

## miRCURY LNA™ microRNA Inhibitors

### Selected publications - *in vivo* inhibition

**Bessard *et al.*** RNAi-mediated ERK2 knockdown inhibits growth of tumor cells *in vitro* and *in vivo*. *Oncogene* 2008, 27: 5315-25. PMID: [18521085](#)

Cells/Organisms: FAO (Rat hepatoma), FI (rat biliary epithelial), nude mice

Targets: ERK2

**Corsten *et al.*** MicroRNA-21 knockdown disrupts glioma growth *in vivo* and displays synergistic cytotoxicity with neural precursor cell delivered S-TRAIL in human gliomas. *Cancer Res.* 2007, 67: 8994-9000. PMID: [17908999](#)

Cells: U87 (human glioma cells); U87-Fluc-DsRed2 glioma cells implanted in the brains of nude mice

Targets: miR-21

**Elmén *et al.*** LNA-mediated microRNA silencing in non-human primates. *Nature* 2008, 452: 896-9. PMID: [18368051](#)

Cells/Organisms: Huh-7 (human hepatoma) / African green monkey; mouse,

Targets: miR-122

**Elmén *et al.*** Antagonism of microRNA-122 in mice by systemically administered LNA-antimiR leads to up-regulation of a large set of predicted target mRNAs in the liver. *Nucleic Acids Res.* 2008, 36: 1153-62. PMID: [18158304](#)

Cells/Organisms: Huh-7 (human hepatoma) / mouse

Targets: miR-122

**Frezzetti *et al.*** Upregulation of miR-21 by Ras *in vivo* and its role in tumor growth. *Oncogene* 2010 PMID: [20956945](#)

Organism: FRTL-5 cells were injected into mice

Targets: miR-21

**Fu *et al.*** Mir-144 selectively regulates embryonic alpha-hemoglobin synthesis during primitive erythropoiesis.

*Blood* 2009, 113: 1340-9. PMID: [18941117](#)

Organism: Zebrafish embryos

Targets: miR-144

**Gebeshuber *et al.*** miR-29a suppresses tristetraprolin, which is a regulator of epithelial polarity and metastasis.

*EMBO Rep.* 2009, 10: 400-5. PMID: [19247375](#)

Cells: RasXT (mouse breast) cells were injected into mice

Targets: miR-29a

**Hollander *et al.*** Striatal microRNA controls cocaine intake through CREB signalling. *Nature* 2010, 466 :197-202.

PMID: [20613834](#)

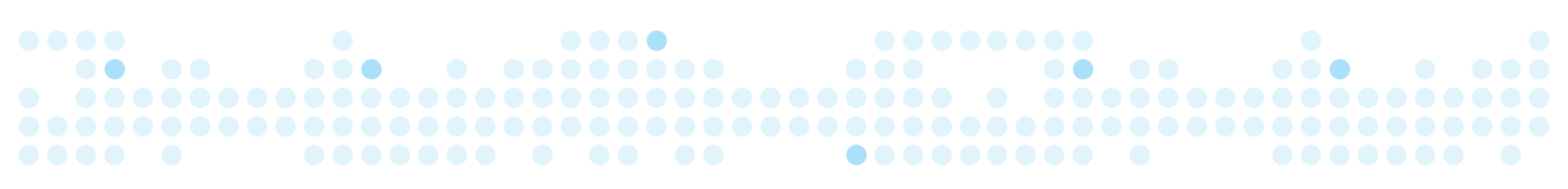
Organism: rat (cannulae, dorsal striatum)

Targets: miR-212

**Kato *et al.*** TGF-beta activates Akt kinase through a microRNA-dependent amplifying circuit targeting PTEN. *Nat. Cell Biol.* 2009, 11: 881-9. PMID: [19543271](#)

Organism: mouse (subcutaneously injected, accumulation in the kidney)

Targets: miR-192



**Lanford *et al.*** Therapeutic silencing of microRNA-122 in primates with chronic hepatitis C virus infection. *Science* 2009, 327: 198-201. PMID: [19965718](#)  
Organism: Chimpanzee (intravenous injection)  
Targets: miR-122

