



*From Research to Discovery*

# Hypoxia

**Hypoxia-related products from Covalab**

# Hypoxia

Hypoxia refers to a deprivation of oxygen that can affect the body as a whole (generalised hypoxia) or a tissue (tissue hypoxia). Oxygen is critical for many biological processes at the molecular, cellular and tissue levels<sup>1</sup>. Low levels of oxygen have been linked to many pathological situations. Among them heart and brain ischemia-related diseases and cancer progression are particularly linked with perturbed oxygen signalling and metabolism<sup>2</sup>.

An important and well characterised ‘master regulator’ of the adaptive response to changes in the levels of available oxygen is the **hypoxia-inducible factor (HIF)**. Activation of the HIF transcription factor signalling cascade leads to extensive changes in gene expression, which allow cells, tissues and organisms to adapt to reduced oxygenation<sup>3</sup>.

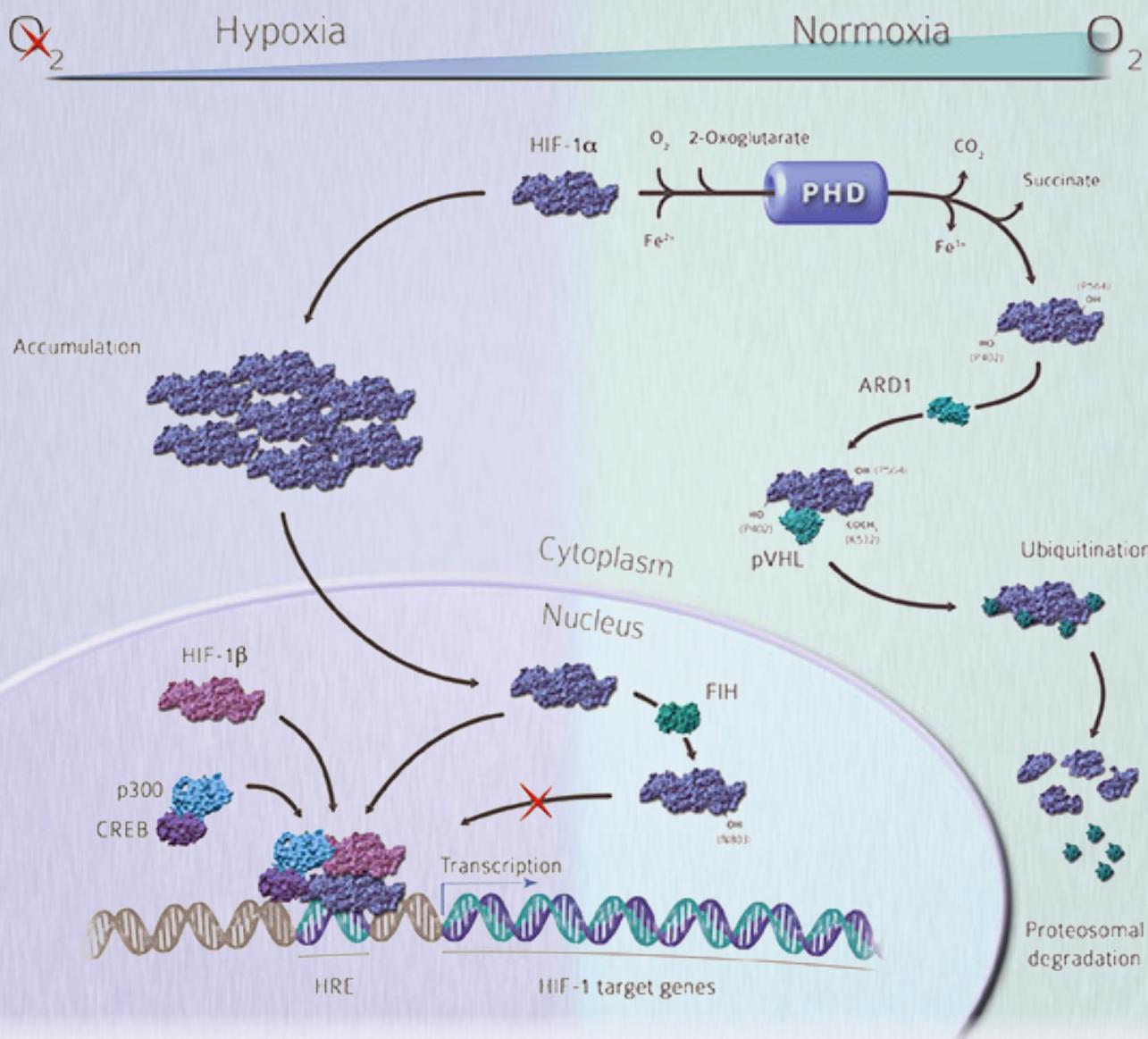


Figure 1: HIF-1 regulation pathway

## References:

- 1 - Hypoxia, a novel inducer of acute phase gene expression in a human hepatoma cell line: Wenger RH. et al.; *J Biol Chem.* 1995 Nov 17; 270(46):27865-70.
- 2 - Oxygen sensing, Homeostasis and Disease: Semenza GL.; *N Engl J Med.* 2011 Nov 10; 365(19): 1845-6.
- 3 - Regulation of angiogenesis by hypoxia: role of the HIF system: Pugh CW. et al.; *Nat Med.* 2003 Jun; 9(6): 677-84.
- 4 - Endothelial PAS domain protein 1 (EPAS1), a transcription factor selectively expressed in endothelial cells: Tian H. et al.; *Genes Dev.* 1997 Jan 1; 11(1): 72-82.
- 5 - Molecular characterization and chromosomal localization of a third alpha-class hypoxia inducible factor subunit, HIF3alpha: Gu YZ. et al.; *Gene Expr.* 1998; 7(3): 205-13.
