgk | Bruhn et al 2010 |
| Sh3yl1 | Blessing et al 2015 |
| Slc11a1 | Zhu et al 2022 |
| Sod2 | Kim et al 2017 |
| Sod3 | Carmona et al 2020 |
| Spi12 |  |
| Sprr2a | Specht et al 2013 |
| Sprr2b | Yao et al 2021 |
| Stat1 | Zhang et al 2017 |
| Stat3 | Zou et al 2020 |
| Stk2 | Tsugeno et al 2014 |
| Tac1 | Reddy et al 2009 |
| Tapbp |  |
| Tgm2 | Malkomes et al 2021 |
| Tgm3 | Feng et al 2020 |
| Thbd | Mohamed et al 2018 |
| Thy1 | Hu et al 2020 |
| Trim25 | Takayama et al 2018 |
| Tubb5 |  |
| Vcam1 | Zhang et al 2020 |
| Vdr | Thorne et al 2008 |
| Xdh | Takayama et al 2018, Chen et al 2017 |
| LATE EFFECTOR | |
| Alox15b | The human protein atlas |
| Anxa8 | The human protein atlas |
| Chi3l1 | Kawada et al 2012 |
| Ctsb | Peng S et al 2021 |
| Cxcl5 | Deng et al 2022 |
| Cyp1b1 | Mckay et al 1995 |
| Defb1 | Lee et al 2016 |
| Gsta4 | Zhang et al 2022 |
| Gyk |  |
| Hp | Tai et al 2017 |
| Ifi204 | Dauffy et al 2006 |
| Iigp |  |
| Il1rl1 | Wang et al 2020 |
| Isg15 | Han et al 2018 |
| Isgf3g | Weihua et al 1997 |
| Krt1-16 | Han et al 2021 |
| Krt2-6a |  |
| Krt2-6b |  |
| Lrg | Takemoto et al 2015 |
| Mmp13 | Huang et al 2010. |
| Mmp3 | Suhaimi et al 2020 |
| Mmp9 | Joseph et al 2020 |
| Osmr | Lee et al 2021 |
| Procr | Wang et al 2018 |
| Prss18 | Bao et al 2019 |
| Psmb8 | Chen et al 2021 |
| S100a8 | Huang et al 2020 |
| Saa1 | Takehara et al 2020 |
| Saa3 | Djurec et al 2018 |
| Serpina3n |  |
| Slc2a1 | Liu et al 2022 |
| Slpi | Wei et al 2020 |
| Sprr1b | Sasahira et al 2021 |
| Sprr2a | Specht et al 2013 |
| Sprr2d | The human protein atlas |
| Sprr2f | Contreras et al 2010 |
| Sprr2h | Hudlikar et al 2020 |
| Timp1 | Schoeps et al 2021 |
| Tnc | Yoshida et al 2015 |
| Usp18 | Pinto-Fernandez et al 2021 |
| STOP | |
| Actc1 | Suresh, R., & Diaz, R. J.2021 |
| Acvr2 | Jung et al 2007 |
| Alcam | Darvishi et al 2020 |
| Amd2 | Hollander et al 2015 |
| Apoe | Kemp et al 2021 |
| Atp7a | Li et al 2016 |
| Bmi1 | Cao et al 2011 |
| Bmpr1a | Fernandez-Rozadilla et al 2013 |
| Calm4 |  |
| Cbx3 | Niu et al 2022 |
| Cbx5 | He et al 2021 |
| Ccne2 | Taghavi, et al 2016 |
| Cd2ap | Xie et al 2022 |
| Cdh6 | Meng et al 2022 |
| Chgb | Weisbrod et al 2013 |
| Cldn1 | Bhat et al 2020 |
| Crem | Yu et al 2021 |
| Ctse | Ye et al 2021 |
| Cyp51 |  |
| Diap3 |  |
| Dlx3 | Bajpai et al 2021 |
| Dmd | Jones et al 2021 |
| Dsc3 | Cui et al 2019 |
| Efnb1 | Shi et al 2021 |
| Egfr | Uribe et al 2021 |
| Emp2 | Chung et al 2017 |
| Gata3 | Takaku et al 2015 |
| Grpel2 | Lai et al 2021 |
| Hba-a1 |  |
| Hbb-b1 | Zheng et al 2017 |
| Hmgcr | Göbel, et al 2019 |
| Hsp105 | Nosaka et al 2021 |
| Hsp70-2 | Jagadish et al 2016 |
| Itga4 | Mo et al 2022 |
| Itpr5 |  |
| Kif1b | Ando et al 2019 |
| Klf3 | Wang et al 2019 |
| Krt1-1 |  |
| Krt1-2 |  |
| Krt1-24 |  |
| Krt1-24 |  |
| Krt1-3 |  |
| Krt1-c29 |  |
| Krt2-1 |  |
| Krt2-10 |  |
| Krt2-18 |  |
| Krt2-19 |  |
| Krt2-6g |  |
| Krtap6-1 |  |
| L1Md-Tf29 |  |
| Matr3 | Yang et al 2020 |
| Mbd4 | Tanakaya et al 2019 |
| Mrps15 | The human protein atlas |
| Msr1 | Wang et al 2021 |
| Msx3 |  |
| Mt4 | Pai et al 2015 |
| Mtap6 | Mamoor, S. 2021 |
| Narg1 | Bae et al 2013 |
| Ncl | Berger et al 2015 |
| Nfia | The human protein atlas |
| Nfic | The human protein atlas |
| Nfyb | Fang et al 2018 |
| Nol5 |  |
| Npy6r | Mei et al 2022 |
| Nr3c1 | Wang et al 2023 |
| Nrg3 | Li et al 2021 |
| Pcdh7 | Zhang et al 2021 |
| Pdi3 |  |
| Plxna3 | Gabrovska et al 2011 |
| Pnn | Zhang et al 2022 |
| Ppp1r3c | Lee et al 2015 |
| Prss12 | Liu et al 2019 |
| Ptgfrn | Aguila et al 2019 |
| Ptprr | Wang et al 2019 |
| Pura | The human protein atlas |
| Pvrl3 | Sun et al 2018 |
| Rad50 | Li et al 2021 |
| Rev1I | Chatterjee et al 2020 |
| Rpo1-1 |  |
| Rps2 | Wang et al 2009 |
| Rps24 | Wang et al 2015 |
| Rps27a | Wang et al 2014 |
| S100a3 | Zhang et al 2021 |
| Scd1 | Katoch et al 2022 |
| Sdfr2 |  |
| Sh3d19 | The human protein atlas |
| Sox2 | Mamum et al 2020 |
| Spr | Wu et al 2020 |
| Sprr1b | Sasahira et al 2021 |
| Stag1 | van der Lelij et al 2017 |
| Top2b | Uusküla-Reimand, L., & Wilson, M. D. 2022 |
| Tpt1 | Chen et al 2013, National library of medicine |
| Tyrp1 | Jha et al 2021 |
| Ube3a | Zheng et al 2021 |
| Utx | Wang et al 2019 |
| Wnt5a | Asem et al 2016 |
| Zfa |  |
| Zfp26 |  |
| Zfp292 | Takeda et al 2015 |
| Zfp46 |  |
| Zfp62 |  |
| Zfp97 |  |
| EARLY INFLAMMATORY | |
| C3 | Lin et al 2014 |
| C3ar1 | Zou et al 2021 |
| Casp1 | Liu et al 2021 |
| Ccl9 | Yan et al 2015 |
| Ccr1 | Zilio et al 2022 |
| Cd14 | Cheah et al 2015 |
| Cd53 | Dunlock et al 2022 |
| Clecsf8 | Raskov et al 2021 |
| Cxcl10 | Reschke et al 2021 |
| Cxcl2 | Zhang et al 2021 |
| Dab2 | Adamson et al 2016 |
| Fpr-rs2 |  |
| Gbp2 | Yu et al 2020 |
| Gp49a |  |
| Ifi203 |  |
| Ifi204 | Dauffy et al 2006 |
| IL-17 | Vitiello et al 2020 |
| Il1b | Rébé, C., &Ghiringhelli, F. (2020) |
| Irg1 | Papathanassiu et al 2021 |
| Lcp1 | Zeng et al 2021 |
| Mcpt7 |  |
| Mpeg1 | Bayly et al 2020 |
| Mrc1 | Huang et al 2022 |
| Mx1 | Aljohani et al 2020 |
| Pfc | Hingorani, et al 2020 |
| Pglyrp | Li et al 2021 |
| Prg | Liu et al 2022 |
| S100a9 | Gebhardt et al 2006 |
| Slfn2 | Mavrommatis et al 2013 |
| Spp1 | Gao et al 2022 |
| Sqrdl | Liu et al 2020 |
| LATE INFLAMMATORY | |
| Acadm | Ma et al 2021 |
| Adam9 | Lin et al 2014 |
| Agtr2 | The human protein atlas |
| Ars2 | Chen et al 2018 |
| B2m | Zhao et al 2021 |
| C4 |  |
| Cacybp | Li et al 2022 |
| Casp8ap2 | Myacheva et al 2023 |
| Ccr2 | Fein et 2020 |
| Cidea | Laurencikene et al 2008 |
| Clecsf6 |  |
| Clk | Tam et 2020 |
| Clk4 | Kang et al 2022 |
| Cops2 | Alves et al 2020 |
| Coq7 | Brea- Calvo et al 2006 |
| Ctss | Wilkinson et al 2019 |
| Cyp2b19 | Heslby et al 2008 |
| Dbt | Miao et al 2023 |
| Eif3 | Yin et al 2018 |
| Eif4a2 | Chen et al 2019 |
| Fin16 |  |
| Fmr1 | Hu et al 2022 |
| Fnbp4 | Zhong et al 2018 |
| Gas5 | Yu, Y., &Hann, S. S. 2019 |
| Gbp3 | He et al 2021 |
| Gtf2h1 | Geng et al 2022 |
| Hells | Robinson et al 2019 |
| Hnrph1 | Liu et al 2021 |
| Ifi1 |  |
| Ifi202a |  |
| Ifit1 | Pidugu et al 2019 |
| Ifit2 | Lai et al 2022 |
| Ifit3 | Pidugu et al 2019 |
| Lzp-s |  |
| Mup3 |  |
| Nmyc1 | Beltran et al 2014 |
| Np220 |  |
| Nssr |  |
| Nucb2 | Suzuki et al 2012 |
| Pcee |  |
| Ppic | The human protein atlas |
| Ppicap |  |
| Prpk | Zykova et al 2018 |
| Ptbp2 | Chen et al 2022 |
| Rbmx | Yan et al 2021 |
| Rptn | The human protein atlas |
| Septin7 | Wang et al 2018 |
| Sfrs5 |  |
| Sh3bgrl | Zhang et al 2022 |
| Slfn3 | Mavrommatis et al 2013 |
| Sucla2 | Kohno et al 2020 |
| Tank | Revach et al 2020 |
| Tgtp |  |
| Thra | Kim et al 2013 |
| Ttrap | The human protein atlas |
| Uchl5 | Liu et al 2020 |
| Ucp1 | Huang et al 2022 |
| Wsb1 | Kim et al 2015 |
| Zac1 | Su et al 2020 |
| Zfp101 |  |
| Zfp118 |  |
| Zfp265 |  |
| Zfp97 |  |
| REALTED INFLAMMATORY | |
| C1qa | Liang et al 2022 |
| C1qc | Chen et al 2021 |
| Ccl2 | O'Connor, T., &Heikenwalder, M. 2021 |
| Ccl7 | Liu et al 2018 |
| Cish3 |  |
| Cma2 |  |
| Cpa3 | Huang et al 1999 |
| Hdc | Nicoud et al 2020 |
| Il6 | Wang et al 2017 |
| Mcpt5 |  |
| Mup1 |  |
| Mup4 | Singh et al 2007 |
| MUPV |  |
| Ptx3 | Giacomini et al 2018 |
| Slc6a4 |  |
| Tnfip6 | Zhang et al 2021 |

References:

1. Adamson, S. E., Griffiths, R., Moravec, R., Senthivinayagam, S., Montgomery, G., Chen, W., Han, J., Sharma, P. R., Mullins, G. R., Gorski, S. A., Cooper, J. A., Kadl, A., Enfield, K., Braciale, T. J., Harris, T. E., & Leitinger, N. (2016). Disabled homolog 2 controls macrophage phenotypic polarization and adipose tissue inflammation. *The Journal of clinical investigation*, *126*(4), 1311–1322. https://doi.org/10.1172/JCI79590
2. Aguila, B., Morris, A. B., Spina, R., Bar, E., Schraner, J., Vinkler, R., Sohn, J. W., & Welford, S. M. (2019). The Ig superfamily protein PTGFRN coordinates survival signaling in glioblastoma multiforme. *Cancer letters*, *462*, 33–42. https://doi.org/10.1016/j.canlet.2019.07.018
3. Al Kafri, N., & Hafizi, S. (2019). Tumour-Secreted Protein S (ProS1) Activates a Tyro3-Erk Signalling Axis and Protects Cancer Cells from Apoptosis. *Cancers*, *11*(12), 1843. https://doi.org/10.3390/cancers11121843
4. Aljohani, A. I., Joseph, C., Kurozumi, S., Mohammed, O. J., Miligy, I. M., Green, A. R., & Rakha, E. A. (2020). Myxovirus resistance 1 (MX1) is an independent predictor of poor outcome in invasive breast cancer. *Breast cancer research and treatment*, *181*(3), 541–551. https://doi.org/10.1007/s10549-020-05646-x
5. Alves, C. R. R., Neves, W. D., de Almeida, N. R., Eichelberger, E. J., Jannig, P. R., Voltarelli, V. A., Tobias, G. C., Bechara, L. R. G., de Paula Faria, D., Alves, M. J. N., Hagen, L., Sharma, A., Slupphaug, G., Moreira, J. B. N., Wisloff, U., Hirshman, M. F., Negrão, C. E., de Castro, G., Jr, Chammas, R., Swoboda, K. J., … Brum, P. C. (2020). Exercise training reverses cancer-induced oxidative stress and decrease in muscle COPS2/TRIP15/ALIEN. *Molecular metabolism*, *39*, 101012. https://doi.org/10.1016/j.molmet.2020.101012
6. Ando, K., Yokochi, T., Mukai, A., Wei, G., Li, Y., Kramer, S., Ozaki, T., Maehara, Y., & Nakagawara, A. (2019). Tumor suppressor KIF1Bβ regulates mitochondrial apoptosis in collaboration with YME1L1. *Molecular carcinogenesis*, *58*(7), 1134–1144. https://doi.org/10.1002/mc.22997
7. Arons, E., Zhou, H., Sokolsky, M., Gorelik, D., Potocka, K., Davies, S., Fykes, E., Still, K., Edelman, D. C., Wang, Y., Meltzer, P. S., Raffeld, M., Wiestner, A., Xi, L., Wang, H. W., Stetler-Stevenson, M., Yuan, C., & Kreitman, R. J. (2020). Expression of the muscle-associated gene MYF6 in hairy cell leukemia. *PloS one*, *15*(2), e0227586. https://doi.org/10.1371/journal.pone.0227586
8. Asem, M. S., Buechler, S., Wates, R. B., Miller, D. L., & Stack, M. S. (2016). Wnt5a Signaling in Cancer. *Cancers*, *8*(9), 79. https://doi.org/10.3390/cancers8090079
9. Bae, D. H., Jansson, P. J., Huang, M. L., Kovacevic, Z., Kalinowski, D., Lee, C. S., Sahni, S., & Richardson, D. R. (2013). The role of NDRG1 in the pathology and potential treatment of human cancers. *Journal of clinical pathology*, *66*(11), 911–917. https://doi.org/10.1136/jclinpath-2013-201692
10. Bajpai, D., Mehdizadeh, S., Uchiyama, A., Inoue, Y., Sawaya, A., Overmiller, A., Brooks, S. R., Hasneen, K., Kellett, M., Palazzo, E., Motegi, S. I., Yuspa, S. H., Cataisson, C., & Morasso, M. I. (2021). Loss of DLX3 tumor suppressive function promotes progression of SCC through EGFR-ERBB2 pathway. *Oncogene*, *40*(21), 3680–3694. https://doi.org/10.1038/s41388-021-01802-9
11. Bao, Y., Guo, Y., Yang, Y., Wei, X., Zhang, S., Zhang, Y., Li, K., Yuan, M., Guo, D., Macias, V., Zhu, X., Zhang, W., & Yang, W. (2019). PRSS8 suppresses colorectal carcinogenesis and metastasis. *Oncogene*, *38*(4), 497–517. https://doi.org/10.1038/s41388-018-0453-3
12. Bayly-Jones, C., Pang, S. S., Spicer, B. A., Whisstock, J. C., & Dunstone, M. A. (2020). Ancient but Not Forgotten: New Insights Into MPEG1, a Macrophage Perforin-Like Immune Effector. *Frontiers in immunology*, *11*, 581906. https://doi.org/10.3389/fimmu.2020.581906
13. Bean, C., Verma, N., Yamamoto, D. *et al.* Ankrd2 is a modulator of NF-*κ*B-mediated inflammatory responses during muscle differentiation. *Cell Death Dis* 5, e1002 (2014). https://doi.org/10.1038/cddis.2013.525
14. Bednarz-Misa, I., Diakowska, D., Szczuka, I., Fortuna, P., Kubiak, A., Rosińczuk, J., & Krzystek-Korpacka, M. (2020). Interleukins 4 and 13 and Their Receptors Are Differently Expressed in Gastrointestinal Tract Cancers, Depending on the Anatomical Site and Disease Advancement, and Improve Colon Cancer Cell Viability and Motility. *Cancers*, *12*(6), 1463. https://doi.org/10.3390/cancers12061463
15. Beltran H. (2014). The N-myc Oncogene: Maximizing its Targets, Regulation, and Therapeutic Potential. *Molecular cancer research : MCR*, *12*(6), 815–822. https://doi.org/10.1158/1541-7786.MCR-13-0536
16. Berger, C. M., Gaume, X., & Bouvet, P. (2015). The roles of nucleolin subcellular localization in cancer. *Biochimie*, *113*, 78–85. https://doi.org/10.1016/j.biochi.2015.03.023
17. Bhat, A. A., Syed, N., Therachiyil, L., Nisar, S., Hashem, S., Macha, M. A., Yadav, S. K., Krishnankutty, R., Muralitharan, S., Al-Naemi, H., Bagga, P., Reddy, R., Dhawan, P., Akobeng, A., Uddin, S., Frenneaux, M. P., El-Rifai, W., & Haris, M. (2020). Claudin-1, A Double-Edged Sword in Cancer. *International journal of molecular sciences*, *21*(2), 569. https://doi.org/10.3390/ijms21020569
18. Blessing, A. M., Ganesan, S., Rajapakshe, K., Ying Sung, Y., Reddy Bollu, L., Shi, Y., Cheung, E., Coarfa, C., Chang, J. T., McDonnell, D. P., & Frigo, D. E. (2015). Identification of a Novel Coregulator, SH3YL1, That Interacts With the Androgen Receptor N-Terminus. *Molecular endocrinology (Baltimore, Md.)*, *29*(10), 1426–1439. https://doi.org/10.1210/me.2015-1079
19. Brea-Calvo, G., Rodríguez-Hernández, A., Fernández-Ayala, D. J., Navas, P., & Sánchez-Alcázar, J. A. (2006). Chemotherapy induces an increase in coenzyme Q10 levels in cancer cell lines. *Free radical biology & medicine*, *40*(8), 1293–1302. https://doi.org/10.1016/j.freeradbiomed.2005.11.014
20. Bredel, M., Kim, H., Thudi, N.K., Scholtens, D.M., Bonner, J.A., & Sikic, B. (2013). NFKBIA deletion in triple-negative breast cancer. Journal of Clinical Oncology, 31, 1012-1012.