**Liu *et al.*** miR-21 mediates fibrogenic activation of pulmonary fibroblasts and lung fibrosis. *J. Exp. Med.* 2010, 207: 1589-97. PMID: [20643828](#)  
Organism: mouse lung  
Targets: miR-21

**Najafi-Shoushtari *et al.*** MicroRNA-33 and the SREBP host genes cooperate to control cholesterol homeostasis. *Science* 2010, 328: 1566-9. PMID: [20466882](#)  
Organism: mouse  
Targets: miR-33

**Patrick *et al.*** Stress-dependent cardiac remodeling occurs in the absence of microRNA-21 in mice. *J. Clin. Invest.* 2010, 120: 3912-6. PMID: [20978354](#)  
Organism: mouse  
Targets: miR-21

**Worm *et al.*** Silencing of microRNA-155 in mice during acute inflammatory response leads to derepression of c/ebp Beta and down-regulation of G-CSF. *Nucleic Acids Res.* 2009. PMID: [19596814](#)  
Cells/Organism: THP1 (Human acute monocytic leukemia cell line)/ mouse (tail vein injection, accumulation in the spleen)  
Targets: miR-155

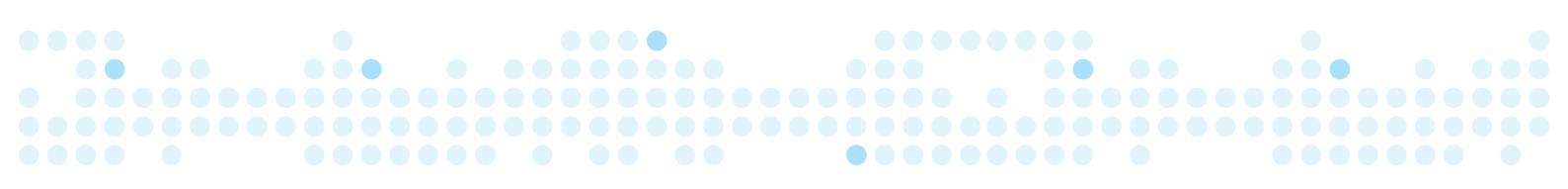
#### Selected publications - *in vitro* inhibition

**Bessard *et al.*** RNAi-mediated ERK2 knockdown inhibits growth of tumor cells *in vitro* and *in vivo*. *Oncogene* 2008, 27: 5315-25. PMID: [18521085](#)  
Cells/Organisms: FAO (Rat hepatoma), FI (rat biliary epithelial), nude mice  
Targets: ERK2

**Boutz *et al.*** MicroRNAs regulate the expression of the alternative splicing factor nPTB during muscle development. *Genes Dev.* 2007, 21: 71-84. PMID: [17210790](#)  
Cells: C2C12 (Mouse myoblast)  
Targets: miR-133

**Boyerinas *et al.*** Identification of let-7-regulated oncofetal genes. *Cancer Res.* 2008, 68: 2587-91. PMID: [18413726](#)  
Cells: HeLa  
Targets: let-7

**Braun *et al.*** p53-Responsive microRNAs 192 and 215 are capable of inducing cell cycle arrest. *Cancer Res.* 2008, 68: 10094-104. PMID: [19074875](#)  
Cells: A549 (carcinomic human alveolar basal epithelial)  
Targets: miR-192



**Ceppi *et al.*** MicroRNA-155 modulates the interleukin-1 signaling pathway in activated human monocyte-derived dendritic cells. *Proc. Natl. Acad. Sci. USA.* 2009, 106: 2735-40. PMID: [19193853](#)  
Cells: primary human monocyte-derived dendritic cells  
Targets: miR-155

**Chan *et al.*** MicroRNA-21 is an antiapoptotic factor in human glioblastoma cells. *Cancer Res.* 2005, 65: 6029-33. PMID: [16024602](#)  
Cells: U87, A172, LN229, LN308 (Human glioblastoma)  
Targets: miR-21

