

[Download table]

Conserved

	Predicted consequential pairing of target region (top) and miRNA (bottom)	Site type	Context++ score	Context++ score percentile	Weighted context++ score	Conserved branch length	P _{ct}
Position 177-183 of HIF1A 3' UTR	5' ...CAUCCUUUUUUUGGACACUGU... hsa-miR-199b-5p 3' CUUGUCUACAGAUUGUGACCC	7mer-m8	-0.22	91	-0.22	9.367	> 0.99
Position 177-183 of HIF1A 3' UTR	5' ...CAUCCUUUUUUUGGACACUGU... hsa-miR-199a-5p 3' CUUGUCAUCAGACUUGUGACCC	7mer-m8	-0.23	91	-0.23	9.367	> 0.99

Figure S1: *HIF1A* data, extracted from the UALCAN database, an interactive web resource for analyzing cancer OMICS data. **A.** Expression of *HIF1A* across TCGA cancers with tumor and normal samples. **B:** Effect of *HIF1A* expression level on bladder urothelial carcinoma (BLCA) patient survival. **C:** HIF1A proteomic expression profile based on sample types. **D.** Conserved miRNA mir-199-5p target site within the 3' UTR region of the *HIF1A* gene.

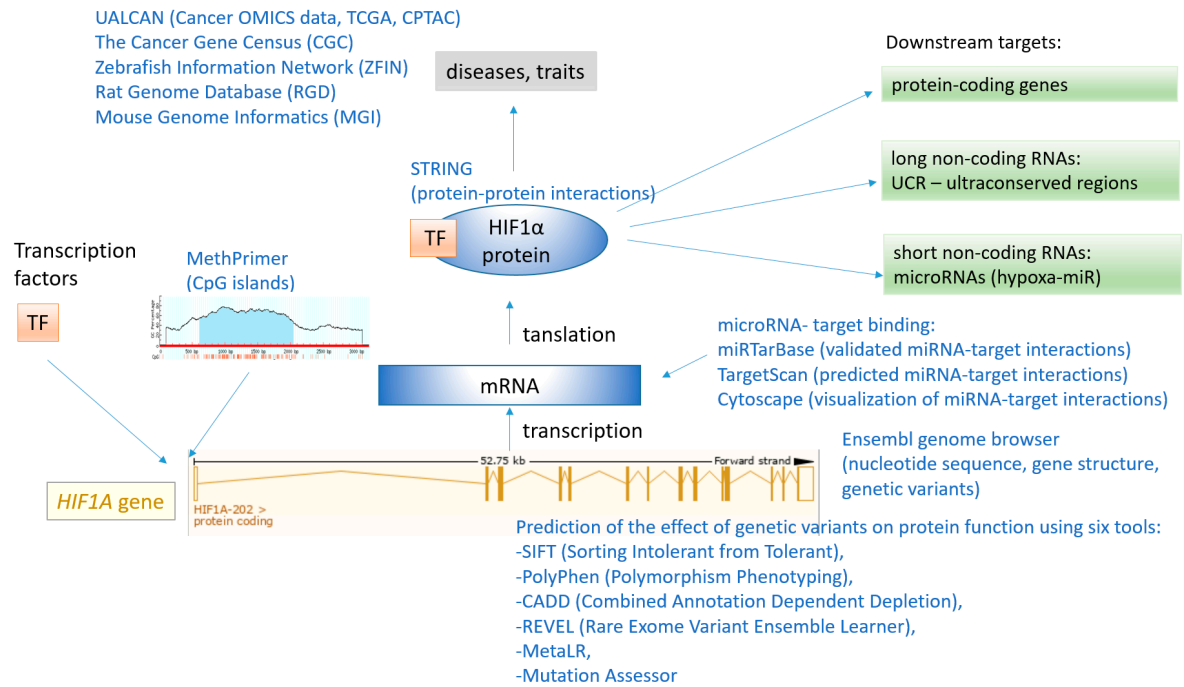


Figure S2: Summary of genomic databases and bioinformatics tools used in the present analysis.

Table S1. Phenotypes, diseases and traits associated with the *HIF1A* gene in human. Data obtained from the Ensembl genome browser.