21. Brooks, D. L., Schwab, L. P., Krutilina, R., Parke, D. N., Sethuraman, A., Hoogewijs, D., Schörg, A., Gotwald, L., Fan, M., Wenger, R. H., & Seagroves, T. N. (2016). ITGA6 is directly regulated by hypoxia-inducible factors and enriches for cancer stem cell activity and invasion in metastatic breast cancer models. *Molecular cancer*, *15*, 26. https://doi.org/10.1186/s12943-016-0510-x
22. Bruhn, M. A., Pearson, R. B., Hannan, R. D., & Sheppard, K. E. (2010). Second AKT: the rise of SGK in cancer signalling. *Growth factors (Chur, Switzerland)*, *28*(6), 394–408. https://doi.org/10.3109/08977194.2010.518616
23. Cannarile, M. A., Weisser, M., Jacob, W., Jegg, A. M., Ries, C. H., & Rüttinger, D. (2017). Colony-stimulating factor 1 receptor (CSF1R) inhibitors in cancer therapy. *Journal for immunotherapy of cancer*, *5*(1), 53. https://doi.org/10.1186/s40425-017-0257-y
24. Cao, L., Bombard, J., Cintron, K., Sheedy, J., Weetall, M. L., & Davis, T. W. (2011). BMI1 as a novel target for drug discovery in cancer. *Journal of cellular biochemistry*, *112*(10), 2729–2741. https://doi.org/10.1002/jcb.2323
25. Carmona-Rodríguez, L., Martínez-Rey, D., Fernández-Aceñero, M. J., González-Martín, A., Paz-Cabezas, M., Rodríguez-Rodríguez, N., Pérez-Villamil, B., Sáez, M. E., Díaz-Rubio, E., Mira, E., & Mañes, S. (2020). SOD3 induces a HIF-2α-dependent program in endothelial cells that provides a selective signal for tumor infiltration by T cells. *Journal for immunotherapy of cancer*, *8*(1), e000432. https://doi.org/10.1136/jitc-2019-000432
26. Chatterjee, N., Whitman, M. A., Harris, C. A., Min, S. M., Jonas, O., Lien, E. C., Luengo, A., Vander Heiden, M. G., Hong, J., Zhou, P., Hemann, M. T., & Walker, G. C. (2020). REV1 inhibitor JH-RE-06 enhances tumor cell response to chemotherapy by triggering senescence hallmarks. *Proceedings of the National Academy of Sciences of the United States of America*, *117*(46), 28918–28921. https://doi.org/10.1073/pnas.2016064117
27. Chaudhary, S., Madhukrishna, B., Adhya, A. K., Keshari, S., & Mishra, S. K. (2016). Overexpression of caspase 7 is ERα dependent to affect proliferation and cell growth in breast cancer cells by targeting p21(Cip). *Oncogenesis*, *5*(4), e219. https://doi.org/10.1038/oncsis.2016.12
28. Cheah, M. T., Chen, J. Y., Sahoo, D., Contreras-Trujillo, H., Volkmer, A. K., Scheeren, F. A., Volkmer, J. P., & Weissman, I. L. (2015). CD14-expressing cancer cells establish the inflammatory and proliferative tumor microenvironment in bladder cancer. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(15), 4725–4730. https://doi.org/10.1073/pnas.1424795112
29. Chen, C., Shang, A., Gao, Y., Huang, J., Liu, G., Cho, W. C., & Li, D. (2022). PTBPs: An immunomodulatory-related prognostic biomarker in pan-cancer. *Frontiers in molecular biosciences*, *9*, 968458. https://doi.org/10.3389/fmolb.2022.968458
30. Chen, GL., Ye, T., Chen, HL. *et al.* Xanthine dehydrogenase downregulation promotes TGFβ signaling and cancer stem cell-related gene expression in hepatocellular carcinoma. *Oncogenesis* 6, e382 (2017). https://doi.org/10.1038/oncsis.2017.81
31. Chen, L. H., Liu, J. F., Lu, Y., He, X. Y., Zhang, C., & Zhou, H. H. (2021). Complement C1q (C1qA, C1qB, and C1qC) May Be a Potential Prognostic Factor and an Index of Tumor Microenvironment Remodeling in Osteosarcoma. *Frontiers in oncology*, *11*, 642144. https://doi.org/10.3389/fonc.2021.642144
32. Chen, L., Long, X., Duan, S., Liu, X., Chen, J., Lan, J., Liu, X., Huang, W., Geng, J., & Zhou, J. (2020). CSRP2 suppresses colorectal cancer progression *via* p130Cas/Rac1 axis-meditated ERK, PAK, and HIPPO signaling pathways. *Theranostics*, *10*(24), 11063–11079. https://doi.org/10.7150/thno.4567
33. Chen, L., Xiao, D., Tang, F., Gao, H., & Li, X. (2020). CAPN6 in disease: An emerging therapeutic target (Review). *International journal of molecular medicine*, *46*(5), 1644–1652. https://doi.org/10.3892/ijmm.2020.4734
34. Chen, W., Chen, M., Zhao, Z., Weng, Q., Song, J., Fang, S., Wu, X., Wang, H., Zhang, D., Yang, W., Wang, Z., Xu, M., & Ji, J. (2020). ZFP36 Binds With PRC1 to Inhibit Tumor Growth and Increase 5-Fu Chemosensitivity of Hepatocellular Carcinoma. *Frontiers in molecular biosciences*, *7*, 126. https://doi.org/10.3389/fmolb.2020.00126
35. Chen, Y., Hu, X., Li, Y., Zhang, H., Fu, R., Liu, Y., Hu, J., Deng, Q., Luo, Q., Zhang, D., Gao, N., & Cui, H. (2018). Ars2 promotes cell proliferation and tumorigenicity in glioblastoma through regulating miR-6798-3p. *Scientific reports*, *8*(1), 15602. https://doi.org/10.1038/s41598-018-33905-x
36. Chen, ZH., Qi, JJ., Wu, QN. *et al.* Eukaryotic initiation factor 4A2 promotes experimental metastasis and oxaliplatin resistance in colorectal cancer. *J Exp Clin Cancer Res* 38, 196 (2019). https://doi.org/10.1186/s13046-019-1178-z
37. Chung, L. K., Bhatt, N. S., Lagman, C., Pelargos, P. E., Qin, Y., Gordon, L. K., Wadehra, M., & Yang, I. (2017). Epithelial membrane protein 2: Molecular interactions and clinical implications. *Journal of clinical neuroscience : official journal of the Neurosurgical Society of Australasia*, *44*, 84–88. https://doi.org/10.1016/j.jocn.2017.06.044
38. Cong M, Yu T, Zhu L, et al. TNNI3 expression and prognostic value and correlation with tumor-infiltrating immune cells in LIHC: A bioinformatics analysis. Research Square; 2022. DOI: 10.21203/rs.3.rs-1678776/v1.
39. Contreras, C. M., Akbay, E. A., Gallardo, T. D., Haynie, J. M., Sharma, S., Tagao, O., Bardeesy, N., Takahashi, M., Settleman, J., Wong, K. K., & Castrillon, D. H. (2010). Lkb1 inactivation is sufficient to drive endometrial cancers that are aggressive yet highly responsive to mTOR inhibitor monotherapy. *Disease models & mechanisms*, *3*(3-4), 181–193. https://doi.org/10.1242/dmm.004440
40. Cui, T., Yang, L., Ma, Y., Petersen, I., & Chen, Y. (2019). Desmocollin 3 has a tumor suppressive activity through inhibition of AKT pathway in colorectal cancer. *Experimental cell research*, *378*(2), 124–130. https://doi.org/10.1016/j.yexcr.2019.03.015
41. Dahabieh, M. S., Di Pietro, E., Jangal, M., Goncalves, C., Witcher, M., Braverman, N. E., & Del Rincón, S. V. (2018). Peroxisomes and cancer: The role of a metabolic specialist in a disease of aberrant metabolism. *Biochimica et biophysica acta. Reviews on cancer*, *1870*(1), 103–121. https://doi.org/10.1016/j.bbcan.2018.07.004
42. Darvishi, B., Boroumandieh, S., Majidzadeh-A, K., Salehi, M., Jafari, F., & Farahmand, L. (2020). The role of activated leukocyte cell adhesion molecule (ALCAM) in cancer progression, invasion, metastasis and recurrence: A novel cancer stem cell marker and tumor-specific prognostic marker. *Experimental and molecular pathology*, *115*, 104443. <https://doi.org/10.1016/j.yexmp.2020.104443>
43. Das, S. K., Maji, S., Wechman, S. L., Bhoopathi, P., Pradhan, A. K., Talukdar, S., Sarkar, D., Landry, J., Guo, C., Wang, X. Y., Cavenee, W. K., Emdad, L., & Fisher, P. B. (2020). MDA-9/Syntenin (SDCBP): Novel gene and therapeutic target for cancer metastasis. *Pharmacological research*, *155*, 104695. https://doi.org/10.1016/j.phrs.2020.104695
44. Dauffy, J., Mouchiroud, G., & Bourette, R. P. (2006). The interferon-inducible gene, Ifi204, is transcriptionally activated in response to M-CSF, and its expression favors macrophage differentiation in myeloid progenitor cells. *Journal of leukocyte biology*, *79*(1), 173–183. https://doi.org/10.1189/jlb.0205083
45. Del Rey, M. J., Faré, R., Izquierdo, E., Usategui, A., Rodríguez-Fernández, J. L., Suárez-Fueyo, A., Cañete, J. D., & Pablos, J. L. (2014). Clinicopathological correlations of podoplanin (gp38) expression in rheumatoid synovium and its potential contribution to fibroblast platelet crosstalk. *PloS one*, *9*(6), e99607. https://doi.org/10.1371/journal.pone.0099607
46. Djurec, M., Graña, O., Lee, A., Troulé, K., Espinet, E., Cabras, L., Navas, C., Blasco, M. T., Martín-Díaz, L., Burdiel, M., Li, J., Liu, Z., Vallespinós, M., Sanchez-Bueno, F., Sprick, M. R., Trumpp, A., Sainz, B., Jr, Al-Shahrour, F., Rabadan, R., Guerra, C., … Barbacid, M. (2018). Saa3 is a key mediator of the protumorigenic properties of cancer-associated fibroblasts in pancreatic tumors. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(6), E1147–E1156. https://doi.org/10.1073/pnas.1717802115
47. Dourado, M. R., de Oliveira, C. E., Sawazaki-Calone, I., Sundquist, E., Coletta, R. D., & Salo, T. (2018). Clinicopathologic significance of ROCK2 expression in oral squamous cell carcinomas. *Journal of oral pathology & medicine : official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, *47*(2), 121–127. https://doi.org/10.1111/jop.12651s
48. Duffy, M. J., O'Grady, S., Tang, M., & Crown, J. (2021). MYC as a target for cancer treatment. *Cancer treatment reviews*, *94*, 102154. https://doi.org/10.1016/j.ctrv.2021.102154
49. Dunlock, V. E., Arp, A. B., Singh, S. P., Charrin, S., Nguyen, V., Jansen, E., Schaper, F., Beest, M. T., Zuidscherwoude, M., van Deventer, S. J., Nakken, B., Szodoray, P., Demaria, M. C., Wright, M. D., Querol Cano, L., Rubinstein, E., & van Spriel, A. B. (2022). Tetraspanin CD53 controls T cell immunity through regulation of CD45RO stability, mobility, and function. *Cell reports*, *39*(13), 111006. https://doi.org/10.1016/j.celrep.2022.111006
50. Fan, Y., Mu, J., Huang, M., Imani, S., Wang, Y., Lin, S., Fan, J., & Wen, Q. (2019). Epigenetic identification of ADCY4 as a biomarker for breast cancer: an integrated analysis of adenylate cyclases. *Epigenomics*, *11*(14), 1561–1579. https://doi.org/10.2217/epi-2019-0207
51. Fang, Z., Gong, C., Yu, S., Zhou, W., Hassan, W., Li, H., Wang, X., Hu, Y., Gu, K., Chen, X., Hong, B., Bao, Y., Chen, X., Zhang, X., & Liu, H. (2018). NFYB-induced high expression of E2F1 contributes to oxaliplatin resistance in colorectal cancer via the enhancement of CHK1 signaling. *Cancer letters*, *415*, 58–72. https://doi.org/10.1016/j.canlet.2017.11.040
52. Fein, M. R., He, X. Y., Almeida, A. S., Bružas, E., Pommier, A., Yan, R., Eberhardt, A., Fearon, D. T., Van Aelst, L., Wilkinson, J. E., Dos Santos, C. O., & Egeblad, M. (2020). Cancer cell CCR2 orchestrates suppression of the adaptive immune response. *The Journal of experimental medicine*, *217*(10), e20181551. https://doi.org/10.1084/jem.20181551
53. Feng, L. Y., Huang, Y. Z., Zhang, W., & Li, L. (2021). LAMA3 DNA methylation and transcriptome changes associated with chemotherapy resistance in ovarian cancer. *Journal of ovarian research*, *14*(1), 67. https://doi.org/10.1186/s13048-021-00807-y
54. Feng, X., Zhang, M., Wang, B. *et al.* CRABP2 regulates invasion and metastasis of breast cancer through hippo pathway dependent on ER status. *J Exp Clin Cancer Res* 38, 361 (2019). https://doi.org/10.1186/s13046-019-1345-2
55. Feng, X., Zhang, M., Wang, B. *et al.* CRABP2 regulates invasion and metastasis of breast cancer through hippo pathway dependent on ER status. *J Exp Clin Cancer Res* 38, 361 (2019). https://doi.org/10.1186/s13046-019-1345-2
56. Feng, Y., Guo, C., Wang, H., Zhao, L., Wang, W., Wang, T., Feng, Y., Yuan, K., & Huang, G. (2020). Fibrinogen-Like Protein 2 (FGL2) is a Novel Biomarker for Clinical Prediction of Human Breast Cancer. *Medical science monitor : international medical journal of experimental and clinical research*, *26*, e923531. https://doi.org/10.12659/MSM.923531
57. Feng, Y., Ji, D., Huang, Y., Ji, B., Zhang, Y., Li, J., Peng, W., Zhang, C., Zhang, D., Sun, Y., & Xu, Z. (2020). TGM3 functions as a tumor suppressor by repressing epithelial‑to‑mesenchymal transition and the PI3K/AKT signaling pathway in colorectal cancer. *Oncology reports*, *43*(3), 864–876. https://doi.org/10.3892/or.2020.7474
58. Fernandez-Rozadilla, C., Brea-Fernández, A., Bessa, X., Alvarez-Urturi, C., Abulí, A., Clofent, J., Payá, A., EPICOLON Consortium, Jover, R., Xicola, R., Llor, X., Andreu, M., Castells, A., Carracedo, A., Castellví-Bel, S., & Ruiz-Ponte, C. (2013). BMPR1A mutations in early-onset colorectal cancer with mismatch repair proficiency. *Clinical genetics*, *84*(1), 94–96. https://doi.org/10.1111/cge.12023
59. Fjæstad, K. Y., Rømer, A. M. A., Goitea, V., Johansen, A. Z., Thorseth, M. L., Carretta, M., Engelholm, L. H., Grøntved, L., Junker, N., & Madsen, D. H. (2022). Blockade of beta-adrenergic receptors reduces cancer growth and enhances the response to anti-CTLA4 therapy by modulating the tumor microenvironment. *Oncogene*, *41*(9), 1364–1375. https://doi.org/10.1038/s41388-021-02170-0
60. Gabrovska, P. N., Smith, R. A., Tiang, T., Weinstein, S. R., Haupt, L. M., & Griffiths, L. R. (2011). Semaphorin-plexin signalling genes associated with human breast tumourigenesis. *Gene*, *489*(2), 63–69. https://doi.org/10.1016/j.gene.2011.08.024
61. Gao, L., Wang, Q., Ren, W., Zheng, J., Li, S., Dou, Z., Kong, X., Liang, X., & Zhi, K. (2020). The RBP1-CKAP4 axis activates oncogenic autophagy and promotes cancer progression in oral squamous cell carcinoma. *Cell death & disease*, *11*(6), 488. https://doi.org/10.1038/s41419-020-2693-8
62. Gao, W., Liu, D., Sun, H. *et al.* SPP1 is a prognostic related biomarker and correlated with tumor-infiltrating immune cells in ovarian cancer. *BMC Cancer* 22, 1367 (2022). https://doi.org/10.1186/s12885-022-10485-8
63. Gao, X., Chen, G., Gao, C., Zhang, D. H., Kuan, S. F., Stabile, L. P., Liu, G., & Hu, J. (2017). MAP4K4 is a novel MAPK/ERK pathway regulator required for lung adenocarcinoma maintenance. *Molecular oncology*, *11*(6), 628–639. https://doi.org/10.1002/1878-0261.12055
64. Gebhardt, C., Németh, J., Angel, P., & Hess, J. (2006). S100A8 and S100A9 in inflammation and cancer. *Biochemical pharmacology*, *72*(11), 1622–1631. https://doi.org/10.1016/j.bcp.2006.05.017
65. Geisen, U., Zenthoefer, M., Peipp, M., Kerber, J., Plenge, J., Managò, A., Fuhrmann, M., Geyer, R., Hennig, S., Adam, D., Piker, L., Rimbach, G., & Kalthoff, H. (2015). Molecular Mechanisms by Which a Fucus vesiculosus Extract Mediates Cell Cycle Inhibition and Cell Death in Pancreatic Cancer Cells. *Marine drugs*, *13*(7), 4470–4491. https://doi.org/10.3390/md13074470
66. Geng, T., Li, M., Chen, R. *et al.* Impact of *GTF2H1* and *RAD54L2* polymorphisms on the risk of lung cancer in the Chinese Han population. *BMC Cancer* 22, 1181 (2022). https://doi.org/10.1186/s12885-022-10303-1
67. Giacomini, A., Ghedini, G. C., Presta, M., & Ronca, R. (2018). Long pentraxin 3: A novel multifaceted player in cancer. *Biochimica et biophysica acta. Reviews on cancer*, *1869*(1), 53–63. https://doi.org/10.1016/j.bbcan.2017.11.004
68. Göbel, A., Breining, D., Rauner, M. *et al.* Induction of 3-hydroxy-3-methylglutaryl-CoA reductase mediates statin resistance in breast cancer cells. *Cell Death Dis* 10, 91 (2019). https://doi.org/10.1038/s41419-019-1322-x
69. Göbel, A., Breining, D., Rauner, M. *et al.* Induction of 3-hydroxy-3-methylglutaryl-CoA reductase mediates statin resistance in breast cancer cells. *Cell Death Dis* 10, 91 (2019). https://doi.org/10.1038/s41419-019-1322-x
70. Han, H. G., Moon, H. W., & Jeon, Y. J. (2018). ISG15 in cancer: Beyond ubiquitin-like protein. *Cancer letters*, *438*, 52–62. https://doi.org/10.1016/j.canlet.2018.09.007
71. Han, W., Hu, C., Fan, ZJ. *et al.* Transcript levels of keratin 1/5/6/14/15/16/17 as potential prognostic indicators in melanoma patients. *Sci Rep* 11, 1023 (2021). https://doi.org/10.1038/s41598-020-80336-8
72. Haptoglobin expression correlates with tumor differentiation and five-year overall survival rate in hepatocellular carcinoma Chun-San Tai1,2,3☯, Yan-Ren Lin4,5,6☯, Tsung-Han Teng2 , Ping-Yi Lin7,8, Siang-Jyun Tu9 , Chih-Hung Chou9 , Ya-Rong Huang9 , Wei-Chih Huang9 , Shun-Long Weng10,11,12, HsienDa Huang1,9\*, Yao-Li Chen5,13\*, Wen Liang Chen 2017
73. He, H., Huang, J., Wu, S. *et al.* The roles of GTPase-activating proteins in regulated cell death and tumor immunity. *J Hematol Oncol* 14, 171 (2021). https://doi.org/10.1186/s13045-021-01184-1
74. He, M., Yue, L., Wang, H. *et al.* Evaluation of the prognostic value of CBXs in gastric cancer patients. *Sci Rep* 11, 12375 (2021). https://doi.org/10.1038/s41598-021-91649-7
75. Hedrick, E., Lee, S. O., Kim, G., Abdelrahim, M., Jin, U. H., Safe, S., & Abudayyeh, A. (2015). Nuclear Receptor 4A1 (NR4A1) as a Drug Target for Renal Cell Adenocarcinoma. *PloS one*, *10*(6), e0128308. https://doi.org/10.1371/journal.pone.0128308
76. Helsby, N., Lo, WY., Sharples, K. *et al.* *CYP2C19* pharmacogenetics in advanced cancer: compromised function independent of genotype. *Br J Cancer* 99, 1251–1255 (2008). https://doi.org/10.1038/sj.bjc.6604699
77. Hingorani, D. V., Chapelin, F., Stares, E., Adams, S. R., Okada, H., & Ahrens, E. T. (2020). Cell penetrating peptide functionalized perfluorocarbon nanoemulsions for targeted cell labeling and enhanced fluorine-19 MRI detection. *Magnetic resonance in medicine*, *83*(3), 974–987. https://doi.org/10.1002/mrm.27988
78. Hollander, L. L., Guo, X., Salem, R. R., & Cha, C. H. (2015). The novel tumor angiogenic factor, adrenomedullin-2, predicts survival in pancreatic adenocarcinoma. *The Journal of surgical research*, *197*(2), 219–224. https://doi.org/10.1016/j.jss.2014.11.002
79. Hu, W., Zhou, C., Jing, Q. *et al.* FTH promotes the proliferation and renders the HCC cells specifically resist to ferroptosis by maintaining iron homeostasis. *Cancer Cell Int* 21, 709 (2021). https://doi.org/10.1186/s12935-021-02420-x
80. Hu, Y., Jin, D., Zhou, Y., Cheng, Y., Cao, H., Ma, Y., & Zhang, W. (2020). Multiple roles of THY1 in gastric cancer based on data mining. *Translational cancer research*, *9*(4), 2748–2757. https://doi.org/10.21037/tcr.2020.02.51
81. Huang H, Zhang J, Huang C, Ding X. Prognostic and immunological role of MRC1: A pan-cancer analysis. Research Square; 2022. DOI: 10.21203/rs.3.rs-1467735/v1.
82. Huang, A., Fan, W., Liu, J., Huang, B., Cheng, Q., Wang, P., Duan, Y., Ma, T., Chen, L., Wang, Y., & Yu, M. (2020). Prognostic Role of S100A8 in Human Solid Cancers: A Systematic Review and Validation. *Frontiers in oncology*, *10*, 564248. https://doi.org/10.3389/fonc.2020.564248
83. Huang, H., Reed, C. P., Zhang, J. S., Shridhar, V., Wang, L., & Smith, D. I. (1999). Carboxypeptidase A3 (CPA3): a novel gene highly induced by histone deacetylase inhibitors during differentiation of prostate epithelial cancer cells. *Cancer research*, *59*(12), 2981–2988.