**Chen *et al.*** The genomic analysis of erythrocyte microRNA expression in sickle cell diseases. *PLoS ONE* 2008, 3: e2360. PMID: [18523662](#)  
Cells: human reticulocytes  
Targets: miR-20a, miR-320

**Christoffersen *et al.*** miR-200b mediates post-transcriptional repression of ZFHX1B. *RNA* 2007, 13: 1172-8. PMID: [17585049](#)  
Cells: HEK293 (Human Embryonic Kidney 293)  
Targets: miR-200b

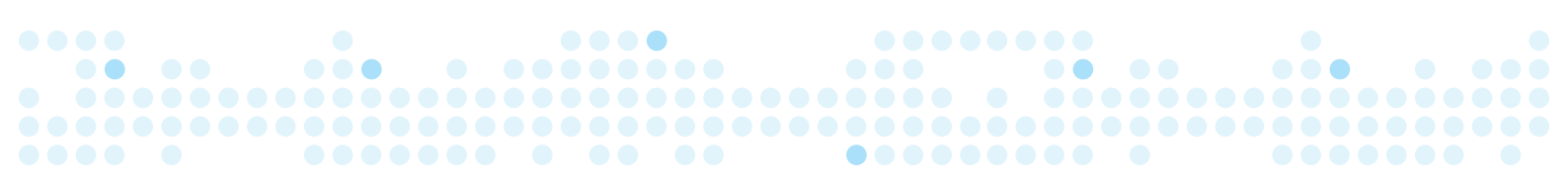
**Corsten *et al.*** MicroRNA-21 knockdown disrupts glioma growth in vivo and displays synergistic cytotoxicity with neural precursor cell delivered S-TRAIL in human gliomas. *Cancer Res.* 2007, 67: 8994-9000. PMID: [17908999](#)  
Cells: U87 (human glioma cells); U87-Fluc-DsRed2 glioma cells implanted in the brains of nude mice  
Targets: miR-21

**Davis *et al.*** Improved targeting of miRNA with antisense oligonucleotides. *Nucleic Acids Res.* 2006, 34: 2294-304. PMID: [16690972](#)  
Cells: HeLa  
Targets: miR-21

**Dyrskjøt *et al.*** Genomic profiling of microRNAs in bladder cancer: miR-129 is associated with poor outcome and promotes cell death *in vitro*. *Cancer Res.* 2009, 69: 4851-60. PMID: [19487295](#)  
Cells: Human urinary bladder transitional cell carcinoma (T24, SW780, HT1376, RT4, and J82), immortalized human bladder epithelium (HU609 and HCV29)  
Targets: miR-129

**Elmén *et al.*** LNA-mediated microRNA silencing in non-human primates. *Nature* 2008, 452: 896-9. PMID: [18368051](#)  
Cells/Organisms: Huh-7 (human hepatoma) / African green monkey; mouse,  
Targets: miR-122

**Elmén *et al.*** Antagonism of microRNA-122 in mice by systemically administered LNA-antimiR leads to up-regulation of a large set of predicted target mRNAs in the liver. *Nucleic Acids Res.* 2008, 36: 1153-62. PMID: [18158304](#)  
Cells/Organisms: Huh-7 (human hepatoma) / mouse  
Targets: miR-122



**Fabani & Gait.** miR-122 targeting with LNA/2'-O-methyl oligonucleotide mixmers, peptide nucleic acids (PNA), and PNA-peptide conjugates. RNA 2008, 14: 336-46. PMID: [18073344](#)  
Cells: Huh-7 (human hepatoma), primary rat hepatocytes  
Targets: miR-122

**Fasanaro *et al.*** MicroRNA-210 modulates endothelial cell response to hypoxia and inhibits the receptor tyrosine kinase ligand Ephrin-A3. J. Biol. Chem. 2008, 283: 15878-83. PMID: [18417479](#)  
Cells: HUVEC (Human Umbilical Vein Endothelial)  
Targets: miR-210

**Fazi *et al.*** A minicircuitry comprised of microRNA-223 and transcription factors NFI-A and C/EBPalpha regulates human granulopoiesis. Cell 2005, 123: 819-31. PMID: [16325577](#)  
Cells: NB4 (human acute promyelocytic leukemia (APL))  
Targets: miR-126, miR-223

