**Search format:**

((ligand) OR (satellite cell proliferation) OR (myogenesis) OR (muscle stem cell proliferation) OR (teleost) OR (fish)) + ((GeneID) OR (GeneSymbol) OR (Gene description))

**GeneID:** 121905205

**Symbol:** pear1

**Description:** platelet endothelial aggregation receptor 1

**Other designations:** platelet endothelial aggregation receptor 1

**log2 Fold Change:** 3.19733532283723

**Adjusted p-value:** 1.65235820523692e-119

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28%22ligand%22%29+OR+%28%22satellite+cell+proliferation%22%29%29+%2B+%28%28%22pear1%22%29+OR+%28%22platelet+endothelial+aggregation+receptor+1%22%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/36792666/>
  + SVEP1 is an endogenous ligand for the orphan receptor PEAR1
    - SVEP1 signals through PEAR1 to activate AKT and mTOR signaling
* <https://pubmed.ncbi.nlm.nih.gov/36695374/>
  + Heparin and heparin proteoglycan-mimetics activate platelets via PEAR1 and PI3Kβ
* <https://pubmed.ncbi.nlm.nih.gov/25713122/>
  + A Human Platelet Receptor Protein Microarray Identifies the High Affinity Immunoglobulin E Receptor Subunit α (FcεR1α) as an Activating Platelet Endothelium Aggregation Receptor 1 (PEAR1) Ligand
* <https://pubmed.ncbi.nlm.nih.gov/33356751/>
  + Is the endogenous ligand for PEAR1 a proteoglycan: clues from the sea

**GeneID:** 121905054

**Symbol:** kitb

**Description:** KIT proto-oncogene, receptor tyrosine kinase b

**Other designations:** KIT proto-oncogene, receptor tyrosine kinase b

**log2 Fold Change:** 6.9696057226272

**Adjusted p-value:** 3.18093948973572e-83

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=((ligand)%20OR%20(satellite%20cell%20proliferation)%20OR%20(myogenesis)%20OR%20(muscle%20stem%20cell%20proliferation)%20OR%20(teleost)%20OR%20(fish))%20%20%20((121905054)%20OR%20(kitb)%20OR%20(KIT%20proto-oncogene%2C%20receptor%20tyrosine%20kinase%20b))&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/24243489/>
  + Differential regulation of Kit ligand A expression in the ovary by IGF-I via different pathways
  + “Kit ligand (KITL) plays indispensable roles both in primordial follicle activation and in the maintenance of meiotic arrest of the oocyte. The regulation of KITL expression in the ovary, however, remains largely unknown. In the zebrafish, there are 2 paralogues of KITL, kitlga and kitlgb, and 2 Kit receptors, kita and kitb.”
* <https://pubmed.ncbi.nlm.nih.gov/29779898/>
  + “Understanding the molecular pathways controlling hematopoietic stem cell specification and expansion is a necessary milestone to perform regenerative medicine. Here, we used the zebrafish model to study the role of the ckit signaling pathway in this process. We show the importance of kitb/kitlgb signaling in the specification and expansion of hematopoietic stem cells (HSCs), in the hemogenic endothelium and caudal hematopoietic tissue (CHT), respectively. Moreover, we identified the zebrafish ortholog of Oncostatin M (osm) in the zebrafish genome. We show that the osm/osmr pathway acts upstream of kitb during specification of the hemogenic endothelium, while both pathways act synergistically to expand HSCs in the CHT. Moreover, we found that osm, in addition to its role in promoting HSC proliferation, inhibits HSC commitment to the lymphoid fate. Altogether, our data identified two cytokines, kitlgb and osm, secreted by the vascular niche, that control HSCs during early embryonic development.”
* <https://pubmed.ncbi.nlm.nih.gov/35709278/>
  + “We identify the monocyte- and macrophage-derived cytokine METRNL (meteorin-like) as a driver of postinfarction angiogenesis and high-affinity ligand for the stem cell factor receptor KIT (KIT receptor tyrosine kinase). METRNL mediated angiogenic effects in cultured human endothelial cells through KIT-dependent signaling pathways. In a mouse model of myocardial infarction, METRNL promoted infarct repair by selectively expanding the KIT-expressing endothelial cell population in the infarct border zone. *Metrnl*-deficient mice failed to mount this KIT-dependent angiogenic response and developed severe postinfarction heart failure. Our data establish METRNL as a KIT receptor ligand in the context of ischemic tissue repair.”