84. Huang, J., Wang, G., Liao, K., Xie, N., & Deng, K. (2022). UCP1 modulates immune infiltration level and survival outcome in ovarian cancer patients. *Journal of ovarian research*, *15*(1), 16. https://doi.org/10.1186/s13048-022-00951-z
85. Huang, M. Y., Chang, H. J., Chung, F. Y., Yang, M. J., Yang, Y. H., Wang, J. Y., & Lin, S. R. (2010). MMP13 is a potential prognostic marker for colorectal cancer. *Oncology reports*, *24*(5), 1241–1247.
86. Hudlikar, R. R., Sargsyan, D., Wu, R., Su, S., Zheng, M., & Kong, A. N. (2020). Triterpenoid corosolic acid modulates global CpG methylation and transcriptome of tumor promotor TPA induced mouse epidermal JB6 P+ cells. *Chemico-biological interactions*, *321*, 109025. https://doi.org/10.1016/j.cbi.2020.109025
87. Izuhara, K., Yamaguchi, Y., Ohta, S., Nunomura, S., Nanri, Y., Azuma, Y., Nomura, N., Noguchi, Y., & Aihara, M. (2018). Squamous Cell Carcinoma Antigen 2 (SCCA2, SERPINB4): An Emerging Biomarker for Skin Inflammatory Diseases. *International journal of molecular sciences*, *19*(4), 1102. https://doi.org/10.3390/ijms19041102
88. Jagadish, N., Agarwal, S., Gupta, N. *et al.* Heat shock protein 70-2 (HSP70-2) overexpression in breast cancer. *J Exp Clin Cancer Res* 35, 150 (2016). https://doi.org/10.1186/s13046-016-0425-9
89. Jan, Y. H., Lai, T. C., Yang, C. J., Huang, M. S., & Hsiao, M. (2019). A co-expressed gene status of adenylate kinase 1/4 reveals prognostic gene signature associated with prognosis and sensitivity to EGFR targeted therapy in lung adenocarcinoma. *Scientific reports*, *9*(1), 12329. https://doi.org/10.1038/s41598-019-48243-9
90. Jeong, S. H., Kim, H. B., Kim, M. C., Lee, J. M., Lee, J. H., Kim, J. H., Kim, J. W., Park, W. Y., Kim, S. Y., Kim, J. B., Kim, H., Kim, J. M., Choi, H. S., & Lim, D. S. (2018). Hippo-mediated suppression of IRS2/AKT signaling prevents hepatic steatosis and liver cancer. *The Journal of clinical investigation*, *128*(3), 1010–1025. https://doi.org/10.1172/JCI95802
91. Jha, J., Singh, M.K., Singh, L. *et al.* Association of TYRP1 with hypoxia and its correlation with patient outcome in uveal melanoma. *Clin Transl Oncol* 23, 1874–1884 (2021). https://doi.org/10.1007/s12094-021-02597-7
92. Jiang, T., Zhou, B., Li, Y. M., Yang, Q. Y., Tu, K. J., & Li, L. Y. (2020). ALOX12B promotes carcinogenesis in cervical cancer by regulating the PI3K/ERK1 signaling pathway. *Oncology letters*, *20*(2), 1360–1368. https://doi.org/10.3892/ol.2020.11641
93. Jie, Y., Liu, G., Feng, L., Li, Y., E, M., Wu, L., Li, Y., Rong, G., Li, Y., Wei, H., & Gu, A. (2021). PTK7-Targeting CAR T-Cells for the Treatment of Lung Cancer and Other Malignancies. *Frontiers in immunology*, *12*, 665970. https://doi.org/10.3389/fimmu.2021.665970
94. Jones, L., Naidoo, M., Machado, L. R., & Anthony, K. (2021). The Duchenne muscular dystrophy gene and cancer. *Cellular oncology (Dordrecht)*, *44*(1), 19–32. https://doi.org/10.1007/s13402-020-00572-y
95. Jung, B. H., Beck, S. E., Cabral, J., Chau, E., Cabrera, B. L., Fiorino, A., Smith, E. J., Bocanegra, M., & Carethers, J. M. (2007). Activin type 2 receptor restoration in MSI-H colon cancer suppresses growth and enhances migration with activin. *Gastroenterology*, *132*(2), 633–644. https://doi.org/10.1053/j.gastro.2006.11.018
96. Kang, E., Kim, K., Jeon, S. Y., Jung, J. G., Kim, H. K., Lee, H. B., & Han, W. (2022). Targeting CLK4 inhibits the metastasis and progression of breast cancer by inactivating TGF-β pathway. *Cancer gene therapy*, *29*(8-9), 1168–1180. https://doi.org/10.1038/s41417-021-00419-0
97. Karki, R., Sharma, B. R., Lee, E., Banoth, B., Malireddi, R. K. S., Samir, P., Tuladhar, S., Mummareddy, H., Burton, A. R., Vogel, P., & Kanneganti, T. D. (2020). Interferon regulatory factor 1 regulates PANoptosis to prevent colorectal cancer. *JCI insight*, *5*(12), e136720. https://doi.org/10.1172/jci.insight.136720
98. Katoh, Y., Yaguchi, T., Kubo, A., Iwata, T., Morii, K., Kato, D., Ohta, S., Satomi, R., Yamamoto, Y., Oyamada, Y., Ouchi, K., Takahashi, S., Ishioka, C., Matoba, R., Suematsu, M., & Kawakami, Y. (2022). Inhibition of stearoyl-CoA desaturase 1 (SCD1) enhances the antitumor T cell response through regulating β-catenin signaling in cancer cells and ER stress in T cells and synergizes with anti-PD-1 antibody. *Journal for immunotherapy of cancer*, *10*(7), e004616. https://doi.org/10.1136/jitc-2022-004616
99. Kawada, M., Seno, H., Kanda, K. *et al.* Chitinase 3-like 1 promotes macrophage recruitment and angiogenesis in colorectal cancer. *Oncogene* 31, 3111–3123 (2012). https://doi.org/10.1038/onc.2011.498
100. Kemp, S. B., Carpenter, E. S., Steele, N. G., Donahue, K. L., Nwosu, Z. C., Pacheco, A., Velez-Delgado, A., Menjivar, R. E., Lima, F., The, S., Espinoza, C. E., Brown, K., Long, D., Lyssiotis, C. A., Rao, A., Zhang, Y., Pasca di Magliano, M., & Crawford, H. C. (2021). Apolipoprotein E Promotes Immune Suppression in Pancreatic Cancer through NF-κB-Mediated Production of CXCL1. *Cancer research*, *81*(16), 4305–4318. https://doi.org/10.1158/0008-5472.CAN-20-3929
101. Kim, GC., Kwon, HK., Lee, CG. *et al.* Upregulation of Ets1 expression by NFATc2 and NFKB1/RELA promotes breast cancer cell invasiveness. *Oncogenesis* 7, 91 (2018). https://doi.org/10.1038/s41389-018-0101-3
102. Kim, J. J., Lee, S. B., Jang, J., Yi, S. Y., Kim, S. H., Han, S. A., Lee, J. M., Tong, S. Y., Vincelette, N. D., Gao, B., Yin, P., Evans, D., Choi, D. W., Qin, B., Liu, T., Zhang, H., Deng, M., Jen, J., Zhang, J., Wang, L., … Lou, Z. (2015). WSB1 promotes tumor metastasis by inducing pVHL degradation. *Genes & development*, *29*(21), 2244–2257. https://doi.org/10.1101/gad.268128.115
103. Kim, W. G., & Cheng, S. Y. (2013). Thyroid hormone receptors and cancer. *Biochimica et biophysica acta*, *1830*(7), 3928–3936. https://doi.org/10.1016/j.bbagen.2012.04.00
104. Kim, Y. S., Gupta Vallur, P., Phaëton, R., Mythreye, K., & Hempel, N. (2017). Insights into the Dichotomous Regulation of SOD2 in Cancer. *Antioxidants (Basel, Switzerland)*, *6*(4), 86. https://doi.org/10.3390/antiox6040086
105. Ko, A., Shin, J. Y., Seo, J., Lee, K. D., Lee, E. W., Lee, M. S., Lee, H. W., Choi, I. J., Jeong, J. S., Chun, K. H., & Song, J. (2012). Acceleration of gastric tumorigenesis through MKRN1-mediated posttranslational regulation of p14ARF. *Journal of the National Cancer Institute*, *104*(21), 1660–1672. https://doi.org/10.1093/jnci/djs424
106. Kohno, S., Linn, P., Nagatani, N. *et al.* Pharmacologically targetable vulnerability in prostate cancer carrying RB1-SUCLA2 deletion. *Oncogene* 39, 5690–5707 (2020). https://doi.org/10.1038/s41388-020-1381-6
107. Konishi N, Shimada K, Nakamura M, et al. Function of JunB in transient amplifying cell senescence and progression of human prostate cancer. Clinical Cancer Research : an Official Journal of the American Association for Cancer Research. 2008 Jul;14(14):4408-4416. DOI: 10.1158/1078-0432.ccr-07-4120. PMID: 18628455.
108. Kuo, S. H., Yang, S. H., Wei, M. F., Lee, H. W., Tien, Y. W., Cheng, A. L., & Yeh, K. H. (2021). Contribution of nuclear BCL10 expression to tumor progression and poor prognosis of advanced and/or metastatic pancreatic ductal adenocarcinoma by activating NF-κB-related signaling. *Cancer cell international*, *21*(1), 436. https://doi.org/10.1186/s12935-021-02143-
109. Kyjacova, L., Saup, R., Rönsch, K., Wallbaum, S., Dukowic-Schulze, S., Foss, A., Scherer, S. D., Rothley, M., Neeb, A., Grau, N., Thiele, W., Thaler, S., Cremers, N., Sticht, C., Gretz, N., Garvalov, B. K., Utikal, J., & Sleeman, J. P. (2021). IER2-induced senescence drives melanoma invasion through osteopontin. *Oncogene*, *40*(47), 6494–6512. https://doi.org/10.1038/s41388-021-02027-6
110. Lai, K. C., Hong, Z. X., Hsieh, J. G., Lee, H. J., Yang, M. H., Hsieh, C. H., Yang, C. H., & Chen, Y. R. (2022). IFIT2-depleted metastatic oral squamous cell carcinoma cells induce muscle atrophy and cancer cachexia in mice. *Journal of cachexia, sarcopenia and muscle*, *13*(2), 1314–1328. https://doi.org/10.1002/jcsm.12943
111. Lai, M. C., Zhu, Q. Q., Xu, J., & Zhang, W. J. (2021). Experimental and clinical evidence suggests that GRPEL2 plays an oncogenic role in HCC development. *American journal of cancer research*, *11*(9), 4175–4198.
112. Lara-Lemus R. (2019). On The Role of Myelin and Lymphocyte Protein (MAL) In Cancer: A Puzzle With Two Faces. *Journal of Cancer*, *10*(10), 2312–2318. https://doi.org/10.7150/jca.30376
113. Lau, T. S., Chung, T. K., Cheung, T. H., Chan, L. K., Cheung, L. W., Yim, S. F., Siu, N. S., Lo, K. W., Yu, M. M., Kulbe, H., Balkwill, F. R., & Kwong, J. (2014). Cancer cell-derived lymphotoxin mediates reciprocal tumour-stromal interactions in human ovarian cancer by inducing CXCL11 in fibroblasts. *The Journal of pathology*, *232*(1), 43–56. https://doi.org/10.1002/path.4258
114. Laurencikiene, J., Stenson, B. M., Arvidsson Nordström, E., Agustsson, T., Langin, D., Isaksson, B., Permert, J., Rydén, M., & Arner, P. (2008). Evidence for an important role of CIDEA in human cancer cachexia. *Cancer research*, *68*(22), 9247–9254. https://doi.org/10.1158/0008-5472.CAN-08-1343
115. Lee, B.Y., Hogg, E.K.J., Below, C.R. *et al.* Heterocellular OSM-OSMR signalling reprograms fibroblasts to promote pancreatic cancer growth and metastasis. *Nat Commun* 12, 7336 (2021). https://doi.org/10.1038/s41467-021-27607-8
116. Lee, J., Han, J. H., Jang, A., Kim, J. W., Hong, S. A., & Myung, S. C. (2016). DNA Methylation-Mediated Downregulation of DEFB1 in Prostate Cancer Cells. *PloS one*, *11*(11), e0166664. https://doi.org/10.1371/journal.pone.0166664
117. Lee, S. K., Moon, J. W., Lee, Y. W., Lee, J. O., Kim, S. J., Kim, N., Kim, J., Kim, H. S., & Park, S. H. (2015). The effect of high glucose levels on the hypermethylation of protein phosphatase 1 regulatory subunit 3C (PPP1R3C) gene in colorectal cancer. *Journal of genetics*, *94*(1), 75–85. https://doi.org/10.1007/s12041-015-0492-2
118. Li, H., Meng, D., Jia, J. *et al.* PGLYRP2 as a novel biomarker for the activity and lipid metabolism of systemic lupus erythematosus. *Lipids Health Dis* 20, 95 (2021). https://doi.org/10.1186/s12944-021-01515-8
119. Li, H., Price, D. K., & Figg, W. D. (2007). ADH1, an N-cadherin inhibitor, evaluated in preclinical models of angiogenesis and androgen-independent prostate cancer. *Anti-cancer drugs*, *18*(5), 563–568. https://doi.org/10.1097/CAD.0b013e328020043e
120. Li, J. Y., Ou, Z. L., Yu, S. J., Gu, X. L., Yang, C., Chen, A. X., Di, G. H., Shen, Z. Z., & Shao, Z. M. (2012). The chemokine receptor CCR4 promotes tumor growth and lung metastasis in breast cancer. *Breast cancer research and treatment*, *131*(3), 837–848. <https://doi.org/10.1007/s10549-011-1502-6>
121. Li, L., Lou, Z., & Wang, L. (2011). The role of FKBP5 in cancer aetiology and chemoresistance. *British journal of cancer*, *104*(1), 19–23. https://doi.org/10.1038/sj.bjc.6606014
122. Li, N., Xiao, H., Shen, J., Qiao, X., Zhang, F., Zhang, W., Gao, Y., & Liu, Y. D. (2021). *SELE* gene as a characteristic prognostic biomarker of colorectal cancer. *The Journal of international medical research*, *49*(4), 3000605211004386. https://doi.org/10.1177/03000605211004386
123. Li, Q., Liu, Z., Ma, L. *et al.* CACYBP knockdown inhibits progression of prostate cancer via p53. *J Cancer Res Clin Oncol* (2022). https://doi.org/10.1007/s00432-022-04497-x
124. Li, X., Li, Z., Gu, S., & Zhao, X. (2022). A pan-cancer analysis of collagen VI family on prognosis, tumor microenvironment, and its potential therapeutic effect. *BMC bioinformatics*, *23*(1), 390. https://doi.org/10.1186/s12859-022-04951-0
125. Li, Y. H., Xue, T. Y., He, Y. Z., & Du, J. W. (2013). Novel oncoprotein EPS8: a new target for anticancer therapy. *Future oncology (London, England)*, *9*(10), 1587–1594. https://doi.org/10.2217/fon.13.104
126. Li, Y., Gong, H., Wang, P. *et al.* The emerging role of ISWI chromatin remodeling complexes in cancer. *J Exp Clin Cancer Res* 40, 346 (2021). https://doi.org/10.1186/s13046-021-02151-x
127. Li, Y., Wang, S., Li, P., Li, Y., Liu, Y., Fang, H., Zhang, X., Liu, Z., & Kong, B. (2021). Rad50 promotes ovarian cancer progression through NF-κB activation. *Journal of cellular and molecular medicine*, *25*(23), 10961–10972. https://doi.org/10.1111/jcmm.17017
128. Li, Z. H., Zheng, R., Chen, J. T., Jia, J., & Qiu, M. (2016). The role of copper transporter ATP7A in platinum-resistance of esophageal squamous cell cancer (ESCC). *Journal of Cancer*, *7*(14), 2085–2092. https://doi.org/10.7150/jca.16117
129. Liang, Z., Pan, L., Shi, J., & Zhang, L. (2022). C1QA, C1QB, and GZMB are novel prognostic biomarkers of skin cutaneous melanoma relating tumor microenvironment. *Scientific reports*, *12*(1), 20460. https://doi.org/10.1038/s41598-022-24353-9
130. Lin, C. Y., Chen, H. J., Huang, C. C., Lai, L. C., Lu, T. P., Tseng, G. C., Kuo, T. T., Kuok, Q. Y., Hsu, J. L., Sung, S. Y., Hung, M. C., & Sher, Y. P. (2014). ADAM9 promotes lung cancer metastases to brain by a plasminogen activator-based pathway. *Cancer research*, *74*(18), 5229–5243. https://doi.org/10.1158/0008-5472.CAN-13-2995
131. Lin, K., He, S., He, L., Chen, J., Cheng, X., Zhang, G., & Zhu, B. (2014). Complement component 3 is a prognostic factor of non‑small cell lung cancer. *Molecular medicine reports*, *10*(2), 811–817. https://doi.org/10.3892/mmr.2014.2230
132. Lin, Z., Deng, Q., Fang, Q., Li, X., Liu, X., Wang, J., Chen, S., Huang, X., Yang, L., Miao, Y., & Yu, X. Y. (2022). Black phosphorus nanoparticles for dual therapy of non-small cell lung cancer. *Journal of drug targeting*, *30*(6), 614–622. https://doi.org/10.1080/1061186X.2022.2032093
133. Liu, D., Song, Z., Wang, X., & Ouyang, L. (2020). Ubiquitin C-Terminal Hydrolase L5 (UCHL5) Accelerates the Growth of Endometrial Cancer via Activating the Wnt/β-Catenin Signaling Pathway. *Frontiers in oncology*, *10*, 865. https://doi.org/10.3389/fonc.2020.00865
134. Liu, F., Gore, A. J., Wilson, J. L., & Korc, M. (2014). DUSP1 is a novel target for enhancing pancreatic cancer cell sensitivity to gemcitabine. *PloS one*, *9*(1), e84982. https://doi.org/10.1371/journal.pone.0084982
135. Liu, J., Zhao, M., Feng, X., Zeng, Y., & Lin, D. (2021). Expression and prognosis analyses of CASP1 in acute myeloid leukemia. *Aging*, *13*(10), 14088–14108. https://doi.org/10.18632/aging.203028
136. Liu, K., Xie, F., Zhao, T., Zhang, R., Gao, A., Chen, Y., Li, H., Zhang, S., Xiao, Z., Li, J., Hong, X., Shang, L., Huang, W., Wang, J., El-Rifai, W., Zaika, A., Chen, X., Que, J., & Lan, X. (2020). Targeting SOX2 Protein with Peptide Aptamers for Therapeutic Gains against Esophageal Squamous Cell Carcinoma. *Molecular therapy : the journal of the American Society of Gene Therapy*, *28*(3), 901–913. https://doi.org/10.1016/j.ymthe.2020.01.012
137. Liu, M., Cai, R., Wang, T., Yang, X., Wang, M., Kuang, Z., Xie, Y., Zhang, J., & Zheng, Y. (2021). LAMC2 promotes the proliferation of cancer cells and induce infiltration of macrophages in non-small cell lung cancer. *Annals of translational medicine*, *9*(17), 1392. https://doi.org/10.21037/atm-21-4507
138. Liu, M., Chen, S., Zhang, A., Zheng, Q., & Fu, J. (2021). PLAUR as a Potential Biomarker Associated with Immune Infiltration in Bladder Urothelial Carcinoma. *Journal of inflammation research*, *14*, 4629–4641. https://doi.org/10.2147/JIR.S326559
139. Liu, M., Yang, L., Liu, X., Nie, Z., Zhang, X., Lu, Y., Pan, Y., Wang, X., & Luo, J. (2021). HNRNPH1 Is a Novel Regulator Of Cellular Proliferation and Disease Progression in Chronic Myeloid Leukemia. *Frontiers in oncology*, *11*, 682859. https://doi.org/10.3389/fonc.2021.682859
140. Liu, Q., Guo, L., Zhang, S., Wang, J., Lin, X., & Gao, F. (2019). PRSS1 mutation: a possible pathomechanism of pancreatic carcinogenesis and pancreatic cancer. *Molecular medicine (Cambridge, Mass.)*, *25*(1), 44. https://doi.org/10.1186/s10020-019-0111-4
141. Liu, T., Yuan, Z., Wang, H., Wang, J., & Xue, L. (2022). Peroxisome-related genes in hepatocellular carcinoma correlated with tumor metabolism and overall survival. *Clinics and research in hepatology and gastroenterology*, *46*(10), 101835. https://doi.org/10.1016/j.clinre.2021.101835
142. Liu, W., Li, L., Ye, H., Tao, H., & He, H. (2018). Role of COL6A3 in colorectal cancer. *Oncology reports*, *39*(6), 2527–2536. https://doi.org/10.3892/or.2018.6331
143. Liu, X. S., Yang, J. W., Zeng, J., Chen, X. Q., Gao, Y., Kui, X. Y., Liu, X. Y., Zhang, Y., Zhang, Y. H., & Pei, Z. J. (2022). SLC2A1 is a Diagnostic Biomarker Involved in Immune Infiltration of Colorectal Cancer and Associated With m6A Modification and ceRNA. *Frontiers in cell and developmental biology*, *10*, 853596. https://doi.org/10.3389/fcell.2022.853596
144. Liu, Y., Cai, Y., Liu, L., Wu, Y., & Xiong, X. (2018). Crucial biological functions of CCL7 in cancer. *PeerJ*, *6*, e4928. https://doi.org/10.7717/peerj.4928
145. Liu, Y., Hao, J., Yuan, G., Wei, M., Bu, Y., Jin, T., & Ma, L. (2021). PER1 as a Tumor Suppressor Attenuated in the Malignant Phenotypes of Breast Cancer Cells. *International journal of general medicine*, *14*, 7077–7087. https://doi.org/10.2147/IJGM.S328184
146. Liu, Z. H., Dai, X. M., & Du, B. (2015). Hes1: a key role in stemness, metastasis and multidrug resistance. *Cancer biology & therapy*, *16*(3), 353–359. https://doi.org/10.1080/15384047.2015.1016662
147. Lu, M., Ge, Q., Wang, G., Luo, Y., Wang, X., Jiang, W., Liu, X., Wu, C. L., Xiao, Y., & Wang, X. (2018). CIRBP is a novel oncogene in human bladder cancer inducing expression of HIF-1α. *Cell death & disease*, *9*(10), 1046. https://doi.org/10.1038/s41419-018-1109-5
148. Ma, A. P. Y., Yeung, C. L. S., Tey, S. K., Mao, X., Wong, S. W. K., Ng, T. H., Ko, F. C. F., Kwong, E. M. L., Tang, A. H. N., Ng, I. O., Cai, S. H., Yun, J. P., & Yam, J. W. P. (2021). Suppression of ACADM-Mediated Fatty Acid Oxidation Promotes Hepatocellular Carcinoma via Aberrant CAV1/SREBP1 Signaling. *Cancer research*, *81*(13), 3679–3692. https://doi.org/10.1158/0008-5472.CAN-20-3944
