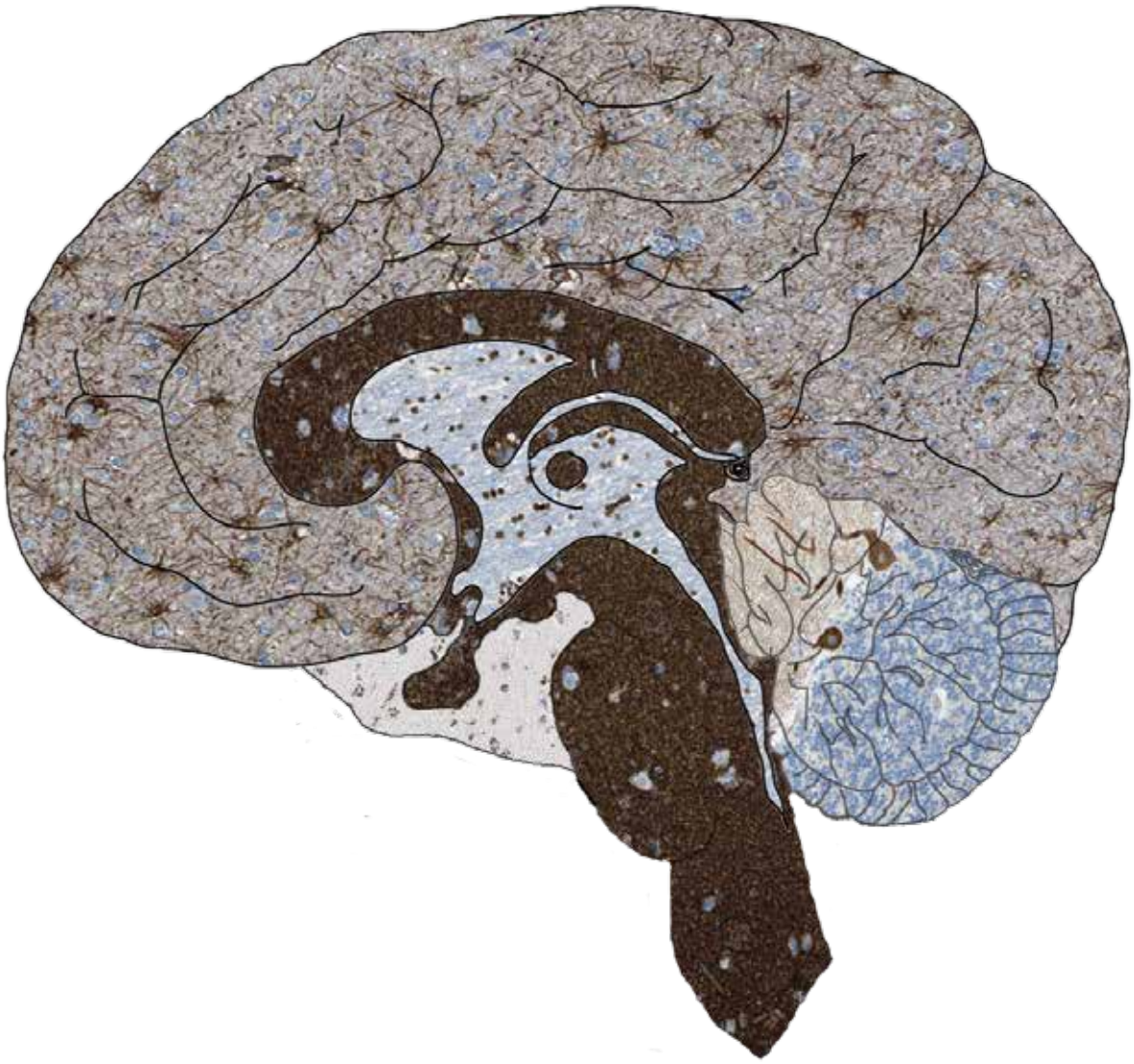
ATLAS ANTIBODIES IN NEUROSCIENCE

ATLAS ANTIBODIES



ATLAS ANTIBODIES

Front cover:
IHC-IF staining in mouse brain using Anti-USP20 (HPA007008)