- 6 - Expression and characterization of hypoxia-inducible factor (HIF)-3alpha in human kidney: suppression of HIF-mediated gene expression by HIF-3alpha: Hara S. et al.; *Biochem Biophys Res Commun.* 2001 Oct 5; 287(4): 808-13.
- 7 - HIF prolyl-hydroxylase 2 is the key oxygen sensor setting low steady-state levels of HIF-1alpha in normoxia: Berra E. et al.; *EMBO J.* 2003 Aug 15; 22(16): 4082-90.
- 8 - Differential function of the prolyl hydroxylases PHD1, PHD2, and PHD3 in the regulation of hypoxia-inducible factor: Appelhoff R. et al.; *J Biol Chem.* 2004 Sep 10; 279(37): 38458-65.
- 9 - An endoplasmic reticulum transmembrane prolyl 4-hydroxylase is induced by hypoxia and acts on hypoxia-inducible factor alpha: Koivunen P. et al.; *J Biol Chem.* 2007 Oct 19; 282(42): 30544-52.

# Hypoxia-inducible factors (HIF)

HIF-alpha subunit includes HIF-1 alpha, HIF-2 alpha (also called EPAS1)<sup>4</sup> as well as HIF-3 alpha<sup>5</sup>. Compared to HIF-1 alpha, HIF-2 alpha and HIF-3 alpha show biochemical similarities such as heterodimerisation with HIF-1 alpha but their functions are not well understood.

HIF subunits have more or less the same structure (see figure) belonging to the basic Helix-Loop-Helix (bHLH) / Per-ARNT-SIM transcription factors family. The bHLH domain is essential for DNA binding activity and the PAS domain is useful for heterodimerisation. The presence of two Transcriptional Activation Domain (TAD) is functionally important for the recruitment of p300 and CREB proteins implicated in transcription. HIF-3 alpha is the only subunit of the family which induces a negative regulation of the HIF pathway<sup>6</sup>.

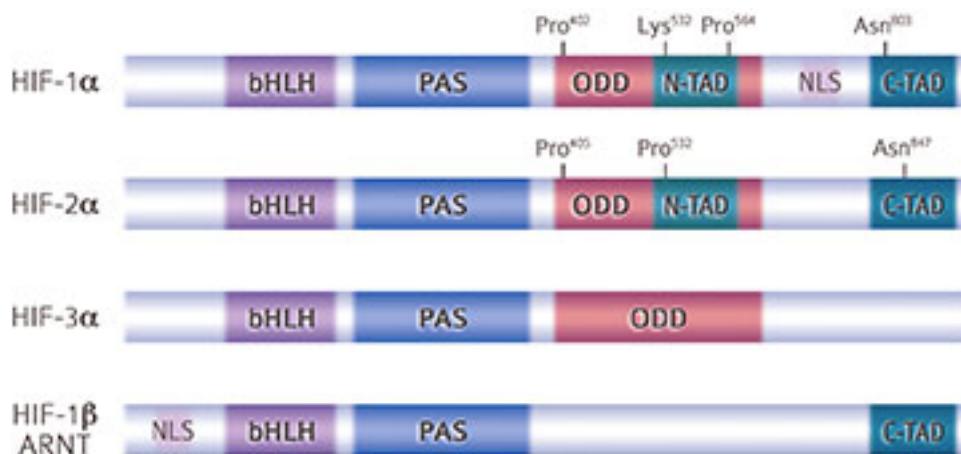


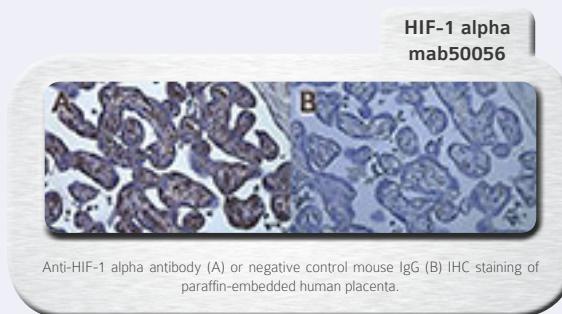
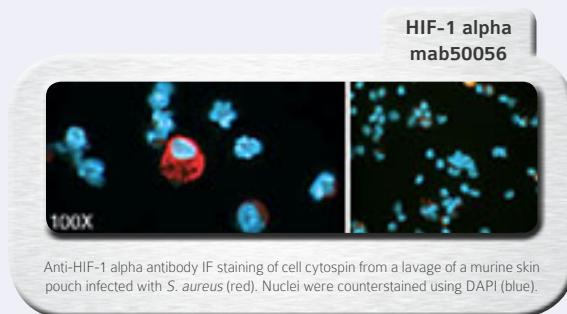
Figure 2: HIF variants