**GeneID:** 121896741

**Symbol:** ptpn9a

**Description:** protein tyrosine phosphatase non-receptor type 9a

**Other designations:** tyrosine-protein phosphatase non-receptor type 9

**log2 Fold Change:** 2.08612901097489

**Adjusted p-value:** 4.83296516099897e-78

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121896741%29+OR+%28ptpn9a%29+OR+%28ptpn%29+OR+%28protein+tyrosine+phosphatase+non-receptor+type+9a%29+OR+%28tyrosine-protein+phosphatase+non-receptor+type+9%29%29&sort=date>

Added “ptpn” to search

**Findings:**

* 83 results. No initial results seem relevant.

**GeneID:** 121904884

**Symbol:** LOC121904884

**Description:** tumor necrosis factor receptor superfamily member 11B-like

**Other designations:** tumor necrosis factor receptor superfamily member 11B-like

**log2 Fold Change:** 3.44599482371074

**Adjusted p-value:** 1.62780132144936e-77

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=((ligand)%20OR%20(satellite%20cell%20proliferation)%20OR%20(myogenesis)%20OR%20(muscle%20stem%20cell%20proliferation)%20OR%20(teleost)%20OR%20(fish))%20%20%20((121904665)%20OR%20(trpv4)%20OR%20(transient%20receptor%20potential%20cation%20channel%2C%20subfamily%20V%2C%20member%204))&sort=date&page=2>

**Findings:**

* 187 results. Top hits don’t seem relevant. Seems like gene is related to cell volume regulation

**GeneID:** 121904665

**Symbol:** trpv4

**Description:** transient receptor potential cation channel, subfamily V, member 4

**Other designations:** transient receptor potential cation channel subfamily V member 4

**log2 Fold Change:** 4.16117104737394

**Adjusted p-value:** 2.56140090299815e-74

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121904665%29+OR+%28trpv4%29+OR+%28transient+receptor+potential+cation+channel%2C+subfamily+V%2C+member+4%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/37011730/>
  + Non-inositol 1,4,5-trisphosphate (IP3) receptor IP3-binding proteins
  + “Conventionally, myo-D-inositol 1, 4,5-trisphosphate (IP3) is thought to exert its second messenger effects through the gating of IP3R Ca2+ release channels, located in Ca2+-storage organelles like the endoplasmic reticulum. However, there is considerable indirect evidence to support the concept that IP3 might interact with other, non-IP3R proteins within cells.”
  + “The remaining 26 structures represent a diverse range of proteins, including inositol-lipid metabolizing enzymes, signal transducers, PH domain containing proteins, cytoskeletal anchor proteins, the TRPV4 ion channel, a retroviral Gag protein and fibroblast growth factor 2. Such proteins may impact on IP3 signalling and its effects on cell-biology. This represents an area open for exploration in the field of IP3 signalling.”
* <https://pubmed.ncbi.nlm.nih.gov/36993766/>
  + “RPV4, expressed in the plasma membrane of a wide range of cell types, is a polymodal ion channel whose gating is controlled by multiple endogenous and exogenous stimuli including synthetic ligands, cell swelling, shear stress, and moderate heat[17](https://www.biorxiv.org/content/10.1101/2023.03.15.532784v2.full#ref-17)–[19](https://www.biorxiv.org/content/10.1101/2023.03.15.532784v2.full#ref-19).”
* <https://pubmed.ncbi.nlm.nih.gov/36563892/>
  + N-arachidonoyltaurine (20:4 NAT) acts as an excellent ligand for the subset of transient receptor potential (TRP) channels, especially vanilloid type channels TRPV1 and TRPV4