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THE HUMAN PROTEIN ATLAS

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The Human Protein Atlas is Characterizing the Human Proteome

The Human Protein Atlas (HPA) project was initiated in 2003 by Swedish researchers, headed by Professor Mathias Uhlén, and funded by the Knut and Alice Wallenberg foundation[1,2]. It is a unique world leading effort performing systematic exploration of the human proteome using antibodies.

The aim of the HPA project is to present an expression map of the complete human proteome. To accomplish this, highly specific Triple A polyclonal antibodies are developed to all protein coding human genes and protein profiling is established in a multitude of tissues and cells using tissue arrays. The antibodies are tested in immunohistochemistry (IHC), Western blot (WB) analysis, protein array assay and immunofluorescent based confocal microscopy (ICC-IF).

The Human Protein Atlas, October 2015

The 14th version of the Human Protein Atlas, released in April 2015, presents a tissue-based map of the complete human proteome. The extensive amount of data is divided into four separate 'sub atlases': the Tissue Atlas, the Cancer Atlas, the Subcell Atlas and the Cell Line Atlas. For all proteins represented in the Tissue Atlas, the expression profiles are based on IHC analysis on a large number of human tissues. The presentation of protein expression data in correlation to RNA sequencing data for each gene has now been included. In the Cancer Atlas, differentially expressed genes in several cancers can be studied, while the Subcell Atlas presents subcellular localization by confocal microscopy. Additional information about protein expression in common cell lines is included in the Cell Line Atlas, which has become an appreciated toolbox for research.

Tissue microarrays containing samples from 44 different normal human tissues, 20 different cancer types and 44 different human cell lines are utilized within the project. The 44 normal tissues are present in triplicate samples and represent 82 different cell types. All normal tissue images have undergone pathology-based annotation of expression levels and are displayed on the normal Tissue Atlas presenting information regarding the expression profiles of human genes both on mRNA and protein level.

Validation in Human Neuro Tissues and Cell Lines

IHC images from human cerebellum, hippocampus, lateral ventricle wall and cerebral cortex tissues are available for the antibodies, as well as from stainings in the following brain cell lines: D341 Med, SH-SY5Y, U-138 MG, U-251 MG, U-87 MG. Malignant glioma tumor samples from up to 12 patients are presented for each antibody in the Cancer Atlas. In addition to IHC images, there are available immunofluorescence (ICC-IF) images from staining in U-251 MG cells for subcellular location information of the proteins.

HPA Mouse Brain Atlas

The protein atlas of the mouse brain project is a new addition to the Human Protein Atlas with the aim to increase the knowledge on protein expression and distribution in the mammalian brain. The basic architecture and organization of the brain, sequence of functional domains within proteins and expression of genes are largely preserved throughout mammalian evolution. This enabled a successful expansion of the current data on protein expression in 4 brain regions (cerebral cortex, lateral ventricle, hippocampus and cerebellum) in the human to over 120 brain regions and subfields containing additional cell types in the much smaller mouse brain using the same antibodies raised against human proteins.

The first release of the HPA Mouse Brain Atlas contains protein expression profiles of 80 genes selected based on global expression (brain vs. peripheral organs), differential expression in the brain (brain regions), cellular expression (neurons, glia and others) and function (physiology, development or disease).

References:

1. Uhlén M *et al.* (2010) Towards a knowledge-based Human Protein Atlas. Nat Biotechnol 28(12):1248-50.

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Triple A Polyclonals

Triple A Polyclonals - the Building Blocks of HPA

The uniqueness and low cross reactivity of Triple A Polyclonals to other proteins are due to a thorough selection of antigen regions, affinity purification on the recombinant antigen, validation using several methods and a stringent approval process.