## 1

### Hypoxia-inducible factor-1

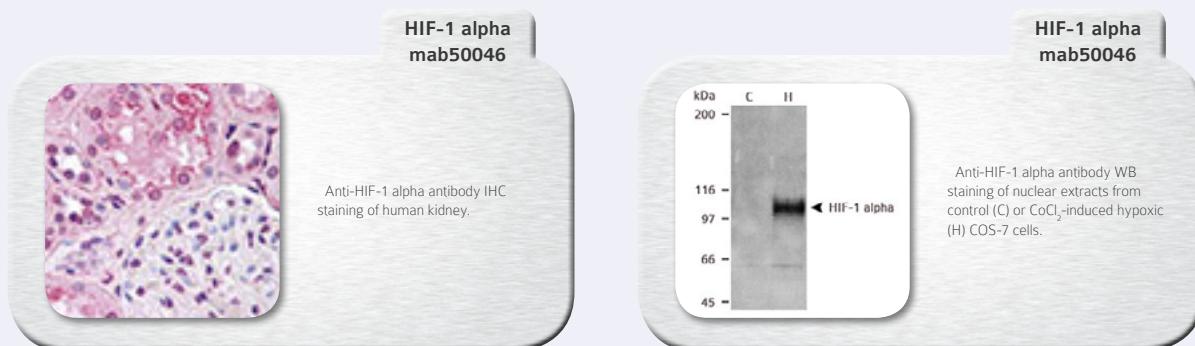
#### HIF-1 alpha – Monoclonal antibodies

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-1 alpha	ESEE122	Mouse	Hu	-	ICC, IHC, WB	mab60225
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat ...	-	ICC, IF, IHC, IP, WB	mab50056
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat, Bov	Biotin	ICC, IF, IHC, IP, WB	mab50201
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat, Bov	HRP	ICC, IF, IHC, IP	mab50204
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat, Bov	DyLight 488	ICC, IF, IHC, IP	mab50203
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat, Bov	DyLight 550	ICC, IF, IHC, IP	mab50205
HIF-1 alpha	ESEE122	Mouse	Hu, Ms, Rat, Bov	DyLight 650	ICC, IF, IHC, IP	mab50202
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	-	WB	mab50062
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	Biotin	WB	mab50195
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	HRP	WB	mab50198
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	DyLight 488	WB	mab50197
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	DyLight 550	WB	mab50199
HIF-1 alpha	H1alpha 67-7	Mouse	Hu, Mk	DyLight 650	WB	mab50196



## HIF-1 alpha – Monoclonal antibodies (continued)

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	-	ChIP, ELISA, FC, ICC, IF, IHC, IP, WB	mab50046
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	-	ChIP, ELISA, FC, ICC, IF, IHC, IP, WB	mab50049
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	Biotin	ChIP, ICC, IF, IHC, IP, WB	mab50168
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	Biotin	IHC, IP, WB	mab50181
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	HRP	IP, WB	mab50171
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	HRP	IP, WB	mab50184
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 488	ChIP, ICC, IF, IHC, IP, WB	mab50170
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 488	IHC, WB	mab50183
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 550	ChIP, ICC, IF, IHC, IP, WB	mab50172
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 550	IHC, WB	mab50186
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 650	ChIP, ICC, IF, IHC, IP, WB	mab50169
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	DyLight 650	IHC, WB	mab50182
HIF-1 alpha	H1alpha67	Mouse	Hu, Ms, Rat ...	HiLyte Fluor 488	IHC - P, IP, WB	mab50185
HIF-1 alpha	HA111	Mouse	Hu	-	WB	mab50061
HIF-1 alpha	HA111	Mouse	Hu	Biotin	WB	mab50265
HIF-1 alpha	HA111	Mouse	Hu	HRP	WB	mab50268
HIF-1 alpha	HA111	Mouse	Hu	DyLight 488	WB	mab50267
HIF-1 alpha	HA111	Mouse	Hu	DyLight 550	WB	mab50269
HIF-1 alpha	HA111	Mouse	Hu	DyLight 650	WB	mab50266