**GeneID:** 121884723

**Symbol:** kdelr2a

**Description:** KDEL endoplasmic reticulum protein retention receptor 2a

**Other designations:** ER lumen protein-retaining receptor 2

**log2 Fold Change:** 2.02382824086684

**Adjusted p-value:** 1.09317504637082e-73

**PubMed Search:**

((ligand) OR (satellite cell proliferation) OR (myogenesis) OR (muscle stem cell proliferation) OR (teleost) OR (fish)) + ((121884723) OR (kdelr2a) OR (KDEL endoplasmic reticulum protein retention receptor 2a) OR (ER lumen protein-retaining receptor 2))

**Findings:**

* One irrelevant paper

**GeneID:** 121903603

**Symbol:** fgfr1a

**Description:** fibroblast growth factor receptor 1a

**Other designations:** fibroblast growth factor receptor 1-A

**log2 Fold Change:** 3.17586069778009

**Adjusted p-value:** 5.92473110930753e-72

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28%22ligand%22%29+OR+%28%22satellite+cell+proliferation%22%29%29+%2B+%28%28fgfr1a%29+OR+%28fibroblast+growth+factor+receptor+1a%29+OR+%28fibroblast+growth+factor+receptor+1-A%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/31175226/>
  + “Fibroblast growth factor (Fgf) signaling regulates many processes during development. In most cases, one tissue layer secretes an Fgf ligand that binds and activates an Fgf receptor (Fgfr) expressed by a neighboring tissue. Although studies have identified the roles of specific Fgf ligands during development, less is known about the requirements for the receptors. We have generated null mutations in each of the five *fgfr* genes in zebrafish. Considering the diverse requirements for Fgf signaling throughout development, and that null mutations in the mouse *Fgfr1* and *Fgfr2* genes are embryonic lethal, it was surprising that all zebrafish homozygous mutants are viable and fertile, with no discernable embryonic defect. Instead, we find that multiple receptors are involved in coordinating most Fgf-dependent developmental processes. For example, mutations in the ligand *fgf8a* cause loss of the midbrain-hindbrain boundary, whereas, in the *fgfr* mutants, this phenotype is seen only in embryos that are triple mutant for *fgfr1a;fgfr1b;fgfr2*, but not in any single or double mutant combinations. We show that this apparent *fgfr* redundancy is also seen during the development of several other tissues, including posterior mesoderm, pectoral fins, viscerocranium, and neurocranium. These data are an essential step toward defining the specific Fgfrs that function with particular Fgf ligands to regulate important developmental processes in zebrafish.”
* <https://pubmed.ncbi.nlm.nih.gov/36841347/>
  + Fibroblast growth factor pathway component expression in the regenerating zebrafish fin

**GeneID:** 121899214

**Symbol:** LOC121899214

**Description:** tyrosine-protein kinase receptor UFO

**Other designations:** tyrosine-protein kinase receptor UFO

**log2 Fold Change:** 2.51462682836006

**Adjusted p-value:** 8.9963029518674e-69

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=((ligand)%20OR%20(satellite%20cell%20proliferation)%20OR%20(myogenesis)%20OR%20(muscle%20stem%20cell%20proliferation)%20OR%20(teleost)%20OR%20(fish))%20%20%20((121899214)%20OR%20(LOC121899214)%20OR%20(tyrosine-protein%20kinase%20receptor%20UFO))&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/17332061/>
  + “The receptor tyrosine kinase, adhesion-related kinase (Ark) (also known as Axl, UFO, and Tyro7), has been implicated in the migration of GnRH neuronal cells. Binding of its ligand, growth arrest-specific gene 6 (Gas6), promotes cytoskeletal remodeling and migration of NLT GnRH neuronal cells via Rac and p38 MAPK.”
* <https://pubmed.ncbi.nlm.nih.gov/25568918/>
  + The TYRO3, AXL (also known as UFO) and MERTK (TAM) family of receptor tyrosine kinases (RTKs) are aberrantly expressed in multiple haematological and epithelial malignancies. Rather than functioning as oncogenic drivers, their induction in tumour cells predominately promotes survival, chemoresistance and motility.
* <https://pubmed.ncbi.nlm.nih.gov/15492251/>
  + The AXL/UFO family of tyrosine kinases is characterized by a common N-CAM (neural adhesion molecule)-related extracellular domain and a common ligand, GAS6 (growth arrest-specific protein 6). Family members are prone to transcriptional regulation and carry out diverse functions including the regulation of cell adhesion, migration, phagocytosis, and survival.