Acute myeloid leukemia	Cancer Gene Census
Adrenal Gland Neuroblastoma	Cancer Gene Census
Ampulla of Vater Carcinoma	Cancer Gene Census
Atypical Meningioma	Cancer Gene Census
Basal cell carcinoma	Cancer Gene Census
bile duct carcinoma	Cancer Gene Census
bladder carcinoma	Cancer Gene Census
brain glioblastoma	Cancer Gene Census
Breast carcinoma	Cancer Gene Census
breast ductal adenocarcinoma	Cancer Gene Census
bronchoalveolar adenocarcinoma	Cancer Gene Census
cecum adenocarcinoma	Cancer Gene Census
Cecum Villous Adenoma	Cancer Gene Census
cervical squamous cell carcinoma	Cancer Gene Census
Chronic lymphocytic leukemia	Cancer Gene Census
Clear cell renal carcinoma	Cancer Gene Census
colon adenocarcinoma	Cancer Gene Census
colorectal adenocarcinoma	Cancer Gene Census
Cutaneous melanoma	Cancer Gene Census
diffuse large B-cell lymphoma	Cancer Gene Census
Endometrial carcinoma	Cancer Gene Census
Endometrial Endometrioid Adenocarcinoma	Cancer Gene Census

Esophageal adenocarcinoma	Cancer Gene Census
Esophageal Squamous Cell Carcinoma	Cancer Gene Census
gastric adenocarcinoma	Cancer Gene Census
Gastric Adenoma	Cancer Gene Census
gastric carcinoma	Cancer Gene Census
head and neck squamous cell carcinoma	Cancer Gene Census
Hepatobiliary Neoplasm	Cancer Gene Census
Hepatocellular Carcinoma	Cancer Gene Census
HER2 Positive Breast Carcinoma	Cancer Gene Census
Invasive Breast Carcinoma	Cancer Gene Census
kidney neoplasm	Cancer Gene Census
Kidney Oncocytoma	Cancer Gene Census
lobular breast carcinoma	Cancer Gene Census
Lung adenocarcinoma	Cancer Gene Census
Lung carcinoma	Cancer Gene Census
lymphoid neoplasm	Cancer Gene Census
mantle cell lymphoma	Cancer Gene Census
Merkel cell skin cancer	Cancer Gene Census
Multiple myeloma	Cancer Gene Census
nasopharyngeal squamous cell carcinoma	Cancer Gene Census
non-functional pancreatic neuroendocrine tumor	Cancer Gene Census
non-small cell lung carcinoma	Cancer Gene Census
ovarian endometrioid adenocarcinoma with squamous differentiation	Cancer Gene Census
ovarian serous adenocarcinoma	Cancer Gene Census
pancreatic ductal adenocarcinoma	Cancer Gene Census
pancreatic neuroendocrine tumor	Cancer Gene Census
Papillary renal cell carcinoma	Cancer Gene Census
prostate adenocarcinoma	Cancer Gene Census
prostate carcinoma	Cancer Gene Census
rectal adenocarcinoma	Cancer Gene Census
rectal tubulovillous adenoma	Cancer Gene Census
Rhabdoid Meningioma	Cancer Gene Census
skin carcinoma	Cancer Gene Census
Small cell lung carcinoma	Cancer Gene Census
soft tissue sarcoma	Cancer Gene Census
squamous cell lung carcinoma	Cancer Gene Census
thyroid carcinoma	Cancer Gene Census
Thyroid Gland Undifferentiated (Anaplastic) Carcinoma	Cancer Gene Census
Uterine Carcinosarcoma	Cancer Gene Census
Exercise Test	dbGaP
Uric Acid	dbGaP
Malignant tumor of prostate	ClinVar
Blood pressure	dbGaP

Table S2. Phenotypes, diseases and traits associated with the *HIF1A* gene in animals. Data obtained from the Ensembl genome browser.

Phenotype, disease and trait	Source	Species	Gene
whole organism, increased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
whole organism, decreased amount	ZFIN	Zebrafish	ENSDARG00000006181
			hiflaa
whole organism, decreased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
Werner syndrome	RGD	Rat	ENSRNOG00000008292
			Hifla
Varicocele	RGD	Rat	ENSRNOG00000008292
			Hifla
Urologic neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifla
Ulcer	RGD	Rat	ENSRNOG00000008292
			Hifla
type 2 diabetes mellitus	RGD	Rat	ENSRNOG00000008292
			Hifla
transient cerebral ischemia	RGD	Rat	ENSRNOG00000008292
			Hifla
Thyroid neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifla
Testis Reperfusion Injury	RGD	Rat	ENSRNOG00000008292
			Hifla
Temporomandibular Joint Disorders	RGD	Rat	ENSRNOG00000008292
			Hifla
Subarachnoid Hemorrhage	RGD	Rat	ENSRNOG00000008292
			Hifla
splanchnocranium, morphology	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
splanchnocranium, malformed	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
Spinal Cord Injuries	RGD	Rat	ENSRNOG00000008292
			Hifla
small second pharyngeal arch	MGI	Mouse	ENSMUSG00000021109
			Hifla
Skin neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifla
skin melanoma	RGD	Rat	ENSRNOG00000008292
			Hifla
sclerosing cholangitis	RGD	Rat	ENSRNOG00000008292
			Hifla
rheumatoid arthritis	RGD	Rat	ENSRNOG00000008292
			Hifla
Retinal neovascularization	RGD	Rat	ENSRNOG00000008292
			Hifla
Retinal Ischemia	RGD	Rat	ENSRNOG00000008292