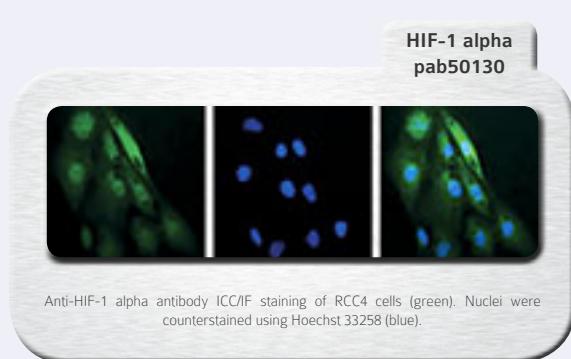


## HIF-1 alpha – Polyclonal antibodies

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-1 alpha	Rabbit	Hu, Ms, Rat ...	-	ChIP, FC, GS, ICC, IF, IHC, IP, WB	pab50008
HIF-1 alpha	Rabbit	Hu, Ms, Rat, Mk	-	ChIP, ICC, IF, IHC, IP, WB	pab50130
HIF-1 alpha	Rabbit	Hu, Rat	-	WB	pab50169
HIF-1 alpha	Rabbit	Hu, Ms	-	WB	pab52192
HIF-1 alpha	Rabbit	Hu, Bov, Po	Biotin	WB	pab50995
HIF-1 alpha	Rabbit	Hu, Ms	Biotin	WB	pab52193
HIF-1 alpha	Rabbit	Hu, Mk	HRP	IHC - P, WB	pab50911
HIF-1 alpha	Rabbit	Hu, Bov, Po	HRP	WB	pab50998
HIF-1 alpha	Rabbit	Hu, Ms	HRP	WB	pab52196
HIF-1 alpha	Rabbit	Hu, Mk	DyLight 488	IHC - P, WB	pab50910
HIF-1 alpha	Rabbit	Hu, Bov, Po	DyLight 488	WB	pab50997
HIF-1 alpha	Rabbit	Hu, Ms	DyLight 488	WB	pab52195
HIF-1 alpha	Rabbit	Hu, Mk	DyLight 550	IHC - P, WB	pab50912
HIF-1 alpha	Rabbit	Hu, Bov, Po	DyLight 550	WB	pab50999
HIF-1 alpha	Rabbit	Hu, Ms	DyLight 550	WB	pab52197
HIF-1 alpha	Rabbit	Hu, Mk	DyLight 650	IHC, WB	pab50909
HIF-1 alpha	Rabbit	Hu, Bov, Po	DyLight 650	WB	pab50996
HIF-1 alpha	Rabbit	Hu, Ms	DyLight 650	WB	pab52194

## HIF-1 alpha – Polyclonal antibodies (continued)

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-1 alpha (C-Terminus)	Rabbit	Hu, Ms, Mk	-	IHC - P, WB	pab72091
HIF-1 alpha (exon 9)	Rabbit	Hu	-	WB	pab52574
HIF-1 alpha (exon 9)	Rabbit	Hu	Biotin	WB	pab52575
HIF-1 alpha (exon 9)	Rabbit	Hu	HRP	WB	pab52578
HIF-1 alpha (exon 9)	Rabbit	Hu	DyLight 488	WB	pab52577
HIF-1 alpha (exon 9)	Rabbit	Hu	DyLight 550	WB	pab52579
HIF-1 alpha (exon 9)	Rabbit	Hu	DyLight 650	WB	pab52576
HIF-1 alpha (exon 10)	Rabbit	Hu	-	WB	pab52581
HIF-1 alpha (exon 10)	Rabbit	Hu	Biotin	WB	pab52582
HIF-1 alpha (exon 10)	Rabbit	Hu	HRP	WB	pab52585
HIF-1 alpha (exon 10)	Rabbit	Hu	DyLight 488	WB	pab52584
HIF-1 alpha (exon 10)	Rabbit	Hu	DyLight 550	WB	pab52586
HIF-1 alpha (exon 10)	Rabbit	Hu	DyLight 650	WB	pab52583
HIF-1 alpha (exon 12)	Rabbit	Hu	-	WB	pab52588
HIF-1 alpha (exon 12)	Rabbit	Hu	Biotin	WB	pab52589
HIF-1 alpha (exon 12)	Rabbit	Hu	HRP	WB	pab52592
HIF-1 alpha (exon 12)	Rabbit	Hu	DyLight 488	WB	pab52591
HIF-1 alpha (exon 12)	Rabbit	Hu	DyLight 550	WB	pab52593
HIF-1 alpha (exon 12)	Rabbit	Hu	DyLight 650	WB	pab52590
HIF-1 alpha (exon 13)	Rabbit	Hu	-	WB	pab52595
HIF-1 alpha (exon 13)	Rabbit	Hu	Biotin	WB	pab52596
HIF-1 alpha (exon 13)	Rabbit	Hu	HRP	WB	pab52599
HIF-1 alpha (exon 13)	Rabbit	Hu	DyLight 488	WB	pab52598
HIF-1 alpha (exon 13)	Rabbit	Hu	DyLight 550	WB	pab52600
HIF-1 alpha (exon 13)	Rabbit	Hu	DyLight 650	WB	pab52597
HIF-1 alpha (hP402)	Rabbit	Hu	-	ELISA, WB	pab0395
HIF-1 alpha (hP564)	Rabbit	Hu	-	ELISA, WB	pab0396



**NEW!**



**HIF-1 alpha hP564  
blocking peptide**

Use the HIF-1 alpha hP564 blocking peptide to reveal the specific staining of the anti-HIF-1 alpha hP564 antibody (Cat# pab0396).