149. Malkomes, P., Lunger, I., Oppermann, E., Abou-El-Ardat, K., Oellerich, T., Günther, S., Canbulat, C., Bothur, S., Schnütgen, F., Yu, W., Wingert, S., Haetscher, N., Catapano, C., Dietz, M. S., Heilemann, M., Kvasnicka, H. M., Holzer, K., Serve, H., Bechstein, W. O., & Rieger, M. A. (2021). Transglutaminase 2 promotes tumorigenicity of colon cancer cells by inactivation of the tumor suppressor p53. *Oncogene*, *40*(25), 4352–4367. <https://doi.org/10.1038/s41388-021-01847-w>
150. Mamoor, S. (2021, October 16). MAP6 expression associates with survival in triple negative breast cancer. https://doi.org/10.31219/osf.io/wgn56
151. Mamun, M. A., Mannoor, K., Cao, J., Qadri, F., & Song, X. (2020). SOX2 in cancer stemness: tumor malignancy and therapeutic potentials. *Journal of molecular cell biology*, *12*(2), 85–98. https://doi.org/10.1093/jmcb/mjy080
152. Mansoori, B., Mohammadi, A., Ditzel, H. J., Duijf, P. H. G., Khaze, V., Gjerstorff, M. F., & Baradaran, B. (2021). HMGA2 as a Critical Regulator in Cancer Development. *Genes*, *12*(2), 269. https://doi.org/10.3390/genes12020269
153. Manupati, K., Debnath, S., Goswami, K., Bhoj, P. S., Chandak, H. S., Bahekar, S. P., & Das, A. (2019). Glutathione S-transferase omega 1 inhibition activates JNK-mediated apoptotic response in breast cancer stem cells. *The FEBS journal*, *286*(11), 2167–2192. https://doi.org/10.1111/febs.14813
154. Mavrommatis, E., Arslan, A. D., Sassano, A., Hua, Y., Kroczynska, B., & Platanias, L. C. (2013). Expression and regulatory effects of murine Schlafen (Slfn) genes in malignant melanoma and renal cell carcinoma. *The Journal of biological chemistry*, *288*(46), 33006–33015. https://doi.org/10.1074/jbc.M113.460741
155. Mavrommatis, E., Arslan, A. D., Sassano, A., Hua, Y., Kroczynska, B., & Platanias, L. C. (2013). Expression and regulatory effects of murine Schlafen (Slfn) genes in malignant melanoma and renal cell carcinoma. *The Journal of biological chemistry*, *288*(46), 33006–33015. https://doi.org/10.1074/jbc.M113.460741
156. McGovern, S.L., Qi, Y., Pusztai, L. *et al.* Centromere protein-A, an essential centromere protein, is a prognostic marker for relapse in estrogen receptor-positive breast cancer. *Breast Cancer Res* 14, R72 (2012). https://doi.org/10.1186/bcr3181
157. McKay, J. A., Melvin, W. T., Ah-See, A. K., Ewen, S. W., Greenlee, W. F., Marcus, C. B., Burke, M. D., & Murray, G. I. (1995). Expression of cytochrome P450 CYP1B1 in breast cancer. *FEBS letters*, *374*(2), 270–272. https://doi.org/10.1016/0014-5793(95)01126-y
158. Mei, S., Li, Y., & Kang, X. (2022). Prognostic and Functional Analysis of *NPY6R* in Uveal Melanoma Using Bioinformatics. *Disease markers*, *2022*, 4143447. https://doi.org/10.1155/2022/4143447
159. Meng, L., Song, Z., Liu, A., Dahmen, U., Yang, X., & Fang, H. (2021). Effects of Lipopolysaccharide-Binding Protein (LBP) Single Nucleotide Polymorphism (SNP) in Infections, Inflammatory Diseases, Metabolic Disorders and Cancers. *Frontiers in immunology*, *12*, 681810. https://doi.org/10.3389/fimmu.2021.681810
160. Meng, M., Zhou, H., He, Y., Chen, L., Wang, W., Yang, L., Wang, Z., Zhang, L., & Wang, S. (2022). CDH6 as a prognostic indicator and marker for chemotherapy in gliomas. *Frontiers in genetics*, *13*, 949552. https://doi.org/10.3389/fgene.2022.949552
161. Miao, D., Wang, Q., Shi, J., Lv, Q., Tan, D., Zhao, C., Xiong, Z., & Zhang, X. (2023). N6-methyladenosine-modified DBT alleviates lipid accumulation and inhibits tumor progression in clear cell renal cell carcinoma through the ANXA2/YAP axis-regulated Hippo pathway. *Cancer communications (London, England)*, 10.1002/cac2.12413. Advance online publication. https://doi.org/10.1002/cac2.12413
162. Mo, J., Zhang, J., Huang, H., Liu, C., Cheng, Y., Mo, Y., Wu, S., Zhong, Y., Zhong, C., & Zhang, B. (2022). The early predictive effect of low expression of the *ITGA4* in colorectal cancer. *Journal of gastrointestinal oncology*, *13*(1), 265–278. https://doi.org/10.21037/jgo-22-92
163. Moamer, A., Hachim, I. Y., Binothman, N., Wang, N., Lebrun, J. J., & Ali, S. (2019). A role for kinesin-1 subunits KIF5B/KLC1 in regulating epithelial mesenchymal plasticity in breast tumorigenesis. *EBioMedicine*, *45*, 92–107. https://doi.org/10.1016/j.ebiom.2019.06.009
164. Mohamed, H. T., El-Husseiny, N., El-Ghonaimy, E. A., Ibrahim, S. A., Bazzi, Z. A., Cavallo-Medved, D., Boffa, M. B., El-Shinawi, M., & Mohamed, M. M. (2018). IL-10 correlates with the expression of carboxypeptidase B2 and lymphovascular invasion in inflammatory breast cancer: The potential role of tumor infiltrated macrophages. *Current problems in cancer*, *42*(2), 215–230. https://doi.org/10.1016/j.currproblcancer.2018.01.009
165. Musumeci, F., Schenone, S., Brullo, C., Desogus, A., Botta, L., & Tintori, C. (2015). Hck inhibitors as potential therapeutic agents in cancer and HIV infection. *Current medicinal chemistry*, *22*(13), 1540–1564. https://doi.org/10.2174/0929867322666150209152057
166. Myacheva, K., Walsh, A., Riester, M., Pelos, G., Carl, J., & Diederichs, S. (2023). CRISPRi screening identifies CASP8AP2 as an essential viability factor in lung cancer controlling tumor cell death via the AP-1 pathway. *Cancer letters*, *552*, 215958. https://doi.org/10.1016/j.canlet.2022.215958
167. Nagahama, Y., Ueno, M., Haraguchi, N., Mori, M., & Takakura, N. (2010). PSF3 marks malignant colon cancer and has a role in cancer cell proliferation. *Biochemical and biophysical research communications*, *392*(2), 150–154. <https://doi.org/10.1016/j.bbrc.2009.12.174>
168. Nicoud, M. B., Sterle, H. A., Massari, N. A., Táquez Delgado, M. A., Formoso, K., Herrero Ducloux, M. V., Martinel Lamas, D., Cremaschi, G. A., & Medina, V. A. (2020). Study of the antitumour effects and the modulation of immune response by histamine in breast cancer. *British journal of cancer*, *122*(3), 348–360. https://doi.org/10.1038/s41416-019-0636-x
169. Nirgude, S., & Choudhary, B. (2021). Insights into the role of GPX3, a highly efficient plasma antioxidant, in cancer. *Biochemical pharmacology*, *184*, 114365. https://doi.org/10.1016/j.bcp.2020.114365
170. Niu, H., Chen, P., Fan, L. *et al.* Comprehensive pan-cancer analysis on CBX3 as a prognostic and immunological biomarker. *BMC Med Genomics* 15, 29 (2022). https://doi.org/10.1186/s12920-022-01179-y
171. Nosaka, K., Suzuki, S., Yoshikawa, T., Shimomura, M., Kitami, K., Yoshida, K., Yoshihara, M., Kikkawa, F., Nakatsura, T., & Kajiyama, H. (2021). Heat Shock Protein 105 as an Immunotherapeutic Target for Patients With Cervical Cancer. *Anticancer research*, *41*(10), 4741–4751. <https://doi.org/10.21873/anticanres.15289>
172. O'Connor, T., & Heikenwalder, M. (2021). CCL2 in the Tumor Microenvironment. *Advances in experimental medicine and biology*, *1302*, 1–14. https://doi.org/10.1007/978-3-030-62658-7\_1
173. Pai, H. C., Kumar, S., Shen, C. C., Liou, J. P., Pan, S. L., & Teng, C. M. (2015). MT-4 suppresses resistant ovarian cancer growth through targeting tubulin and HSP27. *PloS one*, *10*(4), e0123819. https://doi.org/10.1371/journal.pone.0123819
174. Papathanassiu, A.E., Lodi, F., Vu, H.A., & Lambrechts, D. (2021). Abstract 1202: ERG344: A novel IRG1 inhibitor for the treatment of colon cancer. Experimental and Molecular Therapeutics.
175. Pham, T. T., Angus, S. P., & Johnson, G. L. (2013). MAP3K1: Genomic Alterations in Cancer and Function in Promoting Cell Survival or Apoptosis. *Genes & cancer*, *4*(11-12), 419–426. https://doi.org/10.1177/1947601913513950
176. Pidugu, V.K., Wu, MM., Yen, AH. *et al.* IFIT1 and IFIT3 promote oral squamous cell carcinoma metastasis and contribute to the anti-tumor effect of gefitinib via enhancing p-EGFR recycling. *Oncogene* 38, 3232–3247 (2019). https://doi.org/10.1038/s41388-018-0662-9
177. Pidugu, V.K., Wu, MM., Yen, AH. *et al.* IFIT1 and IFIT3 promote oral squamous cell carcinoma metastasis and contribute to the anti-tumor effect of gefitinib via enhancing p-EGFR recycling. *Oncogene* 38, 3232–3247 (2019). https://doi.org/10.1038/s41388-018-0662-9
178. Pinto-Fernandez, A., Salio, M., Partridge, T., Chen, J., Vere, G., Greenwood, H., Olie, C. S., Damianou, A., Scott, H. C., Pegg, H. J., Chiarenza, A., Díaz-Saez, L., Smith, P., Gonzalez-Lopez, C., Patel, B., Anderton, E., Jones, N., Hammonds, T. R., Huber, K., Muschel, R., … Kessler, B. M. (2021). Deletion of the deISGylating enzyme USP18 enhances tumour cell antigenicity and radiosensitivity. *British journal of cancer*, *124*(4), 817–830. https://doi.org/10.1038/s41416-020-01167-y
179. Raman, P., Purwin, T., Pestell, R., & Tozeren, A. (2015). FXYD5 is a Marker for Poor Prognosis and a Potential Driver for Metastasis in Ovarian Carcinomas. *Cancer informatics*, *14*, 113–119. https://doi.org/10.4137/CIN.S30565
180. Raskov, H., Orhan, A., Christensen, J. P., & Gögenur, I. (2021). Cytotoxic CD8+ T cells in cancer and cancer immunotherapy. *British journal of cancer*, *124*(2), 359–367. https://doi.org/10.1038/s41416-020-01048-4
181. Rébé, C., & Ghiringhelli, F. (2020). Interleukin-1β and Cancer. *Cancers*, *12*(7), 1791. https://doi.org/10.3390/cancers12071791
182. Reddy, B. Y., Greco, S. J., Patel, P. S., Trzaska, K. A., & Rameshwar, P. (2009). RE-1-silencing transcription factor shows tumor-suppressor functions and negatively regulates the oncogenic TAC1 in breast cancer cells. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(11), 4408–4413. https://doi.org/10.1073/pnas.0809130106
183. Reina, M., & Espel, E. (2017). Role of LFA-1 and ICAM-1 in Cancer. *Cancers*, *9*(11), 153. <https://doi.org/10.3390/cancers9110153>
184. Reschke, R., Yu, J., Flood, B., Higgs, E. F., Hatogai, K., & Gajewski, T. F. (2021). Immune cell and tumor cell-derived CXCL10 is indicative of immunotherapy response in metastatic melanoma. *Journal for immunotherapy of cancer*, *9*(9), e003521. https://doi.org/10.1136/jitc-2021-003521
185. Revach, O. Y., Liu, S., & Jenkins, R. W. (2020). Targeting TANK-binding kinase 1 (TBK1) in cancer. *Expert opinion on therapeutic targets*, *24*(11), 1065–1078. https://doi.org/10.1080/14728222.2020.1826929
186. Richardsen, E., Uglehus, R. D., Johnsen, S. H., & Busund, L. T. (2015). Macrophage-colony stimulating factor (CSF1) predicts breast cancer progression and mortality. *Anticancer research*, *35*(2), 865–874.
187. Robinson, M.H., Maximov, V., Lallani, S. *et al.* Upregulation of the chromatin remodeler HELLS is mediated by YAP1 in Sonic Hedgehog Medulloblastoma. *Sci Rep* 9, 13611 (2019). https://doi.org/10.1038/s41598-019-50088-1
188. Sadler, T., Bhasin, J.M., Xu, Y. *et al.* Genome-wide analysis of DNA methylation and gene expression defines molecular characteristics of Crohn’s disease-associated fibrosis. *Clin Epigenet* 8, 30 (2016). https://doi.org/10.1186/s13148-016-0193-6
189. Saha, S. K., Islam, S. M. R., Kwak, K. S., Rahman, M. S., & Cho, S. G. (2020). PROM1 and PROM2 expression differentially modulates clinical prognosis of cancer: a multiomics analysis. *Cancer gene therapy*, *27*(3-4), 147–167. https://doi.org/10.1038/s41417-019-0109-7
190. Saha, S. K., Islam, S. M. R., Saha, T., Nishat, A., Biswas, P. K., Gil, M., Nkenyereye, L., El-Sappagh, S., Islam, M. S., & Cho, S. G. (2021). Prognostic role of EGR1 in breast cancer: a systematic review. *BMB reports*, *54*(10), 497–504. https://doi.org/10.5483/BMBRep.2021.54.10.087
191. Saindane, M., Rallabandi, H. R., Park, K. S., Heil, A., Nam, S. E., Yoo, Y. B., Yang, J. H., & Yun, I. J. (2020). Prognostic Significance of Prostaglandin-Endoperoxide Synthase-2 Expressions in Human Breast Carcinoma: A Multiomic Approach. *Cancer informatics*, *19*, 1176935120969696. https://doi.org/10.1177/1176935120969696
192. Sasahira, T., Kurihara-Shimomura, M., Shimomura, H. *et al.* Identification of oral squamous cell carcinoma markers *MUC2* and *SPRR1B* downstream of *TANGO*. *J Cancer Res Clin Oncol* 147, 1659–1672 (2021). https://doi.org/10.1007/s00432-021-03568-9
193. Sasahira, T., Kurihara-Shimomura, M., Shimomura, H. *et al.* Identification of oral squamous cell carcinoma markers *MUC2* and *SPRR1B* downstream of *TANGO*. *J Cancer Res Clin Oncol* 147, 1659–1672 (2021). https://doi.org/10.1007/s00432-021-03568-9
194. Saunders, A. S., Bender, D. E., Ray, A. L., Wu, X., & Morris, K. T. (2021). Colony-stimulating factor 3 signaling in colon and rectal cancers: Immune response and CMS classification in TCGA data. *PloS one*, *16*(2), e0247233. <https://doi.org/10.1371/journal.pone.0247233>
195. Savas, S., Hyde, A., Stuckless, S. N., Parfrey, P., Younghusband, H. B., & Green, R. (2012). Serotonin transporter gene (SLC6A4) variations are associated with poor survival in colorectal cancer patients. *PloS one*, *7*(7), e38953. <https://doi.org/10.1371/journal.pone.0038953>
196. Schoeps, B., Eckfeld, C., Prokopchuk, O., Böttcher, J., Häußler, D., Steiger, K., Demir, I. E., Knolle, P., Soehnlein, O., Jenne, D. E., Hermann, C. D., & Krüger, A. (2021). TIMP1 Triggers Neutrophil Extracellular Trap Formation in Pancreatic Cancer. *Cancer research*, *81*(13), 3568–3579. https://doi.org/10.1158/0008-5472.CAN-20-4125
197. Schott, K., Majer, C., Bulashevska, A., Childs, L., Schmidt, M. H. H., Rajalingam, K., Munder, M., & König, R. (2022). SAMHD1 in cancer: curse or cure?. *Journal of molecular medicine (Berlin, Germany)*, *100*(3), 351–372. https://doi.org/10.1007/s00109-021-02131-w
198. Shen, J., Jin, Z., Lv, H., Jin, K., Jonas, K., Zhu, C., & Chen, B. (2020). PFKP is highly expressed in lung cancer and regulates glucose metabolism. *Cellular oncology (Dordrecht)*, *43*(4), 617–629. https://doi.org/10.1007/s13402-020-00508-6
199. Shi, J., Huo, R., Li, N., Li, H., Zhai, T., Li, H., Shen, B., Ye, J., Fu, R., & Di, W. (2019). CYR61, a potential biomarker of tumor inflammatory response in epithelial ovarian cancer microenvironment of tumor progress. *BMC cancer*, *19*(1), 1140. https://doi.org/10.1186/s12885-019-6321-x
200. Shi, Y., Sun, Y., Cheng, H., & Wang, C. (2021). EFNB1 Acts as a Novel Prognosis Marker in Glioblastoma through Bioinformatics Methods and Experimental Validation. *Journal of oncology*, *2021*, 4701680. https://doi.org/10.1155/2021/4701680
201. Si, M., & Lang, J. (2018). The roles of metallothioneins in carcinogenesis. *Journal of hematology & oncology*, *11*(1), 107. https://doi.org/10.1186/s13045-018-0645-x
202. Singh, A. P., Chaturvedi, P., & Batra, S. K. (2007). Emerging roles of MUC4 in cancer: a novel target for diagnosis and therapy. *Cancer research*, *67*(2), 433–436. https://doi.org/10.1158/0008-5472.CAN-06-3114
203. Sobolev, V. V., Khashukoeva, A. Z., Evina, O. E., Geppe, N. A., Chebysheva, S. N., Korsunskaya, I. M., Tchepourina, E., & Mezentsev, A. (2022). Role of the Transcription Factor FOSL1 in Organ Development and Tumorigenesis. *International journal of molecular sciences*, *23*(3), 1521. https://doi.org/10.3390/ijms2303152
204. Son, H. J., An, C. H., Yoo, N. J., & Lee, S. H. (2020). Tight Junction-Related CLDN5 and CLDN6 Genes, and Gap Junction-Related GJB6 and GJB7 Genes Are Somatically Mutated in Gastric and Colorectal Cancers. *Pathology oncology research : POR*, *26*(3), 1983–1987. https://doi.org/10.1007/s12253-020-00806-2
205. Specht, S., Isse, K., Nozaki, I., Lunz, J. G., 3rd, & Demetris, A. J. (2013). SPRR2A expression in cholangiocarcinoma increases local tumor invasiveness but prevents metastasis. *Clinical & experimental metastasis*, *30*(7), 877–890. https://doi.org/10.1007/s10585-013-9589-2
206. Specht, S., Isse, K., Nozaki, I., Lunz, J. G., 3rd, & Demetris, A. J. (2013). SPRR2A expression in cholangiocarcinoma increases local tumor invasiveness but prevents metastasis. *Clinical & experimental metastasis*, *30*(7), 877–890. https://doi.org/10.1007/s10585-013-9589-2
207. Su, H. C., Wu, S. C., Yen, L. C., Chiao, L. K., Wang, J. K., Chiu, Y. L., Ho, C. L., & Huang, S. M. (2020). Gene expression profiling identifies the role of Zac1 in cervical cancer metastasis. *Scientific reports*, *10*(1), 11837. https://doi.org/10.1038/s41598-020-68835-0
208. Suhaimi, S. A., Chan, S. C., & Rosli, R. (2020). Matrix Metallopeptidase 3 Polymorphisms: Emerging genetic Markers in Human Breast Cancer Metastasis. *Journal of breast cancer*, *23*(1), 1–9. https://doi.org/10.4048/jbc.2020.23.e17
209. Sun, H. D., Xu, Z. P., Sun, Z. Q., Zhu, B., Wang, Q., Zhou, J., Jin, H., Zhao, A., Tang, W. W., & Cao, X. F. (2018). Down-regulation of circPVRL3 promotes the proliferation and migration of gastric cancer cells. *Scientific reports*, *8*(1), 10111. https://doi.org/10.1038/s41598-018-27837-9
210. Sun, H. Y., Min, Z. C., Gao, L., Zhang, Z. Y., Pang, T. L., Gao, Y. J., Pan, H., & Ou-Yang, J. (2022). Association between IL8RB C1208T mutation and risk of cancer: A pooled analysis based on 5299 cases and 6899 controls. *Medicine*, *101*(8), e28986. https://doi.org/10.1097/MD.0000000000028986
211. Sun, Y., Li, W., Shen, S., Yang, X., Lu, B., Zhang, X., Lu, P., Shen, Y., & Ji, J. (2019). Loss of alanine-glyoxylate and serine-pyruvate aminotransferase expression accelerated the progression of hepatocellular carcinoma and predicted poor prognosis. *Journal of translational medicine*, *17*(1), 390. https://doi.org/10.1186/s12967-019-02138-5
212. Suresh, R., & Diaz, R. J. (2021). The remodelling of actin composition as a hallmark of cancer. *Translational oncology*, *14*(6), 101051. https://doi.org/10.1016/j.tranon.2021.101051
213. Suresh, R., & Diaz, R. J. (2021). The remodelling of actin composition as a hallmark of cancer. *Translational oncology*, *14*(6), 101051. https://doi.org/10.1016/j.tranon.2021.101051
214. Suzuki, S., Takagi, K., Miki, Y., Onodera, Y., Akahira, J., Ebata, A., Ishida, T., Watanabe, M., Sasano, H., & Suzuki, T. (2012). Nucleobindin 2 in human breast carcinoma as a potent prognostic factor. *Cancer science*, *103*(1), 136–143. https://doi.org/10.1111/j.1349-7006.2011.02119.