			Hifl a
retina, increased amount	ZFIN	Zebrafish	ENS DARG00000034293
			hifl a b
respiratory gaseous exchange by respiratory system, increased frequency	ZFIN	Zebrafish	ENS DARG00000034293
			hifl a b
Reperfusion Injury	RGD	Rat	ENS RNOG00000008292
			Hifl a
renal cell carcinoma	RGD	Rat	ENS RNOG00000008292
			Hifl a
Radiation Injuries, Experimental	RGD	Rat	ENS RNOG00000008292
			Hifl a
Radiation Injuries	RGD	Rat	ENS RNOG00000008292
			Hifl a
pulmonary hypertension	RGD	Rat	ENS RNOG00000008292
			Hifl a
psoriasis	RGD	Rat	ENS RNOG00000008292
			Hifl a
Prostatic neoplasms	RGD	Rat	ENS RNOG00000008292
			Hifl a
prostate cancer	RGD	Rat	ENS RNOG00000008292
			Hifl a
primary biliary cirrhosis	RGD	Rat	ENS RNOG00000008292
			Hifl a
primary biliary cholangitis	RGD	Rat	ENS RNOG00000008292
			Hifl a
prenatal lethality, incomplete penetrance	MGI	Mouse	ENS MUSG00000021109
			Hifl a
prenatal lethality, complete penetrance	MGI	Mouse	ENS MUSG00000021109
			Hifl a
Postmenopausal Osteoporosis	RGD	Rat	ENS RNOG00000008292
			Hifl a
polycystic kidney disease	RGD	Rat	ENS RNOG00000008292
			Hifl a
Phyllodes tumor	RGD	Rat	ENS RNOG00000008292
			Hifl a
pharyngeal arch artery hypoplasia	MGI	Mouse	ENS MUSG00000021109
			Hifl a
pericardial effusion	MGI	Mouse	ENS MUSG00000021109
			Hifl a
pancreatic cancer	RGD	Rat	ENS RNOG00000008292
			Hifl a
Oxygen-Induced Retinopathy	RGD	Rat	ENS RNOG00000008292
			Hifl a
ovarian cancer	RGD	Rat	ENS RNOG00000008292
			Hifl a
Osteoarthritis	RGD	Rat	ENS RNOG00000008292
			Hifl a

optic cup, increased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
open neural tube	MGI	Mouse	ENSMUSG00000021109
			Hifla
olfactory neuroblastoma	RGD	Rat	ENSRNOG00000008292
			Hifla
non-small cell lung carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifla
no abnormal phenotype detected	MGI	Mouse	ENSMUSG00000021109
			Hifla
neural crest cell migration, decreased process quality	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
neural crest cell migration, decreased occurrence	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
nephroblastoma	RGD	Rat	ENSRNOG00000008292
			Hifla
Neoplastic Cell Transformation	RGD	Rat	ENSRNOG00000008292
			Hifla
Neoplasm Invasiveness	RGD	Rat	ENSRNOG00000008292
			Hifla
Myocardial Reperfusion Injury	RGD	Rat	ENSRNOG00000008292
			Hifla
Myocardial Ischemia	RGD	Rat	ENSRNOG00000008292
			Hifla
Myocardial Infarction	RGD	Rat	ENSRNOG00000008292
			Hifla
Mycosis Fungoides	RGD	Rat	ENSRNOG00000008292
			Hifla
motor neuron, part_of, trunk, increased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
morbid obesity	RGD	Rat	ENSRNOG00000008292
			Hifla
middle cerebral artery infarction	RGD	Rat	ENSRNOG00000008292
			Hifla
Micronuclei, Chromosome-Defective	RGD	Rat	ENSRNOG00000008292
			Hifla
Memory Disorders	RGD	Rat	ENSRNOG00000008292
			Hifla
Mammary Neoplasms, Experimental	RGD	Rat	ENSRNOG00000008292
			Hifla
lung non-small cell carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifla
lung disease	RGD	Rat	ENSRNOG00000008292
			Hifla
Limb Ischemia	RGD	Rat	ENSRNOG00000008292
			Hifla
Kidney Reperfusion Injury	RGD	Rat	ENSRNOG00000008292