SPECIES	APPLICATIONS	CAT #
Hu	IHC, WB	pep0396

## HIF-1 beta antibodies

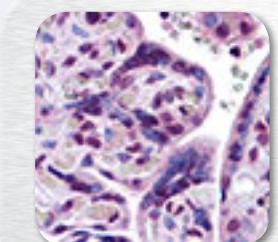
TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	-	ChIP, GS, IHC, IP, WB	mab50050
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	Biotin	IHC, WB	mab50188
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	HRP	IHC, WB	mab50191
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	DyLight 488	IHC, WB	mab50190
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	DyLight 550	IHC - P, WB	mab50192
HIF-1 beta	H1beta234	Mouse	Hu, Ms, Rat ...	DyLight 650	IHC, WB	mab50189
HIF-1 beta	-	Rabbit	Hu, Ms, Rat ...	-	ChIP, IHC, IP, WB	pab50017

## 2

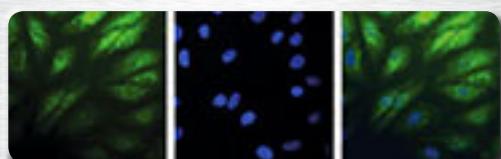
## Hypoxia-inducible factor-2

## HIF-2 alpha antibodies

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-2 alpha	EP190b	Mouse	Hu	-	ELISA, ICC, IHC - P, WB	mab71568
HIF-2 alpha	EP190b	Mouse	Hu	-	ICC, IHC, WB	mab60226
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	-	ChIP, ELISA, FC, ICC, IF, IHC, IP, WB	mab50055
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	Biotin	IHC - P, WB	mab50207
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	HRP	IHC, WB	mab50210
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	DyLight 488	FC, IHC - P, WB	mab50209
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	DyLight 550	FC, IHC - P, WB	mab50211
HIF-2 alpha	EP190b	Mouse	Hu, Ms, Rat, Ham	DyLight 650	FC, IHC - P, WB	mab50208
HIF-2 alpha	-	Rabbit	Hu	-	ICC, IF, IHC - P, WB	pab73064
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	-	ChIP, ELISA, FC, GS, ICC, IF, IHC, IP, WB	pab50074
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat	-	WB	pab50131
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	Biotin	IHC, WB	pab50434
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	HRP	IHC - P, WB	pab50437
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	DyLight 488	IHC, WB	pab50436
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	DyLight 550	IHC, WB	pab50438
HIF-2 alpha	-	Rabbit	Hu, Ms, Rat, Fi	DyLight 650	IHC, WB	pab50435

HIF-2 alpha  
pab73064

Anti-HIF-2 alpha antibody IHC staining of formalin-fixed, paraffin-embedded human placenta.

HIF-2 alpha  
pab50074

Anti-HIF-2 alpha antibody ICC/IF staining of RCC4 cells (green). Nuclei were counterstained with Hoechst 33258 (blue).



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50 µg

Standard  
100 µg

Fast and intuitive  
online selection tool

**3****Hypoxia-inducible factor-3****HIF-3 alpha antibodies**

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
HIF-3 alpha	-	Rabbit	Ms	-	WB	pab50195
HIF-3 alpha	-	Rabbit	Hu, Ms	-	IP, WB	pab50225
HIF-3 alpha	-	Rabbit	Ms	Biotin	WB	pab50634
HIF-3 alpha	-	Rabbit	Hu, Ms	Biotin	IP, WB	pab50779
HIF-3 alpha	-	Rabbit	Ms	HRP	WB	pab50637
HIF-3 alpha	-	Rabbit	Hu, Ms	HRP	IP, WB	pab50782
HIF-3 alpha	-	Rabbit	Ms	DyLight 488	WB	pab50636
HIF-3 alpha	-	Rabbit	Hu, Ms	DyLight 488	IP, WB	pab50781
HIF-3 alpha	-	Rabbit	Ms	DyLight 550	WB	pab50638
HIF-3 alpha	-	Rabbit	Hu, Ms	DyLight 550	IP, WB	pab50783
HIF-3 alpha	-	Rabbit	Ms	DyLight 650	WB	pab50635
HIF-3 alpha	-	Rabbit	Hu, Ms	DyLight 650	IP, WB	pab50780
HIF-3 alpha (aa581-592)	-	Rabbit	Hu, Ms, Rat	-	ELISA, IF, IHC - P, WB	pab70174

**4****Factor-inhibiting HIF-1****FIH-1 antibodies**

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
FIH-1	162c	Mouse	Hu	-	IHC - P, WB	mab50967
FIH-1	162c	Mouse	Hu	Biotin	IHC - P, WB	mab50968
FIH-1	162c	Mouse	Hu	HRP	IHC - P, WB	mab50971
FIH-1	162c	Mouse	Hu	DyLight 488	IHC - P, WB	mab50970
FIH-1	162c	Mouse	Hu	DyLight 550	IHC - P, WB	mab50972
FIH-1	162c	Mouse	Hu	DyLight 650	IHC - P, WB	mab50969
FIH-1	FIH162C	Mouse	Hu	-	ICC, IF, IHC, WB	mab60167
FIH-1	-	Rabbit	Hu, Ms, Rat	-	IHC, IP, WB	pab50128
FIH-1	-	Rabbit	Hu, Ms, Rat	Biotin	IHC, IP, WB	pab50886
FIH-1	-	Rabbit	Hu, Ms, Rat	HRP	IHC, IP, WB	pab50889
FIH-1	-	Rabbit	Hu, Ms, Rat	DyLight 488	IHC, IP, WB	pab50888
FIH-1	-	Rabbit	Hu, Ms, Rat	DyLight 550	IHC, IP, WB	pab50890
FIH-1	-	Rabbit	Hu, Ms, Rat	DyLight 650	IHC, IP, WB	pab50887

**FIH-1  
pab50128**

Anti-FIH-1 antibody IHC staining of rat brain sections.