215. Taghavi, A., Akbari, M. E., Hashemi-Bahremani, M., Nafissi, N., Khalilnezhad, A., Poorhosseini, S. M., Hashemi-Gorji, F., & Yassaee, V. R. (2016). Gene expression profiling of the 8q22-24 position in human breast cancer: *TSPYL5*, *MTDH*, *ATAD2* and *CCNE2* genes are implicated in oncogenesis, while *WISP1* and *EXT1* genes may predict a risk of metastasis. *Oncology letters*, *12*(5), 3845–3855. https://doi.org/10.3892/ol.2016.5218
216. Takaku, M., Grimm, S. A., & Wade, P. A. (2015). GATA3 in Breast Cancer: Tumor Suppressor or Oncogene?. *Gene expression*, *16*(4), 163–168. https://doi.org/10.3727/105221615X14399878166113
217. Takayama, K. I., Suzuki, T., Tanaka, T., Fujimura, T., Takahashi, S., Urano, T., Ikeda, K., & Inoue, S. (2018). TRIM25 enhances cell growth and cell survival by modulating p53 signals via interaction with G3BP2 in prostate cancer. *Oncogene*, *37*(16), 2165–2180. https://doi.org/10.1038/s41388-017-0095-x
218. Takayama, K. I., Suzuki, T., Tanaka, T., Fujimura, T., Takahashi, S., Urano, T., Ikeda, K., & Inoue, S. (2018). TRIM25 enhances cell growth and cell survival by modulating p53 signals via interaction with G3BP2 in prostate cancer. *Oncogene*, *37*(16), 2165–2180. <https://doi.org/10.1038/s41388-017-0095-x>
219. Takeda, H., Wei, Z., Koso, H. *et al.* Transposon mutagenesis identifies genes and evolutionary forces driving gastrointestinal tract tumor progression. *Nat Genet* 47, 142–150 (2015). https://doi.org/10.1038/ng.3175
220. Takehara, M., Sato, Y., Kimura, T., Noda, K., Miyamoto, H., Fujino, Y., Miyoshi, J., Nakamura, F., Wada, H., Bando, Y., Ikemoto, T., Shimada, M., Muguruma, N., & Takayama, T. (2020). Cancer-associated adipocytes promote pancreatic cancer progression through SAA1 expression. *Cancer science*, *111*(8), 2883–2894. https://doi.org/10.1111/cas.14527
221. Takehara, M., Sato, Y., Kimura, T., Noda, K., Miyamoto, H., Fujino, Y., Miyoshi, J., Nakamura, F., Wada, H., Bando, Y., Ikemoto, T., Shimada, M., Muguruma, N., & Takayama, T. (2020). Cancer-associated adipocytes promote pancreatic cancer progression through SAA1 expression. *Cancer science*, *111*(8), 2883–2894. https://doi.org/10.1111/cas.14527
222. Takemoto, N., Serada, S., Fujimoto, M., Honda, H., Ohkawara, T., Takahashi, T., Nomura, S., Inohara, H., & Naka, T. (2015). Leucine-rich α-2-glycoprotein promotes TGFβ1-mediated growth suppression in the Lewis lung carcinoma cell lines. *Oncotarget*, *6*(13), 11009–11022. https://doi.org/10.18632/oncotarget.3557
223. Tam, B. Y., Chiu, K., Chung, H., Bossard, C., Nguyen, J. D., Creger, E., Eastman, B. W., Mak, C. C., Ibanez, M., Ghias, A., Cahiwat, J., Do, L., Cho, S., Nguyen, J., Deshmukh, V., Stewart, J., Chen, C. W., Barroga, C., Dellamary, L., Kc, S. K., … Yazici, Y. (2020). The CLK inhibitor SM08502 induces anti-tumor activity and reduces Wnt pathway gene expression in gastrointestinal cancer models. *Cancer letters*, *473*, 186–197. https://doi.org/10.1016/j.canlet.2019.09.009
224. Tanakaya, K., Kumamoto, K., Tada, Y., Eguchi, H., Ishibashi, K., Idani, H., Tachikawa, T., Akagi, K., Okazaki, Y., & Ishida, H. (2019). A germline MBD4 mutation was identified in a patient with colorectal oligopolyposis and early‑onset cancer: A case report. *Oncology reports*, *42*(3), 1133–1140. https://doi.org/10.3892/or.2019.7239
225. Tang, C., Jiang, Y., Shao, W., Shi, W., Gao, X., Qin, W., Jiang, T., Wang, F., & Feng, S. (2016). Abnormal expression of FOSB correlates with tumor progression and poor survival in patients with gastric cancer. *International journal of oncology*, *49*(4), 1489–1496. https://doi.org/10.3892/ijo.2016.3661
226. Thompson, M. R., Xu, D., & Williams, B. R. (2009). ATF3 transcription factor and its emerging roles in immunity and cancer. *Journal of molecular medicine (Berlin, Germany)*, *87*(11), 1053–1060. <https://doi.org/10.1007/s00109-009-0520-x>
227. Thorne, J., & Campbell, M. J. (2008). The vitamin D receptor in cancer. *The Proceedings of the Nutrition Society*, *67*(2), 115–127. https://doi.org/10.1017/S0029665108006964
228. Upadhyay G. (2019). Emerging Role of Lymphocyte Antigen-6 Family of Genes in Cancer and Immune Cells. *Frontiers in immunology*, *10*, 819. https://doi.org/10.3389/fimmu.2019.00819
229. Uribe, M. L., Marrocco, I., & Yarden, Y. (2021). EGFR in Cancer: Signaling Mechanisms, Drugs, and Acquired Resistance. *Cancers*, *13*(11), 2748. https://doi.org/10.3390/cancers13112748
230. Uusküla-Reimand, L., & Wilson, M. D. (2022). Untangling the roles of TOP2A and TOP2B in transcription and cancer. *Science advances*, *8*(44), eadd4920. https://doi.org/10.1126/sciadv.add4920
231. van der Lelij, P., Lieb, S., Jude, J., Wutz, G., Santos, C. P., Falkenberg, K., Schlattl, A., Ban, J., Schwentner, R., Hoffmann, T., Kovar, H., Real, F. X., Waldman, T., Pearson, M. A., Kraut, N., Peters, J. M., Zuber, J., & Petronczki, M. (2017). Synthetic lethality between the cohesin subunits *STAG1* and *STAG2* in diverse cancer contexts. *eLife*, *6*, e26980. https://doi.org/10.7554/eLife.26980
232. Vanli, N., Sheng, J., Li, S., Xu, Z., & Hu, G. F. (2022). Ribonuclease 4 is associated with aggressiveness and progression of prostate cancer. *Communications biology*, *5*(1), 625. https://doi.org/10.1038/s42003-022-03597-1
233. Vitiello, G. A., & Miller, G. (2020). Targeting the interleukin-17 immune axis for cancer immunotherapy. *The Journal of experimental medicine*, *217*(1), e20190456. https://doi.org/10.1084/jem.20190456
234. Wang, B., Hong, Z., Zhao, C. *et al.* The effects of MEX3A knockdown on proliferation, apoptosis and migration of osteosarcoma cells. *Cancer Cell Int* 21, 197 (2021). https://doi.org/10.1186/s12935-021-01882-3
235. Wang, D., Liu, C., Wang, J., Jia, Y., Hu, X., Jiang, H., Shao, Z. M., & Zeng, Y. A. (2018). Protein C receptor stimulates multiple signaling pathways in breast cancer cells. *The Journal of biological chemistry*, *293*(4), 1413–1424. https://doi.org/10.1074/jbc.M117.814046
236. Wang, H., Yu, J., Zhang, L., Xiong, Y., Chen, S., Xing, H., Tian, Z., Tang, K., Wei, H., Rao, Q., Wang, M., & Wang, J. (2014). RPS27a promotes proliferation, regulates cell cycle progression and inhibits apoptosis of leukemia cells. *Biochemical and biophysical research communications*, *446*(4), 1204–1210. https://doi.org/10.1016/j.bbrc.2014.03.086
237. Wang, J., Jiang, Y. H., Yang, P. Y., & Liu, F. (2021). Increased Collagen Type V α2 (COL5A2) in Colorectal Cancer is Associated with Poor Prognosis and Tumor Progression. *OncoTargets and therapy*, *14*, 2991–3002. https://doi.org/10.2147/OTT.S288422
238. Wang, L., & Shilatifard, A. (2019). UTX Mutations in Human Cancer. *Cancer cell*, *35*(2), 168–176. https://doi.org/10.1016/j.ccell.2019.01.001
239. Wang, L., Miyahira, A. K., Simons, D. L., Lu, X., Chang, A. Y., Wang, C., Suni, M. A., Maino, V. C., Dirbas, F. M., Yim, J., Waisman, J., & Lee, P. P. (2017). IL6 Signaling in Peripheral Blood T Cells Predicts Clinical Outcome in Breast Cancer. *Cancer research*, *77*(5), 1119–1126. https://doi.org/10.1158/0008-5472.CAN-16-1373
240. Wang, M., Hu, Y., & Stearns, M. E. (2009). RPS2: a novel therapeutic target in prostate cancer. *Journal of experimental & clinical cancer research : CR*, *28*(1), 6. https://doi.org/10.1186/1756-9966-28-6
241. Wang, M., Li, M., Liu, Z. *et al.* Hsa\_circ\_0128846 knockdown attenuates the progression of pancreatic cancer by targeting miR-1270/NR3C1 axis. *Sci Rep* 13, 2792 (2023). https://doi.org/10.1038/s41598-023-28439-w
242. Wang, R., Xu, J., Xu, J., Zhu, W., Qiu, T., Li, J., Zhang, M., Wang, Q., Xu, T., Guo, R., Lu, K., Yin, Y., Gu, Y., Zhu, L., Huang, P., Liu, P., Liu, L., De, W., & Shu, Y. (2019). MiR-326/Sp1/KLF3: A novel regulatory axis in lung cancer progression. *Cell proliferation*, *52*(2), e12551. https://doi.org/10.1111/cpr.12551
243. Wang, T., Han, S., & Du, G. (2021). S100A6 represses Calu-6 lung cancer cells growth via inhibiting cell proliferation, migration, invasion and enhancing apoptosis. *Cell biochemistry and function*, *39*(6), 771–779. https://doi.org/10.1002/cbf.3639
244. Wang, T., Jing, B., Sun, B., Liao, Y., Song, H., Xu, D., Guo, W., Li, K., Hu, M., Liu, S., Ling, J., Kuang, Y., Feng, Y., Zhou, B. P., & Deng, J. (2019). Stabilization of PTGES by deubiquitinase USP9X promotes metastatic features of lung cancer via PGE2 signaling. *American journal of cancer research*, *9*(6), 1145–1160.
245. Wang, W., Reiser-Erkan, C., Michalski, C. W., Raggi, M. C., Quan, L., Yupei, Z., Friess, H., Erkan, M., & Kleeff, J. (2010). Hypoxia inducible BHLHB2 is a novel and independent prognostic marker in pancreatic ductal adenocarcinoma. *Biochemical and biophysical research communications*, *401*(3), 422–428. https://doi.org/10.1016/j.bbrc.2010.09.070
246. Wang, X., Fei, F., Qu, J., Li, C., Li, Y., & Zhang, S. (2018). The role of septin 7 in physiology and pathological disease: A systematic review of current status. *Journal of cellular and molecular medicine*, *22*(7), 3298–3307. https://doi.org/10.1111/jcmm.13623
247. Wang, Y., Cao, J., Liu, W., Zhang, J., Wang, Z., Zhang, Y., Hou, L., Chen, S., Hao, P., Zhang, L., Zhuang, M., Yu, Y., Li, D., & Fan, G. (2019). Protein tyrosine phosphatase receptor type R (PTPRR) antagonizes the Wnt signaling pathway in ovarian cancer by dephosphorylating and inactivating β-catenin. *The Journal of biological chemistry*, *294*(48), 18306–18323. https://doi.org/10.1074/jbc.RA119.010348
248. Wang, Y., Gu, W., Wen, W., & Zhang, X. (2022). SERPINH1 is a Potential Prognostic Biomarker and Correlated With Immune Infiltration: A Pan-Cancer Analysis. *Frontiers in genetics*, *12*, 756094. https://doi.org/10.3389/fgene.2021.7560
249. Wang, Y., Gu, W., Wen, W., & Zhang, X. (2022). SERPINH1 is a Potential Prognostic Biomarker and Correlated With Immune Infiltration: A Pan-Cancer Analysis. *Frontiers in genetics*, *12*, 756094. https://doi.org/10.3389/fgene.2021.756094
250. Wang, Y., Luo, H., Wei, M., Becker, M., Hyde, R. K., & Gong, Q. (2020). IL-33/IL1RL1 axis regulates cell survival through the p38 MAPK pathway in acute myeloid leukemia. *Leukemia research*, *96*, 106409. https://doi.org/10.1016/j.leukres.2020.106409
251. Wang, Y., Zhang, J., Li, Y. J., Yu, N. N., Liu, W. T., Liang, J. Z., Xu, W. W., Sun, Z. H., Li, B., & He, Q. Y. (2021). MEST promotes lung cancer invasion and metastasis by interacting with VCP to activate NF-κB signaling. *Journal of experimental & clinical cancer research : CR*, *40*(1), 301. <https://doi.org/10.1186/s13046-021-02107-1>
252. Waugh, D. J., & Wilson, C. (2008). The interleukin-8 pathway in cancer. *Clinical cancer research : an official journal of the American Association for Cancer Research*, *14*(21), 6735–6741. https://doi.org/10.1158/1078-0432.CCR-07-4843
253. Weisbrod, A. B., Zhang, L., Jain, M., Barak, S., Quezado, M. M., & Kebebew, E. (2013). Altered PTEN, ATRX, CHGA, CHGB, and TP53 expression are associated with aggressive VHL-associated pancreatic neuroendocrine tumors. *Hormones & cancer*, *4*(3), 165–175. <https://doi.org/10.1007/s12672-013-0134-1>
254. Wilkinson, R. D. A., Burden, R. E., McDowell, S. H., McArt, D. G., McQuaid, S., Bingham, V., Williams, R., Cox, Ó. T., O'Connor, R., McCabe, N., Kennedy, R. D., Buckley, N. E., & Scott, C. J. (2019). A Novel Role for Cathepsin S as a Potential Biomarker in Triple Negative Breast Cancer. *Journal of oncology*, *2019*, 3980273. <https://doi.org/10.1155/2019/3980273>
255. Wu, LF., Xu, GP., Zhao, Q. *et al.* The association between hypoxia inducible factor 1 subunit alpha gene rs2057482 polymorphism and cancer risk: a meta-analysis. *BMC Cancer* 19, 1123 (2019). https://doi.org/10.1186/s12885-019-6329-2
256. Wu, Z., Xia, C., Zhang, C., Yang, D., & Ma, K. (2022). Prognostic significance of SNCA and its methylation in bladder cancer. *BMC cancer*, *22*(1), 330. https://doi.org/10.1186/s12885-022-09411-9
257. Wu, Z., Xu, J., Tang, R., Wang, W., Zhang, B., Yu, X., Liu, J., & Shi, S. (2022). The Role of PDGFRA in Predicting Oncological and Immune Characteristics in Pancreatic Ductal Adenocarcinoma. *Journal of oncology*, *2022*, 4148805. https://doi.org/10.1155/2022/4148805
258. Xie, W., Chen, C., Han, Z., Huang, J., Liu, X., Chen, H., Zhang, T., Chen, S., Chen, C., Lu, M., Shen, X., & Xue, X. (2020). CD2AP inhibits metastasis in gastric cancer by promoting cellular adhesion and cytoskeleton assembly. *Molecular carcinogenesis*, *59*(4), 339–352. https://doi.org/10.1002/mc.23158
259. Xiong, H., Yang, Y., Yang, K., Zhao, D., Tang, H., & Ran, X. (2018). Loss of the clock gene PER2 is associated with cancer development and altered expression of important tumor-related genes in oral cancer. *International journal of oncology*, *52*(1), 279–287. https://doi.org/10.3892/ijo.2017.4180
260. Xu, H., George, E., Kinose, Y., Kim, H., Shah, J. B., Peake, J. D., Ferman, B., Medvedev, S., Murtha, T., Barger, C. J., Devins, K. M., D'Andrea, K., Wubbenhorst, B., Schwartz, L. E., Hwang, W. T., Mills, G. B., Nathanson, K. L., Karpf, A. R., Drapkin, R., Brown, E. J., … Simpkins, F. (2021). *CCNE1* copy number is a biomarker for response to combination WEE1-ATR inhibition in ovarian and endometrial cancer models. *Cell reports. Medicine*, *2*(9), 100394. https://doi.org/10.1016/j.xcrm.2021.10039
261. Xu, L. D., & Öhman, M. (2018). ADAR1 Editing and its Role in Cancer. *Genes*, *10*(1), 12. https://doi.org/10.3390/genes10010012
262. Xu, Q., Chiao, P., & Sun, Y. (2016). Amphiregulin in Cancer: New Insights for Translational Medicine. *Trends in cancer*, *2*(3), 111–113. https://doi.org/10.1016/j.trecan.2016.02.002
263. Xu, W., Wang, M., Bai, Y., Chen, Y., Ma, X., Yang, Z., Zhao, L., & Li, Y. (2022). The role of microfibrillar-associated protein 2 in cancer. *Frontiers in oncology*, *12*, 1002036. https://doi.org/10.3389/fonc.2022.1002036
264. Yan, H. H., Jiang, J., Pang, Y., Achyut, B. R., Lizardo, M., Liang, X., Hunter, K., Khanna, C., Hollander, C., & Yang, L. (2015). CCL9 Induced by TGFβ Signaling in Myeloid Cells Enhances Tumor Cell Survival in the Premetastatic Organ. *Cancer research*, *75*(24), 5283–5298. https://doi.org/10.1158/0008-5472.CAN-15-2282-T
265. Yan, Q., Zeng, P., Zhou, X., Zhao, X., Chen, R., Qiao, J., Feng, L., Zhu, Z., Zhang, G., & Chen, C. (2021). RBMX suppresses tumorigenicity and progression of bladder cancer by interacting with the hnRNP A1 protein to regulate PKM alternative splicing. *Oncogene*, *40*(15), 2635–2650. https://doi.org/10.1038/s41388-021-01666-
266. Yang, J., Lee, S. J., Kwon, Y., Ma, L., & Kim, J. (2020). Tumor suppressive function of Matrin 3 in the basal-like breast cancer. *Biological research*, *53*(1), 42. https://doi.org/10.1186/s40659-020-00310-6
267. Yao, L., Yan, J., Cheng, F., Gan, L., Huang, Y., Zheng, L., & Fang, N. (2021). Small Proline-Rich Protein 2B Facilitates Gastric Adenocarcinoma Proliferation via MDM2-p53/p21 Signaling Pathway. *OncoTargets and therapy*, *14*, 1453–1463. https://doi.org/10.2147/OTT.S281032
268. Ye, H., Li, T., Wang, H., Wu, J., Yi, C., Shi, J., Wang, P., Song, C., Dai, L., Jiang, G., Huang, Y., Yu, Y., & Li, J. (2021). *TSPAN1, TMPRSS4, SDR16C5*, and *CTSE* as Novel Panel for Pancreatic Cancer: A Bioinformatics Analysis and Experiments Validation. *Frontiers in immunology*, *12*, 649551. https://doi.org/10.3389/fimmu.2021.649551