**GeneID:** 121908711

**Symbol:** tnk2b

**Description:** tyrosine kinase, non-receptor, 2b

**Other designations:** tyrosine kinase, non-receptor, 2b

**log2 Fold Change:** 2.07259792201258

**Adjusted p-value:** 5.11211528940113e-63

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121908711%29+OR+%28tnk2b%29+OR+%28tyrosine+kinase%2C+non-receptor%2C+2b%29%29&sort=date>

**Findings:**

* 4 results. No initial results seem relevant.

**GeneID:** 121892115

**Symbol:** slitrk6

**Description:** SLIT and NTRK-like family, member 6

**Other designations:** SLIT and NTRK-like protein 6

**log2 Fold Change:** 6.6918529823923

**Adjusted p-value:** 1.22214422318299e-62

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121892115%29+OR+%28slitrk6%29+OR+%28SLIT+and+NTRK-like+family%2C+member+6%29+OR+%28SLIT+and+NTRK-like+protein+6%29%29&sort=date>

**Findings:**

* 5 results. No initial results seem relevant.

**GeneID:** 121906797

**Symbol:** cmklr2

**Description:** chemerin chemokine-like receptor 2

**Other designations:** G-protein coupled receptor 1

**log2 Fold Change:** 4.4265214595399

**Adjusted p-value:** 3.73271075838346e-62

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121906797%29+OR+%28cmklr2%29+OR+%28chemerin+chemokine-like+receptor+2%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/35370637/>
  + Chemerin Regulates the Proliferation and Migration of Pulmonary Arterial Smooth Muscle Cells via the ERK1/2 Signaling Pathway
* <https://pubmed.ncbi.nlm.nih.gov/34029211/>
  + Curcumin inhibits the proliferation and migration of vascular smooth muscle cells by targeting the chemerin / CMKLR1 / LCN2 axis
* <https://pubmed.ncbi.nlm.nih.gov/35040613/>
  + Chemerin review paper (2022)
  + Chemerin is a small chemotactic protein and a key player in initiating the early immune response. As an adipokine, chemerin is also involved in energy homeostasis and the regulation of reproductive functions. Secreted as inactive prochemerin, it relies on proteolytic activation by serine proteases to exert biological activity. Chemerin binds to three distinct G protein-coupled receptors (GPCR), namely chemokine-like receptor 1 (CMKLR1, recently named chemerin1), G protein-coupled receptor 1 (GPR1, recently named chemerin2), and CC-motif chemokine receptor-like 2 (CCRL2). Only CMKLR1 displays conventional G protein signaling, while GPR1 only recruits arrestin in response to ligand stimulation, and no CCRL2-mediated signaling events have been described to date. However, GPR1 undergoes constitutive endocytosis, making this receptor perfectly adapted as decoy receptor. Here, we discuss expression pattern, activation, and receptor binding of chemerin. Moreover, we review the current literature regarding the involvement of chemerin in cancer and several obesity-related diseases, as well as recent developments in therapeutic targeting of the chemerin system.
* <https://pubmed.ncbi.nlm.nih.gov/35327393/>
  + Chemerin, produced mainly in adipocytes and liver, is a natural ligand for chemokine-like receptor 1 (CMKLR1), G-protein-coupled receptor 1 (GPR1) and C-C motif chemokine receptor-like 2 (CCRL2), which have been identified in many tissues and organs. The role of this protein is an active area of research, and recent analyses suggest that chemerin contributes to angiogenesis, adipogenesis, glucose homeostasis and energy metabolism.
* *Lots of other interesting papers*