**FIH-1  
pab50128**

Anti-FIH-1 antibody WB staining of astrocytes lysate from rat brain.

# HIF prolyl hydroxylases (PHD)

Prolyl hydroxylases (PHD) are key regulators of the HIF pathway. These enzymes, acting as oxygen sensors, mediate oxygen-dependent hydroxylation of key proline residues of the HIF-1 alpha subunit: Pro<sup>402</sup> and Pro<sup>564</sup>. These modifications allow the von Hippel-Lindau (VHL) tumour suppressor protein to bind to HIF-1 alpha, leading to its ubiquitination by the E3 ubiquitin ligase complex, and subsequently its degradation within the proteasome. Hydroxylation by prolyl hydroxylases requires the presence of molecular oxygen (O<sub>2</sub>). Hypoxic conditions therefore prevents HIF-1 alpha from being hydroxylated and finally degraded, which allows it to fulfill its role of transcriptional activator.

The PHD family is composed of three isoforms encoded by three independent genes. It has been shown that PHD2 is the main regulator of HIF-1 alpha low levels in normoxia<sup>7</sup>, while PHD3 is mainly expressed in hypoxia to inhibit HIF-activated genes when reoxygenation occurs<sup>8</sup>. PHD1 is thought to have a higher role on HIF-2 alpha than on HIF-1 alpha<sup>9</sup>. A fourth isoform of prolyl hydroxylase has been identified<sup>9</sup> which unlike the three others is located within the endoplasmic reticulum. Although its structure and localisation make it resemble collagen prolyl hydroxylases, its action has been shown to be equivalent to the other three HIF-related ones.

## 5 HIF prolyl hydroxylase 1

### PHD-1 antibodies

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
PHD-1	Rabbit	Hu, Ms, Rat	Biotin	WB	pab50833
PHD-1	Rabbit	Hu, Ms, Rat	HRP	WB	pab50836
PHD-1	Rabbit	Hu, Ms, Rat	DyLight 488	WB	pab50835
PHD-1	Rabbit	Hu, Ms, Rat	DyLight 550	WB	pab50837
PHD-1	Rabbit	Hu, Ms, Rat	DyLight 650	WB	pab50834

## 6 HIF prolyl hydroxylase 2

### PHD-2 antibodies

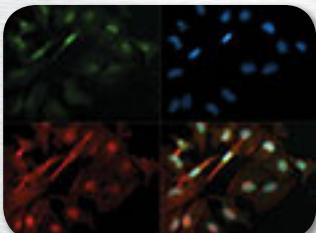
TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
PHD-2	366G/76/3	Mouse	Hu	-	IHC - P, WB	mab50960
PHD-2	366G/76/3	Mouse	Hu	Biotin	IHC - P, WB	mab50961
PHD-2	366G/76/3	Mouse	Hu	HRP	IHC - P, WB	mab50964
PHD-2	366G/76/3	Mouse	Hu	DyLight 488	IHC - P, WB	mab50963
PHD-2	366G/76/3	Mouse	Hu	DyLight 550	IHC - P, WB	mab50965
PHD-2	366G/76/3	Mouse	Hu	DyLight 650	IHC - P, WB	mab50962
PHD-2	-	Rabbit	Hu	-	FC, IHC, IP, WB	pab50102
PHD-2	-	Rabbit	Ms	-	IHC, IP, WB	pab50205
PHD-2	-	Rabbit	Hu	Biotin	FC, WB	pab50460
PHD-2	-	Rabbit	Hu	Biotin	WB	pab50465
PHD-2	-	Rabbit	Ms	Biotin	IHC, IP, WB	pab50617
PHD-2	-	Rabbit	Hu	HRP	WB	pab50463
PHD-2	-	Rabbit	Hu	HRP	WB	pab50468
PHD-2	-	Rabbit	Ms	HRP	IHC, IP, WB	pab50620
PHD-2	-	Rabbit	Hu	DyLight 488	FC, WB	pab50462
PHD-2	-	Rabbit	Hu	DyLight 488	WB	pab50467
PHD-2	-	Rabbit	Ms	DyLight 488	IHC, IP, WB	pab50619
PHD-2	-	Rabbit	Hu	DyLight 550	FC, WB	pab50464
PHD-2	-	Rabbit	Hu	DyLight 550	WB	pab50469
PHD-2	-	Rabbit	Ms	DyLight 550	IHC, IP, WB	pab50621
PHD-2	-	Rabbit	Hu	DyLight 650	FC, WB	pab50461
PHD-2	-	Rabbit	Hu	DyLight 650	WB	pab50466
PHD-2	-	Rabbit	Ms	DyLight 650	IHC, IP, WB	pab50618