269. Yeom, C. J., Zeng, L., Goto, Y., Morinibu, A., Zhu, Y., Shinomiya, K., Kobayashi, M., Itasaka, S., Yoshimura, M., Hur, C. G., Kakeya, H., Hammond, E. M., Hiraoka, M., & Harada, H. (2016). LY6E: a conductor of malignant tumor growth through modulation of the PTEN/PI3K/Akt/HIF-1 axis. *Oncotarget*, *7*(40), 65837–65848. <https://doi.org/10.18632/oncotarget.11670>
270. Yin, Y., Long, J., Sun, Y., Li, H., Jiang, E., Zeng, C., & Zhu, W. (2018). The function and clinical significance of eIF3 in cancer. *Gene*, *673*, 130–133. https://doi.org/10.1016/j.gene.2018.06.034
271. Ying-Gui Yang, Ita Novita Sari, Mohammad Farid Zia, Sung Ryul Lee, Su Jung Song, Hyog Young Kwon,
272. Yoshida, T., Akatsuka, T., & Imanaka-Yoshida, K. (2015). Tenascin-C and integrins in cancer. *Cell adhesion & migration*, *9*(1-2), 96–104. https://doi.org/10.1080/19336918.2015.1008332
273. Yu, K., Kuang, L., Fu, T., Zhang, C., Zhou, Y., Zhu, C., Zhang, Q., Zhang, Z., & Le, A. (2021). CREM Is Correlated With Immune-Suppressive Microenvironment and Predicts Poor Prognosis in Gastric Adenocarcinoma. *Frontiers in cell and developmental biology*, *9*, 697748. https://doi.org/10.3389/fcell.2021.697748
274. Yu, S., Yu, X., Sun, L. *et al.* GBP2 enhances glioblastoma invasion through Stat3/fibronectin pathway. *Oncogene* 39, 5042–5055 (2020). https://doi.org/10.1038/s41388-020-1348-7
275. Yu, W., Yang, X., Zhang, Q., Sun, L., Yuan, S., & Xin, Y. (2021). Targeting GLS1 to cancer therapy through glutamine metabolism. *Clinical & translational oncology : official publication of the Federation of Spanish Oncology Societies and of the National Cancer Institute of Mexico*, *23*(11), 2253–2268. https://doi.org/10.1007/s12094-021-02645-2
276. Yu, Z., Wang, H., Fang, Y., Lu, L., Li, M., Yan, B., Nie, Y., & Teng, C. (2020). Molecular chaperone HspB2 inhibited pancreatic cancer cell proliferation via activating p53 downstream gene RPRM, BAI1, and TSAP6. *Journal of cellular biochemistry*, *121*(3), 2318–2329. https://doi.org/10.1002/jcb.29455
277. Zeng, Q., Li, L., Feng, Z., Luo, L., Xiong, J., Jie, Z., Cao, Y., & Li, Z. (2021). LCP1 is a prognostic biomarker correlated with immune infiltrates in gastric cancer. *Cancer biomarkers : section A of Disease markers*, *30*(1), 105–125. https://doi.org/10.3233/CBM-200006
278. Zhang, D., Bi, J., Liang, Q., Wang, S., Zhang, L., Han, F., Li, S., Qiu, B., Fan, X., Chen, W., Jiao, H., Ye, Y., & Ding, Y. (2020). VCAM1 Promotes Tumor Cell Invasion and Metastasis by Inducing EMT and Transendothelial Migration in Colorectal Cancer. *Frontiers in oncology*, *10*, 1066. https://doi.org/10.3389/fonc.2020.01066
279. Zhang, F., Jiang, J., Xu, B., Xu, Y., & Wu, C. (2021). Over-expression of CXCL2 is associated with poor prognosis in patients with ovarian cancer. *Medicine*, *100*(4), e24125. https://doi.org/10.1097/MD.0000000000024125
280. Zhang, H., Jin, M., Ye, M., Bei, Y., Yang, S., & Liu, K. (2022). The prognostic effect of PNN in digestive tract cancers and its correlation with the tumor immune landscape in colon adenocarcinoma. *Journal of clinical laboratory analysis*, *36*(4), e24327. https://doi.org/10.1002/jcla.24327
281. Zhang, L., Qiang, J., Yang, X., Wang, D., Rehman, A. U., He, X., Chen, W., Sheng, D., Zhou, L., Jiang, Y. Z., Li, T., Du, Y., Feng, J., Hu, X., Zhang, J., Hu, X. C., Shao, Z. M., & Liu, S. (2019). IL1R2 Blockade Suppresses Breast Tumorigenesis and Progression by Impairing USP15-Dependent BMI1 Stability. *Advanced science (Weinheim, Baden-Wurttemberg, Germany)*, *7*(1), 1901728. https://doi.org/10.1002/advs.201901728
282. Zhang, L., Zhu, Z., Yan, H., Wang, W., Wu, Z., Zhang, F., Zhang, Q., Shi, G., Du, J., Cai, H., Zhang, X., Hsu, D., Gao, P., Piao, H. L., Chen, G., & Bu, P. (2021). Creatine promotes cancer metastasis through activation of Smad2/3. *Cell metabolism*, *33*(6), 1111–1123.e4. https://doi.org/10.1016/j.cmet.2021.03.009
283. Zhang, P., Ji, D., Hu, X., Ni, H., Ma, W., Zhang, X., Liao, S., Zeng, Z., Zhao, Y., & Zhou, H. (2018). Oncogenic heterogeneous nuclear ribonucleoprotein D-like promotes the growth of human colon cancer SW620 cells via its regulation of cell-cycle. *Acta biochimica et biophysica Sinica*, *50*(9), 880–887. https://doi.org/10.1093/abbs/gmy085
284. Zhang, S., & Fu, X. (2021). The Clinical Significance and Biological Function of *PCDH7* in Cervical Cancer. *Cancer management and research*, *13*, 3841–3847. https://doi.org/10.2147/CMAR.S298072
285. Zhang, S., Liu, X., Abdulmomen Ali Mohammed, S., Li, H., Cai, W., Guan, W., Liu, D., Wei, Y., Rong, D., Fang, Y., Haider, F., Lv, H., Jin, Z., Chen, X., Mo, Z., Li, L., Yang, S., & Wang, H. (2022). Adaptor SH3BGRL drives autophagy-mediated chemoresistance through promoting PIK3C3 translation and ATG12 stability in breast cancers. *Autophagy*, *18*(8), 1822–1840. https://doi.org/10.1080/15548627.2021.2002108
286. Zhang, X., Xue, J., Yang, H., Zhou, T., & Zu, G. (2021). TNFAIP6 promotes invasion and metastasis of gastric cancer and indicates poor prognosis of patients. *Tissue & cell*, *68*, 101455. https://doi.org/10.1016/j.tice.2020.101455
287. Zhang, Y., & Frohman, M. A. (2014). Cellular and physiological roles for phospholipase D1 in cancer. *The Journal of biological chemistry*, *289*(33), 22567–22574. https://doi.org/10.1074/jbc.R114.576876
288. Zhang, Y., & Liu, Z. (2017). STAT1 in cancer: friend or foe?. *Discovery medicine*, *24*(130), 19–29.
289. Zhang, Y., Yang, X., Zhu, X. L., Bai, H., Wang, Z. Z., Zhang, J. J., Hao, C. Y., & Duan, H. B. (2021). S100A gene family: immune-related prognostic biomarkers and therapeutic targets for low-grade glioma. *Aging*, *13*(11), 15459–15478. https://doi.org/10.18632/aging.203103
290. Zhang, Z., Xu, L., Huang, L., Li, T., Wang, J. Y., Ma, C., Bian, X., Ren, X., Li, H., & Wang, X. (2022). Glutathione *S*-Transferase Alpha 4 Promotes Proliferation and Chemoresistance in Colorectal Cancer Cells. *Frontiers in oncology*, *12*, 887127. https://doi.org/10.3389/fonc.2022.887127
291. Zhao, X., Qin, W., Jiang, Y., Yang, Z., Yuan, B., Dai, R., Shen, H., Chen, Y., Fu, J., & Wang, H. (2020). ACADL plays a tumor-suppressor role by targeting Hippo/YAP signaling in hepatocellular carcinoma. *NPJ precision oncology*, *4*, 7. https://doi.org/10.1038/s41698-020-0111-4
292. Zhao, Y., Cao, Y., Chen, Y., Wu, L., Hang, H., Jiang, C., & Zhou, X. (2021). B2M gene expression shapes the immune landscape of lung adenocarcinoma and determines the response to immunotherapy. *Immunology*, *164*(3), 507–523. https://doi.org/10.1111/imm.13384
293. Zheng, Y., Miyamoto, D. T., Wittner, B. S., Sullivan, J. P., Aceto, N., Jordan, N. V., Yu, M., Karabacak, N. M., Comaills, V., Morris, R., Desai, R., Desai, N., Emmons, E., Milner, J. D., Lee, R. J., Wu, C. L., Sequist, L. V., Haas, W., Ting, D. T., Toner, M., … Haber, D. A. (2017). Expression of β-globin by cancer cells promotes cell survival during blood-borne dissemination. *Nature communications*, *8*, 14344. https://doi.org/10.1038/ncomms14344
294. Zheng, Z., Zhang, B., Yu, H., Li, S., Song, N., Jin, X., & Li, J. (2021). UBE3A activates the NOTCH pathway and promotes esophageal cancer progression by degradation of ZNF185. *International journal of biological sciences*, *17*(12), 3024–3035. https://doi.org/10.7150/ijbs.61117
295. Zhong, C. Q., Zhang, X. P., Ma, N., Zhang, E. B., Li, J. J., Jiang, Y. B., Gao, Y. Z., Yuan, Y. M., Lan, S. Q., Xie, D., & Cheng, S. Q. (2018). FABP4 suppresses proliferation and invasion of hepatocellular carcinoma cells and predicts a poor prognosis for hepatocellular carcinoma. *Cancer medicine*, *7*(6), 2629–2640. https://doi.org/10.1002/cam4.1511
296. Zhong, Z., Zhou, F., Wang, D., Wu, M., Zhou, W., Zou, Y., Li, J., Wu, L., & Yin, X. (2018). Expression of KLF9 in pancreatic cancer and its effects on the invasion, migration, apoptosis, cell cycle distribution, and proliferation of pancreatic cancer cell lines. *Oncology reports*, *40*(6), 3852–3860. https://doi.org/10.3892/or.2018.6760
297. Zhu, C., Wang, Z., Cai, J., Pan, C., Lin, S., Zhang, Y., Chen, Y., Leng, M., He, C., Zhou, P., Wu, C., Fang, Y., Li, Q., Li, A., Liu, S., & Lai, Q. (2021). VDR Signaling via the Enzyme NAT2 Inhibits Colorectal Cancer Progression. *Frontiers in pharmacology*, *12*, 727704. https://doi.org/10.3389/fphar.2021.727704
298. Zhu, G., Cheng, Z., Huang, Y., Zheng, W., Yang, S., Lin, C., & Ye, J. (2020). MyD88 mediates colorectal cancer cell proliferation, migration and invasion via NF‑κB/AP‑1 signaling pathway. *International journal of molecular medicine*, *45*(1), 131–140. https://doi.org/10.3892/ijmm.2019.4390
299. Zhu, Q., Meng, Y., Li, S., Xin, J., Du, M., Wang, M., & Cheng, G. (2022). Association of genetic variants in autophagy-lysosome pathway genes with susceptibility and survival to prostate cancer. *Gene*, *808*, 145953. https://doi.org/10.1016/j.gene.2021.145953
300. Zhuo, C., Ruan, Q., Zhao, X., Shen, Y., & Lin, R. (2022). CXCL1 promotes colon cancer progression through activation of NF-κB/P300 signaling pathway. *Biology direct*, *17*(1), 34. https://doi.org/10.1186/s13062-022-00348-4
301. Zilio, S., Bicciato, S., Weed, D., & Serafini, P. (2022). CCR1 and CCR5 mediate cancer-induced myelopoiesis and differentiation of myeloid cells in the tumor. *Journal for immunotherapy of cancer*, *10*(1), e003131. <https://doi.org/10.1136/jitc-2021-003131>
302. Zou, S., Tong, Q., Liu, B., Huang, W., Tian, Y., & Fu, X. (2020). Targeting STAT3 in Cancer Immunotherapy. *Molecular cancer*, *19*(1), 145. https://doi.org/10.1186/s12943-020-01258-7
303. Zou, T., Liu, W., Wang, Z., Chen, J., Lu, S., Huang, K., & Li, W. (2021). C3AR1 mRNA as a Potential Therapeutic Target Associates With Clinical Outcomes and Tumor Microenvironment in Osteosarcoma. *Frontiers in medicine*, *8*, 642615. https://doi.org/10.3389/fmed.2021.642615
304. Zykova, T., Zhu, F., Wang, L., Li, H., Lim, D. Y., Yao, K., Roh, E., Yoon, S. P., Kim, H. G., Bae, K. B., Wen, W., Shin, S. H., Nadas, J., Li, Y., Ma, W., Bode, A. M., & Dong, Z. (2018). Targeting PRPK Function Blocks Colon Cancer Metastasis. *Molecular cancer therapeutics*, *17*(5), 1101–1113. https://doi.org/10.1158/1535-7163.MCT-17-0628

Supplementary table 3b:

Gene expression in wound healing according to Deonarine et al 2007, along with evidence for the involvement of the genes in cancer. Studies giving evidence for the role in cancer are tabulated.

Deonarine, K., Panelli, M.C., Stashower, M.E. *et al.* Gene expression profiling of cutaneous wound healing. *J Transl Med* **5**, 11 (2007). https://doi.org/10.1186/1479-5876-5-11

|  |  |
| --- | --- |
| 1. ACP5 | Ren et al 2018 |
| 1. ACVRL1 | Hanna et al 2018 |
| 1. ADAM10 | Smith et al 2020 |
| 1. ADAM15 | Xu et al 2021 |
| 1. ADAMTS3 | Wu et al 2021 |
| 1. AP1S2 | The Human Protein Atlas |
| 1. AQP3 | Zhu et al 2018 |
| 1. ARG1 | Arlauckas et al 2018 |
| 1. ARG2 | Grzywa et al 2020 |
| 1. BCAP31 | Han et al 2022 |
| 1. BCL7B | Yang et al 2021 |
| 1. BST2 | Liu et al 2018 |
| 1. BTG1 | Zhao et al 2020 |
| 1. CASP10 | Oh et al 2010 |
| 1. CASP6 | Hong et al 2020 |
| 1. CCL18 | Korbecki et al 2020 |
| 1. CCL2 | O’Connnor et al 2021 |
| 1. CCL20 | Chen et al 2021 |
| 1. CCL22 | Rohrle et al 2020 |
| 1. CCR7 | Salem et al 2021 |
| 1. CD163 | Matsubara et al 2021 |
| 1. CD3Z |  |
| 1. CD44 | Xu et al 2020 |
| 1. CD6 | Ruth et al 2021 |
| 1. CD68 | Zhang et al 2022 |
| 1. CD81 | Vences –Catalan et al 2022 |
| 1. CD86 | Wennhold et al 2021 |
| 1. CD99 | Yu et al 2022 |
| 1. CDW52 | Salisbury et al 1994 |
| 1. CEBPB | Okazaki et al 2022 |
| 1. CLL-L3B |  |
| 1. CLSTN1 | Chu et al 2017 |
| 1. COL5A3 | Wang et al 2021 |
| 1. COX15 | Zhang et al 2021 |
| 1. COX5A | Zheng et al 2020 |
| 1. COX5B | Gao et al 2015 |
| 1. CXCL16 | Korbecki et al 2021 |
| 1. CXCL2 | Zhang et al 2021 |
| 1. CXCL9 | Neo, S. Y., & Lundqvist, A. (2020 |
| 1. DEDD | Ni et al 2019 |
| 1. DUSP22 | Sasaki et al 2019 |
| 1. EBI2 |  |
| 1. EDF1 | The human protein atlas |
| 1. EGR3 | Shin et al 2020 |
| 1. EVER1 | Kalińska-Bienias et al 2016 |
| 1. F3 | Zhu et al 2019 |
| 1. FCGR1A | Xu et al 2020 |
| 1. CD64 |  |
| 1. FCGR2A | Michelakos et al 2022 |
| 1. FCGR3A | Li et al 2022 |
| 1. G1P2 | Yu et al 2020 |
| 1. G1P3 | Cheriyath et al 2018 |
| 1. HLA-B | Michelakos et al 2022 |
| 1. HLA-C | Michelakos et al 2022 |
| 1. HLA-DOA | Yu et al 2020 |
| 1. HLA-DQB2 -- | Wu et al 2022 |
| 1. HLA-E - | Marin et al 2003, Borst et al 2020 |
| 1. HLA-F | Wuerfel et al 2020 |
| 1. HSF2 | Chen et al 2022 |
| 1. HSPA1B | Wang et al 2021 |
| 1. ICSBPI |  |
| 1. IFIT1 | Pidugu et al 2019 |
| 1. IFITM1 | Yu et al 2015 |
| 1. IFITM2 | Liu et al 2022 |
| 1. IFITM3 | Chu et al 2022 |
| 1. IFNG | Zaidi M.R 2019 |
| 1. IFNGR1 | Du et al 2022 |
| 1. IFRD2 |  |
| 1. IK | Gao et al 2021 |
| 1. IL10RB | Yoo et al 2011 |
| 1. IL13 | Terebe et al 2004 |
| 1. IL15RA | Xu et al 2021 |
| 1. IL1R1 - | Zhang et al 2020 |
| 1. IL24 -- | Qiu et al 2020 |
| 1. IL4R -- | Bankaitis et al 2015 |
| 1. ITGAV | Cheuk et al 2020 |
| 1. ITGAX | Wang et al 2019 |
| 1. KLF4 - | Yu et al 2011 |
| 1. KLRD1 |  |
| 1. LDHA -- | Feng et al 2018 |
| 1. LNK -- | Lv et al 2020 |
| 1. LTBP4 | Su et al 2021 |
| 1. LTF | Zhao et al 2021 |
| 1. LY64 - |  |
| 1. LY75 -- | Mehdi et al 2020 |
| 1. MAP2K3 -- | J et al 2014 |
| 1. MAP4K2 -- | Li et al 2022 |
| 1. MAPBPIP -- |  |
| 1. MAPKAPK2 | Soni et al 2019 |
| 1. MAPKAPK3 | Ren et al 2021 |
| 1. MIF | O’Reilly et al 2016 |
| 1. MMP11 | Ma et al 2021 |
| 1. MMP2 | Wang et al 2018 |
| 1. MRC2 | Zhao et al 2022 |
| 1. MT1G | Wang et al 2019 |
| 1. MT2A | Shimizu et al 2021 |
| 1. MT3 | Koh JY& Lee SJ. 2020 |
| 1. NMI | Feng et al 2017 |
| 1. NUP153 | Wu et al 2019 |
| 1. P4HB | Wu et al 2021 |
| 1. PECAM1 -- | Cao et al 2021 |
| 1. PLAU -- | Fang et al 2021 |
| 1. PSMB2 -- | Liu et al 2022 |
| 1. PSMB9 -- | Li et al 2020 |
| 1. PSMC4 -- | Kao et al 2021 |
| 1. PSMD13 -- | Kexuan et al 2022 |
| 1. QSCN6 -- |  |
| 1. RAB14 -- | Guo et al 2017 |
| 1. RAB31 -- | Chua et al 2015 |
| 1. RAB35 -- | Shaughnessy et al 2018 |
| 1. S100A4 -- | Fei et al 2017 |
| 1. SCARB1 -- |  |
| 1. SCARB2 -- | Feng et al 2022 |
| 1. SOCS3 -- | Dai et al 2022 |
| 1. SRCRB4D -- |  |
| 1. STAT1 - | Zhang et al 2017 |
| 1. STAT5A - | Rani, A and Murphy J 2016 |
| 1. TGF- | Massague J 2008 |
| 1. TGFB1 -- | Sun et al 2021 |
| 1. TIA1 | Dolicka et al 2022 |
| 1. TIMP1 -- | Schoeps et al 2021 |
| 1. TIMP2 -- | Wang et al 2022 |
| 1. TLR 6 | Babu Prasad ,S & Kumar R 2021 |
| 1. TLR1 -- | Babu Prasad ,S & Kumar R 2021 |
| 1. TLR2 -- | Di Lorenzo et al 2020 |
| 1. TLR3 | Muresan et al 2020 |
| 1. TLR5 | Cai et al 2011 |
| 1. TLR7 | Babu Prasad ,S & Kumar R 2021 |
| 1. TNFRSF12A -- | Yang et al 2018 |
| 1. TNFSF13 -- | Lin et al 2020 |
| 1. TU3A -- | Awakura et al 2008 |
| 1. VEGF -- | Carmeliet et al 2005 |
| 1. VEGFB -- | Yang et al 2015 |
| 1. VEGFC -- | Kong et al 2021 |
| 135. VIM -- | Mohebi et al 2020 |
|  |  |
|  |  |

References for table 3b:

1. Adam J. MacNeil, Shun-Chang Jiao, Lori A. McEachern, Yong Jun Yang, Amanda Dennis, Haiming Yu, Zhaolin Xu, Jean S. Marshall, Tong-Jun Lin; MAPK Kinase 3 Is a Tumor Suppressor with Reduced Copy Number in Breast Cancer. Cancer Res 1 January 2014; 74 (1): 162–172. <https://doi.org/10.1158/0008-5472.CAN-13-1310>
2. Awakura, Y., Nakamura, E., Ito, N., Kamoto, T., & Ogawa, O. (2008). Methylation-associated silencing of TU3A in human cancers. International journal of oncology, 33 4, 893-9 .