**Ferretti *et al.*** Concerted microRNA control of Hedgehog signalling in cerebellar neuronal progenitor and tumour cells. EMBO J. 27: 2616-27. PMID: [18756266](#)  
Cells: MEFs (mouse embryo primary fibroblasts), MB (human medulloblastoma), GCP (Primary cerebellar granule cell precursor)  
Targets: miR-125b, miR-324-5p, miR-326

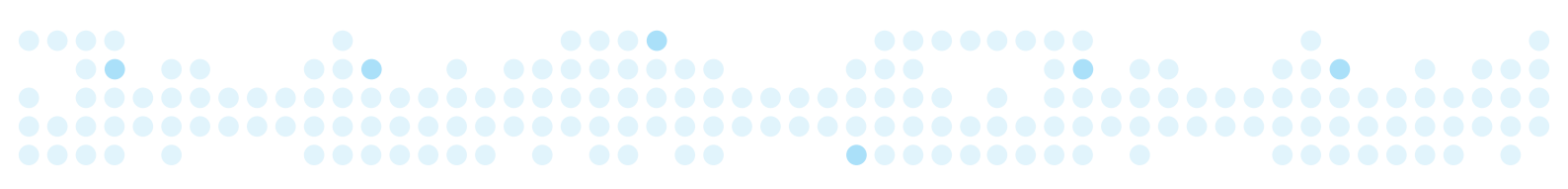
**Frankel *et al.*** Programmed cell death 4 (PDCD4) is an important functional target of the microRNA miR-21 in breast cancer cells. J. Biol. Chem. 2008, 283: 1026-33. PMID: [17991735](#)  
Cells: HEK293 (human embryonic kidney), MCF7 (human breast cancer)  
Targets: miR-21

**Galardi *et al.*** miR-221 and miR-222 expression affects the proliferation potential of human prostate carcinoma cell lines by targeting p27Kip1. J. Biol. Chem. 2007, 282: 23716-24. PMID: [17569667](#)  
Cells: PC3 (human prostate cancer)  
Targets: miR-221, miR-222

**Gao *et al.*** c-Myc suppression of miR-23a/b enhances mitochondrial glutaminase expression and glutamine metabolism. Nature. 2009, 458: 762-5. PMID: [19219026](#)  
Cells: P493 (human lymphoma) cells  
Targets: miR-23a, miR-23b

**Gebeshuber *et al.*** miR-29a suppresses tristetraprolin, which is a regulator of epithelial polarity and metastasis. EMBO Rep. 2009, 10: 400-5. PMID: [19247375](#)  
Cells: RasXT (mouse breast) cells were injected into mice  
Targets: miR-29a

**Ghosh *et al.*** MicroRNA-mediated up-regulation of an alternatively polyadenylated variant of the mouse cytoplasmic  $\beta$ -actin gene. Nucleic Acids Res. 2008, 26: 6318-32. PMID: [18835850](#)  
Cells: Neuro-2a (mouse neuroblastoma)  
Targets: miR-34a, miR-34b-5b



**Greenberger *et al.*** A RNA antagonist of hypoxia-inducible factor-1alpha, EZN-2968, inhibits tumor cell growth. *Mol. Cancer Ther.* 2008, 7: 3598-608. PMID: [18974394](#)  
Cells/Organisms: 15PC3, PC3, DU145 (human prostate), U373 (glioblastoma)/ mouse  
Targets: HIF-1alpha mRNA

**Hansen *et al.*** KSHV-encoded miRNAs target MAF to induce endothelial cell reprogramming. *Genes Dev.* 2010, 24: 195-205. PMID: [20080955](#)  
Cells: lymphatic endothelial cells (LECs)  
Targets: Kaposi sarcoma herpes virus (KSHV) microRNAs

**Hansen *et al.*** SPC3042: a proapoptotic survivin inhibitor. *Mol. Cancer Ther.* 2008, 7: 2736-45. PMID: [18790754](#)  
Cells: 15PC3 (human prostate cancer), PC3 (mouse prostate)  
Targets: survivin