			Hifl a
kidney failure	RGD	Rat	ENSRNOG00000008292
			Hifl a
invasive ductal carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifl a
Intervertebral Disc Disease	RGD	Rat	ENSRNOG00000008292
			Hifl a
infarction	RGD	Rat	ENSRNOG00000008292
			Hifl a
increased tumor necrosis factor secretion	MGI	Mouse	ENSMUSG00000021109
			Hifl a
increased interferon-gamma secretion	MGI	Mouse	ENSMUSG00000021109
			Hifl a
increased hindbrain size	MGI	Mouse	ENSMUSG00000021109
			Hifl a
increased embryonic tissue cell apoptosis	MGI	Mouse	ENSMUSG00000021109
			Hifl a
increased apoptosis	MGI	Mouse	ENSMUSG00000021109
			Hifl a
incomplete somite formation	MGI	Mouse	ENSMUSG00000021109
			Hifl a
Idiopathic Pulmonary Fibrosis	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hypoxia-Ischemia, Brain	RGD	Rat	ENSRNOG00000008292
			Hifl a
hypoxia	MGI	Mouse	ENSMUSG00000021109
			Hifl a
hypertension	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hyperplasia	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hyperalgesia	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hot Flashes	RGD	Rat	ENSRNOG00000008292
			Hifl a
hepatocellular carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hepatic Encephalopathy	RGD	Rat	ENSRNOG00000008292
			Hifl a
hemorrhage	MGI	Mouse	ENSMUSG00000021109
			Hifl a
hematopoietic stem cell, part_of, ventral wall of dorsal aorta, decreased amount	ZFIN	Zebrafish	ENS DARG00000034293
			hifl ab
Hemangioblastoma	RGD	Rat	ENSRNOG00000008292
			Hifl a
Hearing Loss, Noise-Induced	RGD	Rat	ENSRNOG00000008292
			Hifl a

head, increased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
goblet cell, part_of, intestine, decreased amount	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
glycogen storage disease VII	RGD	Rat	ENSRNOG00000008292
			Hifla
glycogen storage disease V	RGD	Rat	ENSRNOG00000008292
			Hifla
glioblastoma multiforme	RGD	Rat	ENSRNOG00000008292
			Hifla
glioblastoma	RGD	Rat	ENSRNOG00000008292
			Hifla
Femur Head Necrosis	RGD	Rat	ENSRNOG00000008292
			Hifla
Experimental Neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifla
Experimental Diabetes Mellitus	RGD	Rat	ENSRNOG00000008292
			Hifla
Experimental Autoimmune Neuritis	RGD	Rat	ENSRNOG00000008292
			Hifla
Experimental Arthritis	RGD	Rat	ENSRNOG00000008292
			Hifla
esophagus squamous cell carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifla
embryonic lethality during organogenesis, incomplete penetrance	MGI	Mouse	ENSMUSG00000021109
			Hifla
embryonic lethality during organogenesis, complete penetrance	MGI	Mouse	ENSMUSG00000021109
			Hifla
embryonic lethality between implantation and somite formation, incomplete penetrance	MGI	Mouse	ENSMUSG00000021109
			Hifla
embryonic growth retardation	MGI	Mouse	ENSMUSG00000021109
			Hifla
embryonic growth arrest	MGI	Mouse	ENSMUSG00000021109
			Hifla
ductal carcinoma in situ	RGD	Rat	ENSRNOG00000008292
			Hifla
Ductal Carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifla
disorganized yolk sac vascular plexus	MGI	Mouse	ENSMUSG00000021109
			Hifla
disorganized myocardium	MGI	Mouse	ENSMUSG00000021109
			Hifla
Disease Progression	RGD	Rat	ENSRNOG00000008292
			Hifla
dilated dorsal aorta	MGI	Mouse	ENSMUSG00000021109
			Hifla