3. Babu Prasad, S., & Kumar, R. (2021). Role of Toll-Like Receptor (TLR)-Signaling in Cancer Progression and Treatment. Cell Interaction - Molecular and Immunological Basis for Disease Management. doi: 10.5772/intechopen.94423.
4. Bankaitis, K. V., & Fingleton, B. (2015). Targeting IL4/IL4R for the treatment of epithelial cancer metastasis. *Clinical & experimental metastasis*, *32*(8), 847–856. https://doi.org/10.1007/s10585-015-9747-9
5. Borst, L., van der Burg, S. H., & van Hall, T. (2020). The NKG2A-HLA-E Axis as a Novel Checkpoint in the Tumor Microenvironment. *Clinical cancer research : an official journal of the American Association for Cancer Research*, *26*(21), 5549–5556. https://doi.org/10.1158/1078-0432.CCR-19-2095
6. Cai, Z., Sanchez, A., Shi, Z., Zhang, T., Liu, M., & Zhang, D. (2011). Activation of Toll-like receptor 5 on breast cancer cells by flagellin suppresses cell proliferation and tumor growth. *Cancer research*, *71*(7), 2466–2475. https://doi.org/10.1158/0008-5472.CAN-10-1993
7. Cao, S., Wang, Y., Li, J., Ling, X., Zhang, Y., Zhou, Y., & Zhong, H. (2021). Prognostic Implication of the Expression Level of PECAM-1 in Non-small Cell Lung Cancer. *Frontiers in oncology*, *11*, 587744. https://doi.org/10.3389/fonc.2021.587744
8. Carmeliet P. (2005). VEGF as a key mediator of angiogenesis in cancer. *Oncology*, *69 Suppl 3*, 4–10. https://doi.org/10.1159/000088478
9. Chen, F., Fan, Y., Liu, X., Zhang, J., Shang, Y., Zhang, B., Liu, B., Hou, J., Cao, P., & Tan, K. (2022). Pan-Cancer Integrated Analysis of HSF2 Expression, Prognostic Value and Potential Implications for Cancer Immunity. *Frontiers in molecular biosciences*, *8*, 789703. https://doi.org/10.3389/fmolb.2021.789703
10. Chen, W., Qin, Y., & Liu, S. (2020). CCL20 Signaling in the Tumor Microenvironment. *Advances in experimental medicine and biology*, *1231*, 53–65. https://doi.org/10.1007/978-3-030-36667-4\_6
11. Cheriyath, V., Kaur, J., Davenport, A., Khalel, A., Chowdhury, N., & Gaddipati, L. (2018). G1P3 (IFI6), a mitochondrial localised antiapoptotic protein, promotes metastatic potential of breast cancer cells through mtROS. *British journal of cancer*, *119*(1), 52–64. https://doi.org/10.1038/s41416-018-0137-3
12. Cheuk, I. W., Siu, M. T., Ho, J. C., Chen, J., Shin, V. Y., & Kwong, A. (2020). *ITGAV* targeting as a therapeutic approach for treatment of metastatic breast cancer. *American journal of cancer research*, *10*(1), 211–223.
13. Chu, P. Y., Huang, W. C., Tung, S. L., Tsai, C. Y., Chen, C. J., Liu, Y. C., Lee, C. W., Lin, Y. H., Lin, H. Y., Chen, C. Y., Yeh, C. T., Lin, K. H., & Chi, H. C. (2022). IFITM3 promotes malignant progression, cancer stemness and chemoresistance of gastric cancer by targeting MET/AKT/FOXO3/c-MYC axis. *Cell & bioscience*, *12*(1), 124. https://doi.org/10.1186/s13578-022-00858-8
14. Chu, Y., Lai, Y. H., Lee, M. C., Yeh, Y. J., Wu, Y. K., Tsao, W., Huang, C. Y., & Wu, S. (2017). Calsyntenin-1, clusterin and neutrophil gelatinase-associated lipocalin are candidate serological biomarkers for lung adenocarcinoma. *Oncotarget*, *8*(64), 107964–107976. https://doi.org/10.18632/oncotarget.22438
15. Chua, C. E., & Tang, B. L. (2015). The role of the small GTPase Rab31 in cancer. *Journal of cellular and molecular medicine*, *19*(1), 1–10. https://doi.org/10.1111/jcmm.12403
16. Dai, L., Tao, Y., Shi, Z., Liang, W., Hu, W., Xing, Z., Zhou, S., Guo, X., Fu, X., & Wang, X. (2022). SOCS3 Acts as an Onco-immunological Biomarker With Value in Assessing the Tumor Microenvironment, Pathological Staging, Histological Subtypes, Therapeutic Effect, and Prognoses of Several Types of Cancer. *Frontiers in oncology*, *12*, 881801. https://doi.org/10.3389/fonc.2022.881801
17. Di Lorenzo, A., Bolli, E., Tarone, L., Cavallo, F., & Conti, L. (2020). Toll-Like Receptor 2 at the Crossroad between Cancer Cells, the Immune System, and the Microbiota. *International journal of molecular sciences*, *21*(24), 9418. https://doi.org/10.3390/ijms21249418
18. Dolicka, D., Zahoran, S., Correia de Sousa, M., Gjorgjieva, M., Sempoux, C., Fournier, M., Maeder, C., Collart, M. A., Foti, M., & Sobolewski, C. (2022). TIA1 Loss Exacerbates Fatty Liver Disease but Exerts a Dual Role in Hepatocarcinogenesis. *Cancers*, *14*(7), 1704. https://doi.org/10.3390/cancers14071704
19. Du, W., Frankel, T.L., Green, M. *et al.* IFNγ signaling integrity in colorectal cancer immunity and immunotherapy. *Cell Mol Immunol* **19**, 23–32 (2022). https://doi.org/10.1038/s41423-021-00735-3
20. Fang, L., Che, Y., Zhang, C., Huang, J., Lei, Y., Lu, Z., Sun, N., & He, J. (2021). PLAU directs conversion of fibroblasts to inflammatory cancer-associated fibroblasts, promoting esophageal squamous cell carcinoma progression via uPAR/Akt/NF-κB/IL8 pathway. *Cell death discovery*, *7*(1), 32. https://doi.org/10.1038/s41420-021-00410-6
21. Fei, F., Qu, J., Zhang, M., Li, Y., & Zhang, S. (2017). S100A4 in cancer progression and metastasis: A systematic review. *Oncotarget*, *8*(42), 73219–73239. https://doi.org/10.18632/oncotarget.18016
22. Feng Wang, Yang Gao, Situ Xue et al. SCARB2 Drives Hepatic Carcinoma Initiation by Supporting Cancer Stem Cell Traits and Enhancing MYC Transcriptional Activity, 17 February 2022, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-1313420/v1]
23. Feng, X., Xu, X., Xiao, X., Zou, K., Yu, W., Wu, J., Tang, R., Gao, Y., Hao, J., Zhao, X., Liao, Y., Chen, Y., Huang, W., Guo, W., Kang, L., & Deng, W. (2017). NMI inhibits cancer stem cell traits by downregulating hTERT in breast cancer. *Cell death & disease*, *8*(5), e2783. https://doi.org/10.1038/cddis.2017.200
24. Feng, Y., Xiong, Y., Qiao, T., Li, X., Jia, L., & Han, Y. (2018). Lactate dehydrogenase A: A key player in carcinogenesis and potential target in cancer therapy. *Cancer medicine*, *7*(12), 6124–6136. https://doi.org/10.1002/cam4.1820
25. Gao, C., Han, Y., Bai, L., Wang, Y., & Xue, F. (2021). IK: A novel cell mitosis regulator that contributes to carcinogenesis. *Cell biochemistry and function*, *39*(7), 854–859. https://doi.org/10.1002/cbf.3660
26. Gao, S. P., Sun, H. F., Jiang, H. L., Li, L. D., Hu, X., Xu, X. E., & Jin, W. (2015). Loss of COX5B inhibits proliferation and promotes senescence via mitochondrial dysfunction in breast cancer. *Oncotarget*, *6*(41), 43363–43374. https://doi.org/10.18632/oncotarget.6222
27. Grzywa, T. M., Sosnowska, A., Matryba, P., Rydzynska, Z., Jasinski, M., Nowis, D., & Golab, J. (2020). Myeloid Cell-Derived Arginase in Cancer Immune Response. *Frontiers in immunology*, *11*, 938. <https://doi.org/10.3389/fimmu.2020.00938>
28. Guo, B., Wang, W., Zhao, Z., Li, Q., Zhou, K., Zhao, L., Wang, L., Yang, J., & Huang, C. (2017). Rab14 Act as Oncogene and Induce Proliferation of Gastric Cancer Cells via AKT Signaling Pathway. *PloS one*, *12*(1), e0170620. https://doi.org/10.1371/journal.pone.0170620
29. Han, L., Shi, J., Zhao, L., Deng, J., Li, Y., Zhao, H., Wang, H., Yan, Y., & Zou, F. (2022). BCAP31 is involved in modulating colorectal cancer cell proliferation via the Emerin/β-catenin axis. *Experimental cell research*, *418*(1), 113265. https://doi.org/10.1016/j.yexcr.2022.113265
30. Hanna, D. L., Loupakis, F., Yang, D., Cremolini, C., Schirripa, M., Li, M., Matsusaka, S., Berger, M. D., Miyamoto, Y., Zhang, W., Ning, Y., Antoniotti, C., Salvatore, L., Moran, M., Zeger, G., Astrow, S. H., Falcone, A., & Lenz, H. J. (2018). Prognostic Value of ACVRL1 Expression in Metastatic Colorectal Cancer Patients Receiving First-line Chemotherapy With Bevacizumab: Results From the Triplet Plus Bevacizumab (TRIBE) Study. *Clinical colorectal cancer*, *17*(3), e471–e488. <https://doi.org/10.1016/j.clcc.2018.03.006>
31. Hong, W., Gu, Y., Guan, R., Xie, D., Zhou, H., & Yu, M. (2020). Pan-cancer analysis of the CASP gene family in relation to survival, tumor-infiltrating immune cells and therapeutic targets. *Genomics*, *112*(6), 4304–4315. https://doi.org/10.1016/j.ygeno.2020.07.026Arlauckas, S. P., Garren, S. B., Garris, C. S., Kohler, R. H., Oh, J., Pittet, M. J., & Weissleder, R. (2018). Arg1 expression defines immunosuppressive subsets of tumor-associated macrophages. *Theranostics*, *8*(21), 5842–5854. <https://doi.org/10.7150/thno.26888>
32. Inoue, A., Omoto, Y., Yamaguchi, Y., Kiyama, R., & Hayashi, S. I. (2004). Transcription factor EGR3 is involved in the estrogen-signaling pathway in breast cancer cells. *Journal of molecular endocrinology*, *32*(3), 649–661. https://doi.org/10.1677/jme.0.0320649
33. Kalińska-Bienias, A., Kowalewski, C., & Majewski, S. (2016). The EVER genes - the genetic etiology of carcinogenesis in epidermodysplasia verruciformis and a possible role in non-epidermodysplasia verruciformis patients. *Postepy dermatologii i alergologii*, *33*(2), 75–80. https://doi.org/10.5114/ada.2016.59145
34. Kao, T. J., Wu, C. C., Phan, N. N., Liu, Y. H., Ta, H. D. K., Anuraga, G., Wu, Y. F., Lee, K. H., Chuang, J. Y., & Wang, C. Y. (2021). Prognoses and genomic analyses of proteasome 26S subunit, ATPase (PSMC) family genes in clinical breast cancer. *Aging*, *13*(14), 17970. https://doi.org/10.18632/aging.203345
35. kexuan Wei, Chunxiang Lin, Jie Li et al. PSMD13 is a prognostic biomarker and correlated with immune infiltrates in hepatocellular carcinoma, 02 August 2022, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-1905597/v1]
36. Koh, JY., Lee, SJ. Metallothionein-3 as a multifunctional player in the control of cellular processes and diseases. *Mol Brain* **13**, 116 (2020). https://doi.org/10.1186/s13041-020-00654-w
37. Kong, D., Zhou, H., Neelakantan, D. *et al.* VEGF-C mediates tumor growth and metastasis through promoting EMT-epithelial breast cancer cell crosstalk. *Oncogene* **40**, 964–979 (2021). https://doi.org/10.1038/s41388-020-01539-x
38. Korbecki, J., Bajdak-Rusinek, K., Kupnicka, P., Kapczuk, P., Simińska, D., Chlubek, D., & Baranowska-Bosiacka, I. (2021). The Role of CXCL16 in the Pathogenesis of Cancer and Other Diseases. *International journal of molecular sciences*, *22*(7), 3490. https://doi.org/10.3390/ijms22073490
39. Korbecki, J., Olbromski, M., & Dzięgiel, P. (2020). CCL18 in the Progression of Cancer. *International journal of molecular sciences*, *21*(21), 7955. https://doi.org/10.3390/ijms21217955
40. Li Y, Zeng M, Wang T, Jiang F. COL5A3 is a prognostic biomarker and correlated with immune infiltrates in pancreatic cancer. Research Square; 2021. DOI: 10.21203/rs.3.rs-889396/v1.
41. Li, C., Dai, S., Yan, Z., Zhang, X., Liu, S., Wang, X., Wang, J., Shi, L., & Yao, Y. (2020). Genetic polymorphisms of proteasome subunit genes of the MHC-I antigen-presenting system are associated with cervical cancer in a Chinese Han population. *Human immunology*, *81*(8), 445–451. https://doi.org/10.1016/j.humimm.2020.07.002
42. Li, L., Huang, Z., Du, K., Liu, X., Li, C., Wang, D., Zhang, Y., Wang, C., & Li, J. (2022). Integrative Pan-Cancer Analysis Confirmed that FCGR3A is a Candidate Biomarker Associated With Tumor Immunity. *Frontiers in pharmacology*, *13*, 900699. https://doi.org/10.3389/fphar.2022.900699
43. Lin, H. Y., Kuei, C. H., Lee, H. H., Lin, C. H., Chen, Y. L., Chen, C. L., & Lin, Y. F. (2020). TNFSF13 upregulation confers chemotherapeutic resistance via triggering autophagy initiation in triple-negative breast cancer. *Journal of molecular medicine (Berlin, Germany)*, *98*(9), 1255–1267. https://doi.org/10.1007/s00109-020-01952-5
44. Liu, W., Cao, Y., Guan, Y., & Zheng, C. (2018). BST2 promotes cell proliferation, migration and induces NF-κB activation in gastric cancer. *Biotechnology letters*, *40*(7), 1015–1027. https://doi.org/10.1007/s10529-018-2562-z
45. Liu, Y., Zhou, M., Wu, J., Wen, Z., Fang, Y., Lin, L., Luo, M., Sun, L., & Liao, W. (2022). Interferon-induced transmembrane protein 2 promotes epithelial-mesenchymal transition by activating transforming growth factor-β1/small mother against decapentaplegic 2 signaling in gastric cancer. *Molecular biology reports*, *49*(2), 997–1006. https://doi.org/10.1007/s11033-021-06919-4
46. Liu, Z., Yu, C., Chen, Z. *et al.* PSMB2 knockdown suppressed proteasome activity and cell proliferation, promoted apoptosis, and blocked NRF1 activation in gastric cancer cells. *Cytotechnology* **74**, 491–502 (2022). https://doi.org/10.1007/s10616-022-00538-y
47. Lv, J., Yu, W., Zhang, Y. *et al.* LNK promotes the growth and metastasis of triple negative breast cancer via activating JAK/STAT3 and ERK1/2 pathway. *Cancer Cell Int* **20**, 124 (2020). https://doi.org/10.1186/s12935-020-01197-9
48. Ma, B., Ran, R., Liao, H. Y., & Zhang, H. H. (2021). The paradoxical role of matrix metalloproteinase-11 in cancer. *Biomedicine & pharmacotherapy = Biomedecine & pharmacotherapie*, *141*, 111899. https://doi.org/10.1016/j.biopha.2021.111899
49. Marín, R., Ruiz-Cabello, F., Pedrinaci, S., Méndez, R., Jiménez, P., Geraghty, D. E., & Garrido, F. (2003). Analysis of HLA-E expression in human tumors. *Immunogenetics*, *54*(11), 767–775. https://doi.org/10.1007/s00251-002-0526-9
50. Massagué J. (2008). TGFbeta in Cancer. *Cell*, *134*(2), 215–230. https://doi.org/10.1016/j.cell.2008.07.001
51. Matsubara, E., Komohara, Y., Shinchi, Y., Mito, R., Fujiwara, Y., Ikeda, K., Shima, T., Shimoda, M., Kanai, Y., Sakagami, T., & Suzuki, M. (2021). CD163-positive cancer cells are a predictor of a worse clinical course in lung adenocarcinoma. *Pathology international*, *71*(10), 666–673. https://doi.org/10.1111/pin.13144
52. Mehdi, S., Macdonald, E., Galpin, K., Landry, D. A., Rodriguez, G., Vanderhyden, B., & Bachvarov, D. (2020). LY75 Suppression in Mesenchymal Epithelial Ovarian Cancer Cells Generates a Stable Hybrid EOC Cellular Phenotype, Associated with Enhanced Tumor Initiation, Spreading and Resistance to Treatment in Orthotopic Xenograft Mouse Model. *International journal of molecular sciences*, *21*(14), 4992. https://doi.org/10.3390/ijms21144992
53. Michelakos, T., Kontos, F., Kurokawa, T., Cai, L., Sadagopan, A., Krijgsman, D., Weichert, W., Durrant, L. G., Kuppen, P. J. K., R Ferrone, C., & Ferrone, S. (2022). Differential role of HLA-A and HLA-B, C expression levels as prognostic markers in colon and rectal cancer. *Journal for immunotherapy of cancer*, *10*(3), e004115. https://doi.org/10.1136/jitc-2021-004115
54. Mohebi, M., Ghafouri-Fard, S., Modarressi, M. H., Dashti, S., Zekri, A., Kholghi-Oskooei, V., & Taheri, M. (2020). Expression analysis of vimentin and the related lncRNA network in breast cancer. *Experimental and molecular pathology*, *115*, 104439. https://doi.org/10.1016/j.yexmp.2020.104439
55. Muresan, X. M., Bouchal, J., Culig, Z., & Souček, K. (2020). Toll-Like Receptor 3 in Solid Cancer and Therapy Resistance. *Cancers*, *12*(11), 3227. https://doi.org/10.3390/cancers12113227
56. Najy AJ, Day KC, Day ML (February 2008). ["ADAM15 supports prostate cancer metastasis by modulating tumor cell-endothelial cell interaction"](https://doi.org/10.1158%2F0008-5472.CAN-07-2432). *Cancer Res*. **68** (4): 1092–9. [doi](https://en.wikipedia.org/wiki/Doi_(identifier)):[10.1158/0008-5472.CAN-07-2432](https://doi.org/10.1158%2F0008-5472.CAN-07-2432). [PMID](https://en.wikipedia.org/wiki/PMID_(identifier)) [18281484](https://pubmed.ncbi.nlm.nih.gov/18281484)
57. Neo, S. Y., & Lundqvist, A. (2020). The Multifaceted Roles of CXCL9 Within the Tumor Microenvironment. *Advances in experimental medicine and biology*, *1231*, 45–51. https://doi.org/10.1007/978-3-030-36667-4\_5The human protein atlas https://v17.proteinatlas.org/ENSG00000107223-EDF1/pathology
58. Ni, Y., Schmidt, K.R., Werner, B.A. *et al.* Death effector domain-containing protein induces vulnerability to cell cycle inhibition in triple-negative breast cancer. *Nat Commun* **10**, 2860 (2019). https://doi.org/10.1038/s41467-019-10743-7
59. O'Connor, T., & Heikenwalder, M. (2021). CCL2 in the Tumor Microenvironment. *Advances in experimental medicine and biology*, *1302*, 1–14. https://doi.org/10.1007/978-3-030-62658-7\_1
60. Oh, J. E., Kim, M. S., Ahn, C. H., Kim, S. S., Han, J. Y., Lee, S. H., & Yoo, N. J. (2010). Mutational analysis of CASP10 gene in colon, breast, lung and hepatocellular carcinomas. *Pathology*, *42*(1), 73–76. https://doi.org/10.3109/00313020903434371
61. Okazaki, K., Anzawa, H., Katsuoka, F., Kinoshita, K., Sekine, H., & Motohashi, H. (2022). CEBPB is required for NRF2-mediated drug resistance in NRF2-activated non-small cell lung cancer cells. *Journal of biochemistry*, *171*(5), 567–578. https://doi.org/10.1093/jb/mvac013
62. O'Reilly, C., Doroudian, M., Mawhinney, L., & Donnelly, S. C. (2016). Targeting MIF in Cancer: Therapeutic Strategies, Current Developments, and Future Opportunities. *Medicinal research reviews*, *36*(3), 440–460. https://doi.org/10.1002/med.21385
63. Pidugu, V.K., Wu, MM., Yen, AH. *et al.* IFIT1 and IFIT3 promote oral squamous cell carcinoma metastasis and contribute to the anti-tumor effect of gefitinib via enhancing p-EGFR recycling. *Oncogene* **38**, 3232–3247 (2019). <https://doi.org/10.1038/s41388-018-0662-9>
64. Qiu, L. L., Zhang, X. G., Chen, G., Dang, Y. W., Huang, Z. G., Li, M. X., Liang, Y., Huang, S. N., Tang, X. Z., Chen, X. X., Wei, H. Y., & Wu, H. Y. (2020). Clinical Significance of the Interleukin 24 mRNA Level in Head and Neck Squamous Cell Carcinoma and Its Subgroups: An In Silico Investigation. *Journal of oncology*, *2020*, 7042025. https://doi.org/10.1155/2020/7042025
65. Rani, A., & Murphy, J. J. (2016). STAT5 in Cancer and Immunity. *Journal of interferon & cytokine research : the official journal of the International Society for Interferon and Cytokine Research*, *36*(4), 226–237. https://doi.org/10.1089/jir.2015.0054
66. Ren, J., Sun, J., Li, M., Zhang, Z., Yang, D., & Cao, H. (2021). MAPK Activated Protein Kinase 3 Is a Prognostic-Related Biomarker and Associated With Immune Infiltrates in Glioma. *Frontiers in oncology*, *11*, 793025. <https://doi.org/10.3389/fonc.2021.793025>
67. Ren, X., Shan, W. H., Wei, L. L., Gong, C. C., & Pei, D. S. (2018). ACP5: Its Structure, Distribution, Regulation and Novel Functions. *Anti-cancer agents in medicinal chemistry*, *18*(8), 1082–1090. https://doi.org/10.2174/1871520618666180411123447
68. Röhrle, N., Knott, M. M. L., & Anz, D. (2020). CCL22 Signaling in the Tumor Environment. *Advances in experimental medicine and biology*, *1231*, 79–96. https://doi.org/10.1007/978-3-030-36667-4\_8
69. Ruth, J. H., Gurrea-Rubio, M., Athukorala, K. S., Rasmussen, S. M., Weber, D. P., Randon, P. M., Gedert, R. J., Lind, M. E., Amin, M. A., Campbell, P. L., Tsou, P. S., Mao-Draayer, Y., Wu, Q., Lanigan, T. M., Keshamouni, V. G., Singer, N. G., Lin, F., & Fox, D. A. (2021). CD6 is a target for cancer immunotherapy. *JCI insight*, *6*(5), e145662. https://doi.org/10.1172/jci.insight.145662
70. Salem, A., Alotaibi, M., Mroueh, R., Basheer, H. A., & Afarinkia, K. (2021). CCR7 as a therapeutic target in Cancer. *Biochimica et biophysica acta. Reviews on cancer*, *1875*(1), 188499. https://doi.org/10.1016/j.bbcan.2020.188499
71. Salisbury JR, Rapson NT, Codd JD, Rogers MV, Nethersell AB. Immunohistochemical analysis of CDw52 antigen expression in non-Hodgkin’s lymphomas.*J Clin Pathol.* 1994; 47:313-7.