**GeneID:** 121896675

**Symbol:** cd44b

**Description:** CD44 molecule (Indian blood group) b

**Other designations:** CD44 antigen

**log2 Fold Change:** 2.51368547524503

**Adjusted p-value:** 1.34289683137307e-56

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121896675%29+OR+%28cd44b%29+OR+%28CD44+molecule+%28Indian+blood+group%29+b%29+OR+%28CD44+antigen%29%29&sort=date>

**Findings:**

* 1,334 results. No initial results seem relevant.

**GeneID:** 121906561

**Symbol:** caska

**Description:** calcium/calmodulin-dependent serine protein kinase a

**Other designations:** peripheral plasma membrane protein CASK

**log2 Fold Change:** 2.35395803053907

**Adjusted p-value:** 1.11161245117203e-54

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121906561%29+OR+%28caski%29+OR+%28calcium%2Fcalmodulin+dependent+serine+protein+kinase%29+OR+%28peripheral+plasma+membrane+protein+CASK%29%29&sort=date&page=1>

**Findings:**

* 250 results. None of the initial results seem relevant.

**GeneID:** 121904572

**Symbol:** hdr

**Description:** hematopoietic death receptor

**Other designations:** hematopoietic death receptor

**log2 Fold Change:** 2.97875861946302

**Adjusted p-value:** 1.37617293770341e-54

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=((ligand)%20OR%20(satellite%20cell%20proliferation)%20OR%20(myogenesis)%20OR%20(muscle%20stem%20cell%20proliferation)%20OR%20(teleost)%20OR%20(fish))%20%20%20((121904572)%20OR%20(hdr)%20OR%20(hematopoietic%20death%20receptor))&sort=date&page=2>

**Findings:**

* 82 results. None of the initial results seem relevant.

**GeneID:** 121889601

**Symbol:** LOC121889601

**Description:** F-box/WD repeat-containing protein 7-like

**Other designations:** F-box/WD repeat-containing protein 7-like

**log2 Fold Change:** 2.31786629858542

**Adjusted p-value:** 1.64251338954465e-52

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121889601%29+OR+%28LOC121889601%29+OR+%28F-box%2FWD+repeat-containing+protein+7-like%29+OR+%28F-box%2FWD+repeat-containing+protein+7%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/35810662/>
  + Glioma-associated oncogene homolog 1 (GLI1), a zinc-finger transcription factor, is upregulated in tumors and promotes cancer cell proliferation and migration. However, whether GLI1 involves in pulmonary artery smooth muscle cells (PASMCs) proliferation and migration and the detailed molecular mechanisms underlying GLI1 in pulmonary arterial hypertension (PAH) are not yet clear. Primary cultured rat PASMCs and monocrotaline (MCT)-induced PAH rats model were applied to address these issues in the present study. We found that the expression of GLI1 was significantly increased in endothelin-1 (ET-1) treated PASMCs, accompanied with the activation of microRNA (miR)-27b-3p/F-box and WD repeat domain containing 7 (FBXW7)/kruppel-like factor 5 (KLF5)/GLI1 pathway through endothelin-1 receptor type A (ETAR). Elevated miR-27b-3p suppressed FBXW7 expression, which led to KLF5 accumulation by decreasing its ubiquitinated degradation, KLF5 further induced GLI1 upregulation leading to PASMCs proliferation and migration. In addition, in MCT-induced PAH rats, targeting ETAR/miR-27b-3p/FBXW7/KLF5/GLI1 pathway effectively prevented the pulmonary vascular remodeling and the development of PAH in rats. Our study indicates that interfering ETAR/miR-27b-3p/FBXW7/KLF5/GLI1 signaling axis might have a potential value in the prevention and treatment of PAH.