## 7 HIF prolyl hydroxylase 3

### PHD-3 antibodies

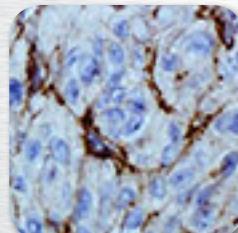
TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
PHD-3	A1.10	Mouse	Hu	-	WB	mab50938
PHD-3	A1.10	Mouse	Hu	Biotin	WB	mab50939
PHD-3	A1.10	Mouse	Hu	HRP	WB	mab50942
PHD-3	A1.10	Mouse	Hu	DyLight 488	WB	mab50941
PHD-3	A1.10	Mouse	Hu	DyLight 550	WB	mab50943
PHD-3	A1.10	Mouse	Hu	DyLight 650	WB	mab50940
PHD-3	EG188e/d5	Mouse	Hu, Mk	-	IHC - P, WB	mab50974
PHD-3	EG188e/d5	Mouse	Hu, Mk	Biotin	IHC - P, WB	mab50975
PHD-3	EG188e/d5	Mouse	Hu, Mk	HRP	IHC - P, WB	mab50978
PHD-3	EG188e/d5	Mouse	Hu, Mk	DyLight 488	IHC - P, WB	mab50977
PHD-3	EG188e/d5	Mouse	Hu, Mk	DyLight 550	IHC - P, WB	mab50979
PHD-3	EG188e/d5	Mouse	Hu, Mk	DyLight 650	IHC - P, WB	mab50976
PHD-3	-	Rabbit	Hu, Rat	Biotin	WB	pab50470
PHD-3	-	Rabbit	Hu, Ms	Biotin	WB	pab50818
PHD-3	-	Rabbit	Hu, Rat	HRP	WB	pab50473
PHD-3	-	Rabbit	Hu, Ms	HRP	WB	pab50821
PHD-3	-	Rabbit	Hu, Rat	DyLight 488	WB	pab50472
PHD-3	-	Rabbit	Hu, Ms	DyLight 488	WB	pab50820
PHD-3	-	Rabbit	Hu, Rat	DyLight 550	WB	pab50474
PHD-3	-	Rabbit	Hu, Ms	DyLight 550	WB	pab50822
PHD-3	-	Rabbit	Hu, Rat	DyLight 650	WB	pab50471
PHD-3	-	Rabbit	Hu, Ms	DyLight 650	WB	pab50819

**PHD-3  
mab50938**



Anti-PHD-3 antibody ICC/IF staining of HeLa cells (green). Nuclei and alpha-tubulin were counterstained using DAPI (blue) and DyLight 550 (red) respectively.

**PHD-3  
mab50974**



Anti-PHD-3 antibody IHC staining of human renal cancer using DAB and hematoxylin counterstain.

## 8

### HIF prolyl hydroxylase 4

### PHD-4 antibodies

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
PHD-4	Rabbit	Hu	Biotin	WB	pab50812
PHD-4	Rabbit	Hu	HRP	WB	pab50815
PHD-4	Rabbit	Hu	DyLight 488	WB	pab50814
PHD-4	Rabbit	Hu	DyLight 550	WB	pab50816
PHD-4	Rabbit	Hu	DyLight 650	WB	pab50813

# Vascular Endothelium Growth Factors (VEGF)

As their name suggests, Vascular Endothelium Growth Factors (VEGFs) are a family of proteins which play a critical role in angiogenesis by stimulating the proliferation and migration of blood vessels endothelial cells. This family comprises five members in mammals: VEGF-A (also referred to as VEGF) to VEGF-D as well as the Placental Growth Factor (PGF).

Alternative splicing of mRNA from the 8-exon VEGFA gene leads to multiple isoforms of VEGF-A, based on exons 6 and 7, and divides them into two groups according to the eighth exon splice site: pro-angiogenic isoforms (noted VEGF<sub>xxx</sub>) and anti-angiogenic isoforms (noted VEGF<sub>xxx</sub>b).

More than other living cells, tumor cells have high needs in oxygen and nutrients to sustain their rapid growth. Cells located in the centre of the tumor usually have a lack of oxygen supply and then produce high levels of VEGFs to stimulate angiogenesis in their neighbourhood. Inhibition of VEGFs activity thus led to promising clinical studies to inhibit cancer cells proliferation.