72. Sasaki, Y., Fujimori, H., Hozumi, M., Onodera, T., Nozaki, T., Murakami, Y., Ashizawa, K., Inoue, K., Koizumi, F., & Masutani, M. (2019). Dysfunction of Poly (ADP-Ribose) Glycohydrolase Induces a Synthetic Lethal Effect in Dual Specificity Phosphatase 22-Deficient Lung Cancer Cells. *Cancer research*, *79*(15), 3851–3861. https://doi.org/10.1158/0008-5472.CAN-18-1037
73. Schoeps, B., Eckfeld, C., Prokopchuk, O., Böttcher, J., Häußler, D., Steiger, K., Demir, I. E., Knolle, P., Soehnlein, O., Jenne, D. E., Hermann, C. D., & Krüger, A. (2021). TIMP1 Triggers Neutrophil Extracellular Trap Formation in Pancreatic Cancer. *Cancer research*, *81*(13), 3568–3579. https://doi.org/10.1158/0008-5472.CAN-20-4125
74. Shaughnessy, R., & Echard, A. (2018). Rab35 GTPase and cancer: Linking membrane trafficking to tumorigenesis. *Traffic (Copenhagen, Denmark)*, *19*(4), 247–252. https://doi.org/10.1111/tra.12546
75. Shimizu, M., Koma, Y. I., Sakamoto, H., Tsukamoto, S., Kitamura, Y., Urakami, S., Tanigawa, K., Kodama, T., Higashino, N., Nishio, M., Shigeoka, M., Kakeji, Y., & Yokozaki, H. (2021). Metallothionein 2A Expression in Cancer-Associated Fibroblasts and Cancer Cells Promotes Esophageal Squamous Cell Carcinoma Progression. *Cancers*, *13*(18), 4552. https://doi.org/10.3390/cancers13184552
76. Shin, SH., Kim, I., Lee, J.E. *et al.* Loss of *EGR3* is an independent risk factor for metastatic progression in prostate cancer. *Oncogene* **39**, 5839–5854 (2020). https://doi.org/10.1038/s41388-020-01418-5
77. Smith, T. M., Jr, Tharakan, A., & Martin, R. K. (2020). Targeting ADAM10 in Cancer and Autoimmunity. *Frontiers in immunology*, *11*, 499. <https://doi.org/10.3389/fimmu.2020.00499>
78. Soni, S., Saroch, M. K., Chander, B., Tirpude, N. V., & Padwad, Y. S. (2019). MAPKAPK2 plays a crucial role in the progression of head and neck squamous cell carcinoma by regulating transcript stability. *Journal of experimental & clinical cancer research : CR*, *38*(1), 175. https://doi.org/10.1186/s13046-019-1167-2
79. Su, C. T., & Urban, Z. (2021). LTBP4 in Health and Disease. *Genes*, *12*(6), 795. https://doi.org/10.3390/genes12060795
80. Sun, X., Bernhardt, S.M., Glynn, D.J. *et al.* Attenuated TGFB signalling in macrophages decreases susceptibility to DMBA-induced mammary cancer in mice. *Breast Cancer Res* **23**, 39 (2021). https://doi.org/10.1186/s13058-021-01417-8
81. Terabe, M., Park, J. M., & Berzofsky, J. A. (2004). Role of IL-13 in regulation of anti-tumor immunity and tumor growth. *Cancer immunology, immunotherapy : CII*, *53*(2), 79–85. <https://doi.org/10.1007/s00262-003-0445-0>
82. The Human Protein Atlas https://v18.proteinatlas.org/ENSG00000182287-AP1S2/pathology
83. Vences-Catalán, F., Duault, C., Kuo, C. C., Rajapaksa, R., Levy, R., & Levy, S. (2017). CD81 as a tumor target. *Biochemical Society transactions*, *45*(2), 531–535. https://doi.org/10.1042/BST20160478
84. Wang, B., Lan, T., Xiao, H. *et al.* The expression profiles and prognostic values of HSP70s in hepatocellular carcinoma. *Cancer Cell Int* **21**, 286 (2021). https://doi.org/10.1186/s12935-021-01987-9
85. Wang, D. D., Xu, W. X., Chen, W. Q., Li, L., Yang, S. J., Zhang, J., & Tang, J. H. (2022). Identification of TIMP2 as a Prognostic Biomarker and Its Correlation with Tumor Immune Microenvironment: A Comprehensive Pan-Cancer Analysis. *Journal of oncology*, *2022*, 9133636. <https://doi.org/10.1155/2022/9133636>
86. Wang, J., Jiang, Y. H., Yang, P. Y., & Liu, F. (2021). Increased Collagen Type V α2 (COL5A2) in Colorectal Cancer is Associated with Poor Prognosis and Tumor Progression. *OncoTargets and therapy*, *14*, 2991–3002. https://doi.org/10.2147/OTT.S288422
87. Wang, J., Yang, L., Liang, F., Chen, Y., & Yang, G. (2019). Integrin alpha x stimulates cancer angiogenesis through PI3K/Akt signaling-mediated VEGFR2/VEGF-A overexpression in blood vessel endothelial cells. *Journal of cellular biochemistry*, *120*(2), 1807–1818. https://doi.org/10.1002/jcb.27480
88. Wang, T., Hou, J., Jian, S., Luo, Q., Wei, J., Li, Z., Wang, X., Bai, P., Duan, B., Xing, J., Cai, J. (2018). miR-29b negatively regulates MMP2 to impact gastric cancer development by suppress gastric cancer cell migration and tumor growth. Journal of Cancer, 9(20), 3776-3786. https://doi.org/10.7150/jca.26263.
89. Wang, Y., Wang, G., Tan, X. *et al.* MT1G serves as a tumor suppressor in hepatocellular carcinoma by interacting with p53. *Oncogenesis* **8**, 67 (2019). https://doi.org/10.1038/s41389-019-0176-5
90. Wennhold, K., Thelen, M., Lehmann, J., Schran, S., Preugszat, E., Garcia-Marquez, M., Lechner, A., Shimabukuro-Vornhagen, A., Ercanoglu, M. S., Klein, F., Thangarajah, F., Eidt, S., Löser, H., Bruns, C., Quaas, A., von Bergwelt-Baildon, M., & Schlößer, H. A. (2021). CD86+ Antigen-Presenting B Cells Are Increased in Cancer, Localize in Tertiary Lymphoid Structures, and Induce Specific T-cell Responses. *Cancer immunology research*, *9*(9), 1098–1108. https://doi.org/10.1158/2326-6066.CIR-20-0949
91. Wu, G., Li, J., Xu, Y., Che, X., Chen, F., & Wang, Q. (2021). A New Survival Model Based on ADAMTSs for Prognostic Prediction in Clear Cell Renal Cell Carcinoma. *Journal of oncology*, *2021*, 2606213. https://doi.org/10.1155/2021/2606213
92. Wu, Y., Fang, G., Wang, X., Wang, H., Chen, W., Li, L., Ye, T., Gong, L., Ke, C., & Cai, Y. (2019). NUP153 overexpression suppresses the proliferation of colorectal cancer by negatively regulating Wnt/β-catenin signaling pathway and predicts good prognosis. *Cancer biomarkers : section A of Disease markers*, *24*(1), 61–70. https://doi.org/10.3233/CBM-181703
93. Wu, Y., Peng, Y., Guan, B., He, A., Yang, K., He, S., Gong, Y., Li, X., & Zhou, L. (2021). P4HB: A novel diagnostic and prognostic biomarker for bladder carcinoma. *Oncology letters*, *21*(2), 95. https://doi.org/10.3892/ol.2020.1235
94. Wuerfel, F. M., Huebner, H., Häberle, L., Gass, P., Hein, A., Jud, S. M., Hack, C. C., Wunderle, M., Schulz-Wendtland, R., Erber, R., Hartmann, A., Ekici, A. B., Beckmann, M. W., Fasching, P. A., & Ruebner, M. (2020). HLA-G and HLA-F protein isoform expression in breast cancer patients receiving neoadjuvant treatment. *Scientific reports*, *10*(1), 15750. <https://doi.org/10.1038/s41598-020->72837-3
95. Xu, H., Buhtoiarov, I. N., Guo, H., & Cheung, N. V. (2021). A novel multimeric IL15/IL15Rα-Fc complex to enhance cancer immunotherapy. *Oncoimmunology*, *10*(1), 1893500. <https://doi.org/10.1080/2162402X.2021.1893500>
96. Xu, H., Niu, M., Yuan, X., Wu, K., & Liu, A. (2020). CD44 as a tumor biomarker and therapeutic target. *Experimental hematology & oncology*, *9*(1), 36. https://doi.org/10.1186/s40164-020-00192-0
97. Xu, J. H., Guan, Y. J., Zhang, Y. C., Qiu, Z. D., Zhou, Y., Chen, C., Yu, J., & Wang, W. X. (2021). ADAM15 correlates with prognosis, immune infiltration and apoptosis in hepatocellular carcinoma. *Aging*, *13*(16), 20395–20417. https://doi.org/10.18632/aging.203425
98. Xu, J. L., & Guo, Y. (2020). FCGR1A Serves as a Novel Biomarker and Correlates With Immune Infiltration in Four Cancer Types. *Frontiers in molecular biosciences*, *7*, 581615. https://doi.org/10.3389/fmolb.2020.581615
99. Yang, D., Gu, X., Li, C., Shi, J., Chen, Y., Dong, M., & Zhang, Z. (2021). BCL7B is a potential novel diagnosis and prognosis biomarker for sarcomas using bioinformatics analysis. *Medicine*, *100*(28), e26632. https://doi.org/10.1097/MD.0000000000026632
100. Yang, J., Min, K. W., Kim, D. H., Son, B. K., Moon, K. M., Wi, Y. C., Bang, S. S., Oh, Y. H., Do, S. I., Chae, S. W., Oh, S., Kim, Y. H., & Kwon, M. J. (2018). High TNFRSF12A level associated with MMP-9 overexpression is linked to poor prognosis in breast cancer: Gene set enrichment analysis and validation in large-scale cohorts. *PloS one*, *13*(8), e0202113. https://doi.org/10.1371/journal.pone.0202113
101. Yang, X., Zhang, Y., Hosaka, K., Andersson, P., Wang, J., Tholander, F., Cao, Z., Morikawa, H., Tegnér, J., Yang, Y., Iwamoto, H., Lim, S., & Cao, Y. (2015). VEGF-B promotes cancer metastasis through a VEGF-A-independent mechanism and serves as a marker of poor prognosis for cancer patients. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(22), E2900–E2909. <https://doi.org/10.1073/pnas.1503500112>
102. Yoo, K. H., Kim, S. K., Chung, J. H., & Chang, S. G. (2011). Association of IL10, IL10RA, and IL10RB polymorphisms with benign prostate hyperplasia in Korean population. *Journal of Korean medical science*, *26*(5), 659–664. https://doi.org/10.3346/jkms.2011.26.5.659
103. Yu, F., Li, J., Chen, H., Fu, J., Ray, S., Huang, S., Zheng, H., & Ai, W. (2011). Kruppel-like factor 4 (KLF4) is required for maintenance of breast cancer stem cells and for cell migration and invasion. *Oncogene*, *30*(18), 2161–2172. https://doi.org/10.1038/onc.2010.591
104. Yu, F., Liu, G., Zhang, H., Wang, X., Wu, Z., Xu, Q., Wu, Y., & Chen, D. (2022). Cell adhesion molecule CD99 in cancer immunotherapy. *Current molecular medicine*, 10.2174/1566524023666221007143513. Advance online publication. https://doi.org/10.2174/1566524023666221007143513
105. Yu, F., Xie, D., Ng, S. S., Lum, C. T., Cai, M. Y., Cheung, W. K., Kung, H. F., Lin, G., Wang, X., & Lin, M. C. (2015). IFITM1 promotes the metastasis of human colorectal cancer via CAV-1. *Cancer letters*, *368*(1), 135–143. https://doi.org/10.1016/j.canlet.2015.07.034
106. Yu, S., Yu, X., Sun, L. *et al.* GBP2 enhances glioblastoma invasion through Stat3/fibronectin pathway. *Oncogene* **39**, 5042–5055 (2020). https://doi.org/10.1038/s41388-020-1348-7Wu, G., Xiao, G., Yan, Y., Guo, C., Hu, N., & Shen, S. (2022). Bioinformatics analysis of the clinical significance of HLA class II in breast cancer. *Medicine*, *101*(40), e31071. https://doi.org/10.1097/MD.0000000000031071
107. Yu, S., Yu, X., Sun, L. *et al.* GBP2 enhances glioblastoma invasion through Stat3/fibronectin pathway. *Oncogene* **39**, 5042–5055 (2020). https://doi.org/10.1038/s41388-020-1348-7
108. Zaidi M. R. (2019). The Interferon-Gamma Paradox in Cancer. *Journal of interferon & cytokine research : the official journal of the International Society for Interferon and Cytokine Research*, *39*(1), 30–38. https://doi.org/10.1089/jir.2018.0087
109. Zeng, J., Li, G., Xia, Y., Wang, F., Wang, Y., Xu, S., Zhou, Y., Liu, X., Xie, X., & Zhang, J. (2020). miR-204/COX5A axis contributes to invasion and chemotherapy resistance in estrogen receptor-positive breast cancers. *Cancer letters*, *492*, 185–196. https://doi.org/10.1016/j.canlet.2020.07.027
110. Zhang, C., Li, N., Liu, Y. Y., Yuan, T., Yang, S., & Wang, X. P. (2021). Cox15 is a novel oncogene that required for lung cancer cell proliferation. *Biochemical and biophysical research communications*, *578*, 70–76. https://doi.org/10.1016/j.bbrc.2021.09.010
111. Zhang, F., Jiang, J., Xu, B., Xu, Y., & Wu, C. (2021). Over-expression of CXCL2 is associated with poor prognosis in patients with ovarian cancer. *Medicine*, *100*(4), e24125. https://doi.org/10.1097/MD.0000000000024125
112. Zhang, J., Li, S., Liu, F., & Yang, K. (2022). Role of CD68 in tumor immunity and prognosis prediction in pan-cancer. *Scientific reports*, *12*(1), 7844. https://doi.org/10.1038/s41598-022-11503-2
113. Zhang, W., Borcherding, N., & Kolb, R. (2020). IL-1 Signaling in Tumor Microenvironment. *Advances in experimental medicine and biology*, *1240*, 1–23. https://doi.org/10.1007/978-3-030-38315-2\_1
114. Zhang, Y., & Liu, Z. (2017). STAT1 in cancer: friend or foe?. *Discovery medicine*, *24*(130), 19–29.
115. Zhao, Q., Cheng, Y., & Xiong, Y. (2021). LTF Regulates the Immune Microenvironment of Prostate Cancer Through JAK/STAT3 Pathway. *Frontiers in oncology*, *11*, 692117. https://doi.org/10.3389/fonc.2021.69211
116. Zhao, S., Xue, H., Hao, C. L., Jiang, H. M., & Zheng, H. C. (2020). BTG1 Overexpression Might Promote Invasion and Metastasis of Colorectal Cancer *via* Decreasing Adhesion and Inducing Epithelial-Mesenchymal Transition. *Frontiers in oncology*, *10*, 598192. https://doi.org/10.3389/fonc.2020.598192
117. Zhao, Z., Yang, Y., Liu, Z., Chen, H., Guan, X., Jiang, Z., Yang, M., Liu, H., Chen, T., Gao, Y., Zou, S., & Wang, X. (2022). Prognostic and immunotherapeutic significance of mannose receptor C type II in 33 cancers: An integrated analysis. *Frontiers in molecular biosciences*, *9*, 951636. https://doi.org/10.3389/fmolb.2022.951636
118. Zhu, M., Chen, Y., Cheng, L., Li, X., Shen, Y., Guo, G., Xu, X., Li, H., Yang, H., Liu, C., & He, K. (2022). Calsyntenin-1 Promotes Doxorubicin-induced Dilated Cardiomyopathy in Rats. *Cardiovascular drugs and therapy*, 10.1007/s10557-022-07389-x. Advance online publication. https://doi.org/10.1007/s10557-022-07389-x
119. Zhu, Z., Jiao, L., Li, T., Wang, H., Wei, W., & Qian, H. (2018). Expression of AQP3 and AQP5 as a prognostic marker in triple-negative breast cancer. *Oncology letters*, *16*(2), 2661–2667. <https://doi.org/10.3892/ol.2018.8955>
120. Zhu, Z., Shen, W., Tian, S., Yang, B., & Zhao, H. (2019). F3, a novel active fraction of Valeriana jatamansi Jones induces cell death via DNA damage in human breast cancer cells. *Phytomedicine : international journal of phytotherapy and phytopharmacology*, *57*, 245–254. <https://doi.org/10.1016/j.phymed.2018.12.041>