Diabetic Retinopathy	RGD	Rat	ENSRNOG00000008292
			Hifl a
Diabetic Nephropathies	RGD	Rat	ENSRNOG00000008292
			Hifl a
Diabetes Mellitus, Experimental	RGD	Rat	ENSRNOG00000008292
			Hifl a
Diabetes Complications	RGD	Rat	ENSRNOG00000008292
			Hifl a
decubitus ulcer	RGD	Rat	ENSRNOG00000008292
			Hifl a
decreased neuron apoptosis	MGI	Mouse	ENSMUSG00000021109
			Hifl a
decreased embryo size	MGI	Mouse	ENSMUSG00000021109
			Hifl a
decreased angiogenesis	MGI	Mouse	ENSMUSG00000021109
			Hifl a
congestive heart failure	RGD	Rat	ENSRNOG00000008292
			Hifl a
congenital heart disease	RGD	Rat	ENSRNOG00000008292
			Hifl a
Colonic Neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifl a
Chronic Cerebral Hypoperfusion	RGD	Rat	ENSRNOG00000008292
			Hifl a
cholesteatoma of middle ear	RGD	Rat	ENSRNOG00000008292
			Hifl a
Cell Transformation, Neoplastic	RGD	Rat	ENSRNOG00000008292
			Hifl a
cell maturation, occurs_in, goblet cell, disrupted	ZFIN	Zebrafish	ENSDARG00000034293
			hifl ab
Cardiomegaly	RGD	Rat	ENSRNOG00000008292
			Hifl a
cardia bifida	MGI	Mouse	ENSMUSG00000021109
			Hifl a
Carcinoma	RGD	Rat	ENSRNOG00000008292
			Hifl a
Burns	RGD	Rat	ENSRNOG00000008292
			Hifl a
Bronchopulmonary Dysplasia	RGD	Rat	ENSRNOG00000008292
			Hifl a
Breast Neoplasms	RGD	Rat	ENSRNOG00000008292
			Hifl a
Brain Ischemia	RGD	Rat	ENSRNOG00000008292
			Hifl a
bladder neck obstruction	RGD	Rat	ENSRNOG00000008292
			Hifl a
axon, part_of, motor neuron, truncated	ZFIN	Zebrafish	ENSDARG00000034293

			hiflab
axon guidance, occurs in, motor neuron, decreased process quality	ZFIN	Zebrafish	ENSDARG00000034293
			hiflab
Atrial Fibrillation	RGD	Rat	ENSRNOG00000008292
			Hifla
Astrocytoma	RGD	Rat	ENSRNOG00000008292
			Hifla
asthma	RGD	Rat	ENSRNOG00000008292
			Hifla
Asphyxia	RGD	Rat	ENSRNOG00000008292
			Hifla
Arterial Thrombosis	RGD	Rat	ENSRNOG00000008292
			Hifla
Anaplasia	RGD	Rat	ENSRNOG00000008292
			Hifla
Alzheimer's Disease	RGD	Rat	ENSRNOG00000008292
			Hifla
Alcoholic Liver Diseases	RGD	Rat	ENSRNOG00000008292
			Hifla
Acute-Phase Reaction	RGD	Rat	ENSRNOG00000008292
			Hifla
acute kidney failure	RGD	Rat	ENSRNOG00000008292
			Hifla
absent third pharyngeal arch	MGI	Mouse	ENSMUSG00000021109
			Hifla
absent second pharyngeal arch	MGI	Mouse	ENSMUSG00000021109
			Hifla
absent pharyngeal arch arteries	MGI	Mouse	ENSMUSG00000021109
			Hifla
absent myocardial trabeculae	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal vitelline vascular remodeling	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal vascular regression	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal vascular development	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal somite development	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal pharyngeal arch morphology	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal pericardium morphology	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal pericardial cavity morphology	MGI	Mouse	ENSMUSG00000021109
			Hifla
abnormal neural fold formation	MGI	Mouse	ENSMUSG00000021109
			Hifla

abnormal neural crest cell migration	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal myocardium layer morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal myocardial trabeculae morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal metabolism	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal intersomitic vessel morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal interleukin secretion	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal heart ventricle morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal heart tube morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal heart looping	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal heart development	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal head mesenchyme morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal embryonic epiblast morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal embryo development	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal dorsal aorta morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal developmental patterning	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal cytokine level	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal cardiac outflow tract development	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal blood vessel morphology	MGI	Mouse	ENSMUSG00000021109
			Hifl a
abnormal angiogenesis	MGI	Mouse	ENSMUSG00000021109