**Haraguchi *et al.*** Vectors expressing efficient RNA decoys achieve the long-term suppression of specific microRNA activity in mammalian cells. *Nucleic Acids Res.* 2009, 37: e43. PMID: [19223327](#)  
Source: Human colon cancer cells  
targets: miR-21

**Inomata *et al.*** MicroRNA-17-92 down-regulates expression of distinct targets in different B-cell lymphoma subtypes. *Blood.* 2009, 113: 396-402. PMID: [18941111](#)  
Cells: Jeko-1 (Human lymphoma) cells  
Targets: miR-17, miR-19a, miR-20a

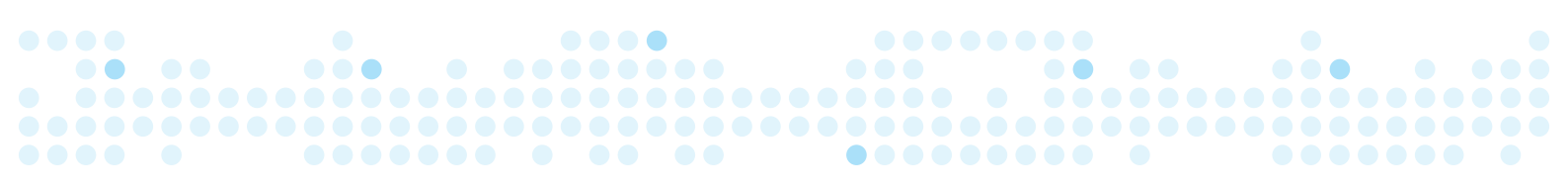
**Karaa *et al.*** The VEGF IRESes are differentially susceptible to translation inhibition by miR-16. *RNA.* 2009, 15: 249-54. PMID: [19144909](#)  
Cells: HeLa (Human cervical) cells  
Targets: miR-16

**Kocerha *et al.*** MicroRNA-219 modulates NMDA receptor-mediated neurobehavioral dysfunction. *Proc. Natl. Acad. Sci. USA* 2009, 106: 3507-12. PMID: [19196972](#)  
Cells: P19 (mouse embryonic carcinoma cells)  
Targets: miR-219

**Lin *et al.*** Involvements of microRNAs in hydrogen peroxide-mediated gene regulation and cellular injury response in vascular smooth muscle cells. *J. Biol. Chem.* 2009, 284: 7903-13. PMID: [19158092](#)  
Cells: rat vascular smooth muscle cells (VSMC)  
Targets: miR-21

**Linsley *et al.*** Transcripts targeted by the microRNA-16 family cooperatively regulate cell cycle progression. *Mol. Cell Biol.* 2007, 27: 2240-52. PMID: [17242205](#)  
Cells: HCT116 Dicer ex5, DLD-1 Dicer ex5 (colon cancer)  
Targets: miR-16, miR-106b

**Mayer *et al.*** The structure of NoRC-associated RNA is crucial for targeting the chromatin remodelling complex NoRC to the nucleolus. *EMBO Rep.* 2008, 9: 774-80. PMID: [18600236](#)  
Cells: NIH3T3 (mouse fibroblast)  
Targets: pRNA (NoRC-associated RNA)



**Mott *et al.*** mir-29 regulates Mcl-1 protein expression and apoptosis. *Oncogene* 2007, 26: 6133-40. PMID: [17404574](#)  
Cells: KMCH (human cholangiocarcinoma), H69 (non-malignant cholangiocyte)  
Targets: miR-29b

**Naguibneva *et al.*** The microRNA miR-181 targets the homeobox protein Hox-A11 during mammalian myoblast differentiation. *Nat. Cell Biol.* 2006, 8: 278-84. PMID: [16489342](#)  
Cells: C2C12 (mouse myoblasts)  
Targets: miR-181

**Naguibneva *et al.*** An LNA-based loss-of-function assay for micro-RNAs. *Biomed. Pharmacother.* 2006, 60: 633-8. PMID: [16962735](#)  
Cells: C2C12 (mouse myoblasts), H1299 (human lung cancer)  
Targets: miR-125b