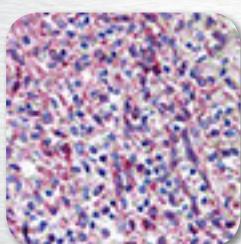
## 9

## VEGF family members

### VEGFs antibodies

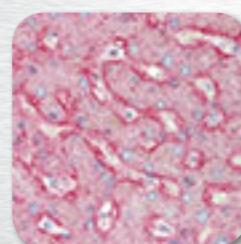
TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
VEGF-A	VG1	Mouse	Hu, Ms, Rat, Ca	-	IF, IHC - F, IHC - P, WB	mab50079
VEGF-A	VG-1	Mouse	Hu	-	ELISA, IHC - P, WB	mab71496
VEGF-A	5C3.F8	Mouse	Hu	-	IHC - P, WB	mab71688
VEGF-A	-	Rabbit	Hu, Ms, Rat	-	WB	pab50210
VEGF-A	-	Rabbit	Hu, Ms, Rat, ...	Biotin	WB	pab50682
VEGF-A	-	Rabbit	Hu, Ms, Rat, ...	HRP	ELISA, WB	pab50685
VEGF-A	-	Rabbit	Hu, Ms, Rat, ...	DyLight 488	WB	pab50684
VEGF-A	-	Rabbit	Hu, Ms, Rat, ...	DyLight 550	WB	pab50686
VEGF-A	-	Rabbit	Hu, Ms, Rat, ...	DyLight 650	WB	pab50683
VEGF-A	-	Rabbit	Hu	-	ELISA, IHC - P, WB	pab75138
VEGF-A	-	Rabbit	Rat	-	IHC - P, WB	pab75143
VEGF-A	-	Rabbit	Hu, Ms, Rat	-	IHC - P	pab75185
VEGF <sub>165</sub>	-	Rabbit	Hu, Ms, Rat, ...	-	ELISA, IHC, WB	pab0928-P
VEGF <sub>165</sub> b	-	Rabbit	Hu	-	ELISA, IHC, WB	pab0929-P
VEGF-C	-	Mouse	Hu	-	IHC - P, WB	mab71767
VEGF-C	-	Rabbit	Hu	-	IHC - P, WB	pab75140
VEGF-C	-	Rabbit	Hu	-	FC, IHC - P, WB	pab76416

VEGF-A  
pab75185



Anti-VEGF-A antibody IHC staining of formalin-fixed, paraffin-embedded human spleen red pulp.

VEGF-C  
pab76416



Anti-VEGF-C antibody IHC staining of formalin-fixed, paraffin-embedded human liver.

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# 10 VEGF receptors

## VEGF receptor 1 antibodies

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
VEGF R1	Rabbit	Hu	-	ELISA, IHC, WB	pab0511
VEGF R1	Rabbit	Hu, Ms	-	WB	pab50166
VEGF R1	Rabbit	Hu	DyLight 488	FC, WB	pab50968
VEGF R1	Rabbit	Hu	DyLight 550	FC, WB	pab50969
VEGF R1	Rabbit	Hu	DyLight 650	FC, WB	pab50967
VEGF R1 (N-Terminus)	Rabbit	Hu	-	IHC - P	pab74002
VEGF R1 (C-Terminus)	Rabbit	Hu	-	IHC - P	pab73905

## VEGF receptor 2 antibodies

TARGET	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
VEGF R2	Rabbit	Hu, Ms	-	IP, WB	pab50043
VEGF R2	Rabbit	Hu, Ms, Rat	-	WB	pab50167
VEGF R2	Rabbit	Hu, Ms, Rat	-	WB	pab50168
VEGF R2	Rabbit	Hu, Ms, Rat	-	WB	pab50209
VEGF R2	Rabbit	Hu	Biotin	WB	pab50971
VEGF R2	Rabbit	Hu	Biotin	WB	pab50977
VEGF R2	Rabbit	Hu	HRP	WB	pab50974
VEGF R2	Rabbit	Hu	HRP	WB	pab50980
VEGF R2	Rabbit	Hu, Ms, Rat	DyLight 488	FC, WB	pab50689
VEGF R2	Rabbit	Hu	DyLight 488	WB	pab50973
VEGF R2	Rabbit	Hu	DyLight 488	WB	pab50979
VEGF R2	Rabbit	Hu	DyLight 550	FC, WB	pab50690
VEGF R2	Rabbit	Hu	DyLight 550	WB	pab50975
VEGF R2	Rabbit	Hu	DyLight 550	WB	pab50981
VEGF R2	Rabbit	Hu	DyLight 650	FC, WB	pab50688
VEGF R2	Rabbit	Hu	DyLight 650	WB	pab50972
VEGF R2	Rabbit	Hu	DyLight 650	WB	pab50978
VEGF R2 (Internal)	Rabbit	Hu	-	IHC - P	pab74017
VEGF R2 (Internal)	Rabbit	Hu	-	IHC - P	pab74021

## VEGF receptor 3 antibodies

TARGET	CLONE	HOST	SPECIES	LABELLING	APPLICATIONS	CAT #
VEGF R3	AFL4	Rat	Ms	-	FC, IHC, IP, WB	mab71341
VEGF R3	-	Rabbit	Hu, Ms, Rat	-	IHC - P, IP, WB	pab75788



# Custom Services

## Custom Polyclonal Antibodies Development

- Anti-Protein
- Anti-Peptide
- Anti-Post-Translational Modification

## Custom Monoclonal Antibodies Development

## Monoclonal Antibodies Production

*In vivo*

*In vitro*

## Peptide Synthesis

## Antibody Purification

## Biomolecule Labelling

## Development of Immunoaffinity Supports (columns)

## Functionalisation of Solid Phases (microtitration plates)



**Expertise**  
**Advice for project design and optimisation of R&D processes**  
**Customised technical troubleshooting support**  
**Active follow-up of projects**

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