**GeneID:** 121887818

**Symbol:** tfr1b

**Description:** transferrin receptor 1b

**Other designations:** transferrin receptor 1b

**log2 Fold Change:** 2.36897685729127

**Adjusted p-value:** 1.04296272068992e-50

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121887818%29+OR+%28tfr1b%29+OR+%28transferrin+receptor+1b%29%29&sort=date>

**Findings:**

* 7 results. None of the results seem relevant.

**GeneID:** 121910392

**Symbol:** fgfr4

**Description:** fibroblast growth factor receptor 4

**Other designations:** fibroblast growth factor receptor 4

**log2 Fold Change:** 2.62779627712691

**Adjusted p-value:** 6.42846211096338e-49

**PubMed Search:**

*Skipping for now*

**Findings:**

*Skipping for now*

**GeneID:** 121882707

**Symbol:** lbr

**Description:** lamin B receptor

**Other designations:** delta(14)-sterol reductase LBR

**log2 Fold Change:** 2.22811979919759

**Adjusted p-value:** 3.07244362865954e-48

**PubMed Search:**

<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28ligand%29+OR+%28satellite+cell+proliferation%29+OR+%28myogenesis%29+OR+%28muscle+stem+cell+proliferation%29+OR+%28teleost%29+OR+%28fish%29%29+%2B+%28%28121882707%29+OR+%28lbr%29+OR+%28lamin+B+receptor%29+OR+%28delta%2814%29-sterol+reductase+LBR%29%29&sort=date>

**Findings:**

* <https://pubmed.ncbi.nlm.nih.gov/33958580/>
  + One of the critical events that regulates muscle cell differentiation is the replacement of the lamin B receptor (LBR)-tether with the lamin A/C (LMNA)-tether to remodel transcription and induce differentiation-specific genes. Here, we report that localization and activity of the LBR-tether are crucially dependent on the muscle-specific chaperone HSPB3 and that depletion of HSPB3 prevents muscle cell differentiation. We further show that HSPB3 binds to LBR in the nucleoplasm and maintains it in a dynamic state, thus promoting the transcription of myogenic genes, including the genes to remodel the extracellular matrix. Remarkably, HSPB3 overexpression alone is sufficient to induce the differentiation of two human muscle cell lines, LHCNM2 cells, and rhabdomyosarcoma cells. We also show that mutant R116P-HSPB3 from a myopathy patient with chromatin alterations and muscle fiber disorganization, forms nuclear aggregates that immobilize LBR. We find that R116P-HSPB3 is unable to induce myoblast differentiation and instead activates the unfolded protein response. We propose that HSPB3 is a specialized chaperone engaged in muscle cell differentiation and that dysfunctional HSPB3 causes neuromuscular disease by deregulating LBR.
* <https://pubmed.ncbi.nlm.nih.gov/29415520/>
  + One of these proteins is the lamin B receptor (LBR) that binds lamin B1 and tethers heterochromatin to the INM in embryonic and undifferentiated cells. It is replaced by lamin A/C with specific lamin A/C binding proteins at the beginning of cell differentiation and in differentiated cells. Our functional experiments in cancer cell lines show that heterochromatin in cancer cells is tethered to the INM by LBR, which is downregulated together with lamin B1 at the onset of cell transition to senescence. The downregulation of these proteins in senescent cells leads to the detachment of centromeric repetitive sequences from INM, their relocation to the nucleoplasm, and distension. In cells, the expression of LBR and LB1 is highly coordinated as evidenced by the reduction of both proteins in LBR shRNA lines. The loss of the constitutive heterochromatin structure containing LADs results in changes in chromatin architecture and genome function and can be the reason for the permanent loss of cell proliferation in senescence.