**Nicolas *et al.*** Experimental identification of microRNA-140 targets by silencing and overexpressing miR-140. *RNA* 2008, 14: 2513-20. PMID: [18945805](#)  
Cells: 3T3 (mouse fibroblasts), C3H10T1/2 (mouse), DF1 (chicken fibroblasts)  
Targets: miR-140, miR-449

**Papagiannakopoulos *et al.*** MicroRNA-21 targets a network of key tumor-suppressive pathways in glioblastoma cells. *Cancer Res.* 2008, 68: 8164-72. PMID: [18829576](#)  
Cells: U251 and U87 (human glioblastoma)  
Targets: miR-21

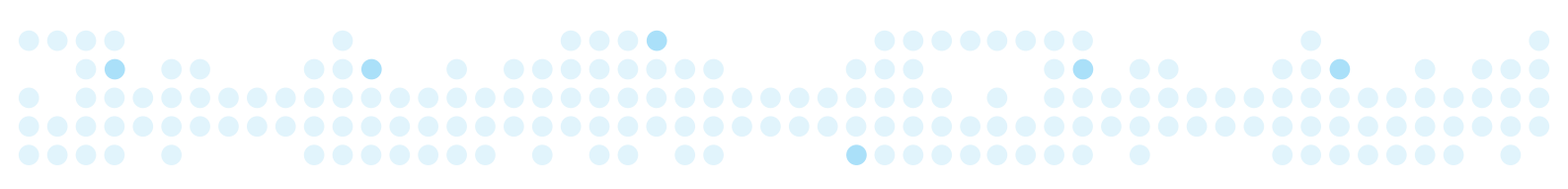
**Park *et al.*** The miR-200 family determines the epithelial phenotype of cancer cells by targeting the E-cadherin repressors ZEB1 and ZEB2. *Genes Dev.* 2008, 22: 894-907. PMID: [18381893](#)  
Cells: HCT116 (human colon cancer)  
Targets: miR-200 family members

**Perez *et al.*** MicroRNA-mediated species-specific attenuation of influenza A virus. *Nat. Biotechnol.* 2009, 27: 572-6. PMID: [19483680](#)  
Cells: HEK293 (human embryonic kidney) cells  
Targets: miR-93

**Petrocca *et al.*** E2F1-regulated microRNAs impair TGFbeta-dependent cell-cycle arrest and apoptosis in gastric cancer. *Cancer Cell* 2008, 13: 272-86. PMID: [18328430](#)  
Cells: Snu-16 (gastric cancer), AGS, MKN-74 cells  
Targets: miR-106b, miR-93

**Rosa *et al.*** The miR-430/427/302 family controls mesendodermal fate specification via species-specific target selection. *Dev. Cell* 2009, 16: 517-27. PMID: [19386261](#)  
Cells: Human embryonic stem (RUES2) cells  
Target: miR-302

**Sachdeva *et al.*** p53 represses c-Myc through induction of the tumor suppressor miR-145. *Proc. Natl. Acad. Sci. USA* 2009, 106: 3207-12. PMID: [19202062](#)  
Cells: Human colon cancer (HCT-116) cells  
Targets: miR-145



**Schepeler *et al.*** Diagnostic and prognostic microRNAs in stage II colon cancer. *Cancer Res.* 2008, 68: 6416-24. PMID: [18676867](#)

Cells: LS174T, DLD1, HCT116 (human colon carcinoma)

Targets: miR-20a, miR-92, miR-145

**Selbach *et al.*** Widespread changes in protein synthesis induced by microRNAs. *Nature* 2008, 455: 58-63. PMID: [18668040](#)

Cells: HeLa

Targets: let-7b

**Siegel *et al.*** A functional screen implicates microRNA-138-dependent regulation of the depalmitoylation enzyme APT1 in dendritic spine morphogenesis. *Nat. Cell Biol.* 2009, 11: 705-16. PMID: [19465924](#)

Cells: rat hippocampal neurons

Targets: miR-138

**Taguchi *et al.*** Identification of hypoxia-inducible factor-1 alpha as a novel target for miR-17-92 microRNA cluster. *Cancer Res.* 2008, 68: 5540-5. PMID: [18632605](#)

Cells: ACC-LC-172, Calu6 (human lung cancer)

Targets: miR-20

**Talotta *et al.*** An autoregulatory loop mediated by miR-21 and PDCD4 controls the AP-1 activity in RAS transformation.

*Oncogene.* 2009, 28: 73-84. PMID: [18850008](#)

Cells: FRTL-5-ER/RAS cells

Targets: miR-21

**Tavazoie *et al.*** Endogenous human microRNAs that suppress breast cancer metastasis. *Nature* 2008, 451: 147-52. PMID: [18185580](#)

Cells: MDA-MB-231 (human breast cancer)

Targets: miR-159, miR-199a\*, miR-335

**Thermann & Hentze.** *Drosophila* miR2 induces pseudo-polysomes and inhibits translation initiation. *Nature* 2007, 447: 875-8. PMID: [17507927](#)

Cells: *Drosophila melanogaster* embryo extract

Targets: miR-2

**Triboulet *et al.*** Suppression of microRNA-silencing pathway by HIV-1 during virus replication. *Science* 2007, 315: 1579-82. PMID: [17322031](#)

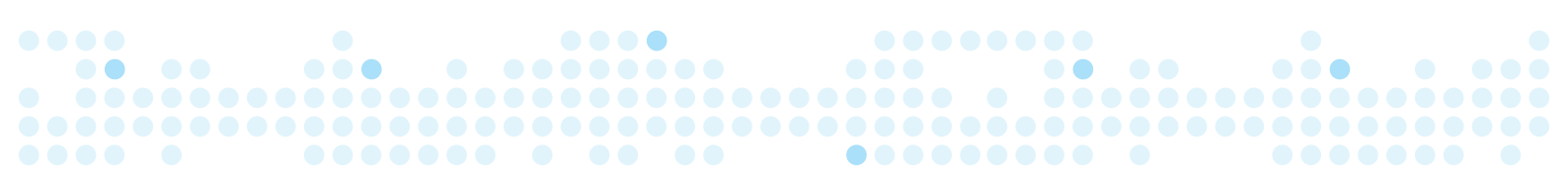
Cells: Jurkat

Targets: miR-17-5p, miR-20a

**Worm *et al.*** Silencing of microRNA-155 in mice during acute inflammatory response leads to derepression of c/ebp Beta and down-regulation of G-CSF. *Nucleic Acids Res.* 2009. PMID: [19596814](#)

Cells/Organism: THP1 (Human acute monocytic leukemia cell line)/ mouse (tail vein injection, accumulation in the spleen)

Targets: miR-155



**Xia *et al.*** microRNA-146b inhibits glioma cell migration and invasion by targeting MMPs. *Brain Res.* 2009, 1269: 158-65.

PMID: [19265686](#)

Cells: U373 cells

Targets: miR-146b

**Xiao *et al.*** Lymphoproliferative disease and autoimmunity in mice with increased miR-17-92 expression in lymphocytes.

*Nat. Immunol.* 2008, 9: 405-14. PMID: [18327259](#)

Cells: HeLa

Targets: miR-17-5p, miR-19, miR-92

**Xu *et al.*** MicroRNA-145 regulates OCT4, SOX2, and KLF4 and represses pluripotency in human embryonic stem cells.

*Cell* 2009, 137: 647-58. PMID: [19409607](#)

Cells: Human embryonic stem (hESC) cells

targets: miR-145

**Yi *et al.*** A skin microRNA promotes differentiation by repressing 'stemness'. *Nature* 2008, 452 :225-9. PMID: [18311128](#)

Cells: Primary mouse keratinocytes

Targets: miR-203

**Zhan *et al.*** MicroRNA expression dynamics during murine and human erythroid differentiation. *Exp. Hematol.* 2007, 35:

1015-25. PMID: [17588470](#)

Cells: MEL (murine erythroleukemia)

Targets: miR-451