**GeneID:** 121893833

**Symbol:** LOC121893833

**Description:** macrophage-stimulating protein receptor-like

**Other designations:** macrophage-stimulating protein receptor-like

**log2 Fold Change:** 4.13311424880604

**Adjusted p-value:** 1.87353888739945e-47

**PubMed Search:**

**Findings:**

**GeneID:** 121904549

**Symbol:** unc5db

**Description:** unc-5 netrin receptor Db

**Other designations:** netrin receptor UNC5D

**log2 Fold Change:** 3.37539083812489

**Adjusted p-value:** 3.1437308517736e-43

**PubMed Search:**

**Findings:**

**GeneID:** 121897079

**Symbol:** LOC121897079

**Description:** leucine-rich repeat-containing G-protein coupled receptor 5-like

**Other designations:** leucine-rich repeat-containing G-protein coupled receptor 5-like

**log2 Fold Change:** 7.54328514139445

**Adjusted p-value:** 3.52765795624466e-42

**PubMed Search:**

**Findings:**

**GeneID:** 121906580

**Symbol:** marco

**Description:** macrophage receptor with collagenous structure

**Other designations:** macrophage receptor MARCO

**log2 Fold Change:** 2.28877108530214

**Adjusted p-value:** 1.57126026648606e-40

**PubMed Search:**

**Findings:**

**GeneID:** 121912879

**Symbol:** LOC121912879

**Description:** tetratricopeptide repeat protein 31-like

**Other designations:** hsp70-Hsp90 organizing protein 3-like|tetratricopeptide repeat protein 31-like

**log2 Fold Change:** 2.24073762321642

**Adjusted p-value:** 1.5834809868372e-40

**PubMed Search:**

**Findings:**

**GeneID:** 121897435

**Symbol:** ptprq

**Description:** protein tyrosine phosphatase receptor type Q

**Other designations:** phosphatidylinositol phosphatase PTPRQ

**log2 Fold Change:** 4.79726447664758

**Adjusted p-value:** 2.09842187735785e-39

**PubMed Search:**

**Findings:**

**GeneID:** 121901771

**Symbol:** slit3

**Description:** slit homolog 3 (Drosophila)

**Other designations:** slit homolog 3 protein

**log2 Fold Change:** 3.19785024126953

**Adjusted p-value:** 5.37135572123583e-39

**PubMed Search:**

**Findings:**

**GeneID:** 121897263

**Symbol:** LOC121897263

**Description:** receptor-type tyrosine-protein phosphatase beta-like

**Other designations:** receptor-type tyrosine-protein phosphatase beta-like

**log2 Fold Change:** 4.78304180019011

**Adjusted p-value:** 3.12796428722998e-37

**PubMed Search:**

**Findings:**

**GeneID:** 121890376

**Symbol:** LOC121890376

**Description:** inositol 1,4,5-trisphosphate receptor type 1

**Other designations:** inositol 1,4,5-trisphosphate receptor type 1

**log2 Fold Change:** 2.50855609816948

**Adjusted p-value:** 2.71068512229743e-36

**PubMed Search:**

**Findings:**

**GeneID:** 121911659

**Symbol:** fgfr2

**Description:** fibroblast growth factor receptor 2

**Other designations:** fibroblast growth factor receptor 2

**log2 Fold Change:** 3.98714249515147

**Adjusted p-value:** 3.59516802292247e-36

**PubMed Search:**

**Findings:**

**GeneID:** 121901064

**Symbol:** tie1

**Description:** tyrosine kinase with immunoglobulin-like and EGF-like domains 1

**Other designations:** tyrosine-protein kinase receptor Tie-1

**log2 Fold Change:** 3.10325602866699

**Adjusted p-value:** 2.49810465146903e-34

**PubMed Search:**

**Findings:**

**GeneID:** 121891942

**Symbol:** gpr180

**Description:** G protein-coupled receptor 180

**Other designations:** integral membrane protein GPR180

**log2 Fold Change:** 2.24914589350782

**Adjusted p-value:** 2.59649005170296e-34

**PubMed Search:**

**Findings:**