Development

The Triple A Polyclonals are developed against recombinant human Protein Epitope Signature Tags (PrESTs) of approximately 50 to 150 amino acids. These protein fragments are designed, using a proprietary software, to contain unique epitopes present in the native protein suitable for triggering the generation of antibodies of high specificity. This is achieved by a complete human genome scanning to ensure that PrESTs with the lowest homology to other human proteins are used as antigens.

Approval

The approval of the Triple A Polyclonals relies on a combined validation of the experimental results using IHC, WB or ICC-IF, from RNA sequencing and from information obtained via bioinformatics prediction methods and literature. Since the literature is often inconclusive, an important objective of the HPA project has been to generate paired antibodies with non-overlapping epitopes towards the same protein target, allowing the results and validation of one antibody to be used to validate the other one.

Triple A Polyclonal catalog

Today, there are more than 18,000 Triple A Polyclonals and new antibodies are added each year.

The antibodies developed and characterized within the Human Protein Atlas project are made available to the scientific community by Atlas Antibodies under the brand name Triple A Polyclonals.

PrecisA Monoclonals

Atlas Antibodies also provide a selected number of mouse monoclonal antibodies, under the brand name PrecisA Monoclonals. The PrecisA Monoclonals catalog is regularly expanding with new products every year.

Unique Features

Special care is taken in offering clones recognizing only unique non-overlapping epitopes and/or isotypes. Using the same stringent PrEST production process and characterization procedure as for the Triple A Polyclonals, the PrecisA Monoclonals offer outstanding performance in approved applications, together with defined specificity, secured continuity and stable supply. In general they also permit high working dilutions and contribute to more standardized assay procedures.

Clone Selection

Functional characterization is performed on a large number of ELISA positive cell supernatants to select the optimal clones for each application prior to subcloning and expansion of selected hybridomas.

Epitope Mapping

Clones are epitope-mapped using synthetic overlapping peptides in a bead-based array format for selection of clones with non-overlapping epitopes only.

Isotyping

All PrecisA Monoclonals antibodies are isotyped to allow for multiplexing using isotype-specific secondary antibodies.

Hybridoma Cell Cultivation

Atlas Antibodies use in-vitro methods for the production scale-up phase thus replacing the use of mice for production of ascites fluid.

Antibody Characterization

The characterization of PrecisA Monoclonals starts with an extensive literature search to select the most relevant and clinically significant tissues to use for IHC characterization. Often there are more than one tissue type displayed in the IHC application data for each antibody. In addition to positive stained tissue, a negative control tissue staining is also displayed and if relevant, clinical cancer tissue staining.

The Western blot (WB) characterization includes results from endogenous human cell or tissue protein lysates or optionally recombinant full-length human protein lysates.

Each PrecisA Monoclonal is thus supplied with the most relevant characterization data for its specific target.

PrecisA Monoclonals are developed by Atlas Antibodies, based on the knowledge from the Human Protein Atlas with careful antigen design and extended validation of antibody performance. With precise epitope information following all monoclonals, these precise, accurate and targeted antibodies are denoted PrecisA Monoclonals.

The product numbers of Triple A Polyclonals start with ”HPA” and of PrecisA Monoclonals with ”AMAb”.

NEUROSCIENCE MARKER PANEL

The newly developed neuroscience marker panel consists of PrecisA Monoclonals antibodies designed to recognize the main anatomical and neurochemical cell types in rodent and human nervous system.

We have taken great care to be able to offer these markers as tools for mapping the structures and cell types in the central and peripheral nervous system.

• Selected target proteins are expressed only by a single cell type

• IHC-validation in rat, mouse and human tissues

• WB-validation in mouse and human tissue lysates for the majority of the markers

• Antibodies of different isotypes, allowing for multiplexing experiments

PrecisA MONOCLONALS™
DESIGNED BY RESEARCHERS FOR RESEARCHERS

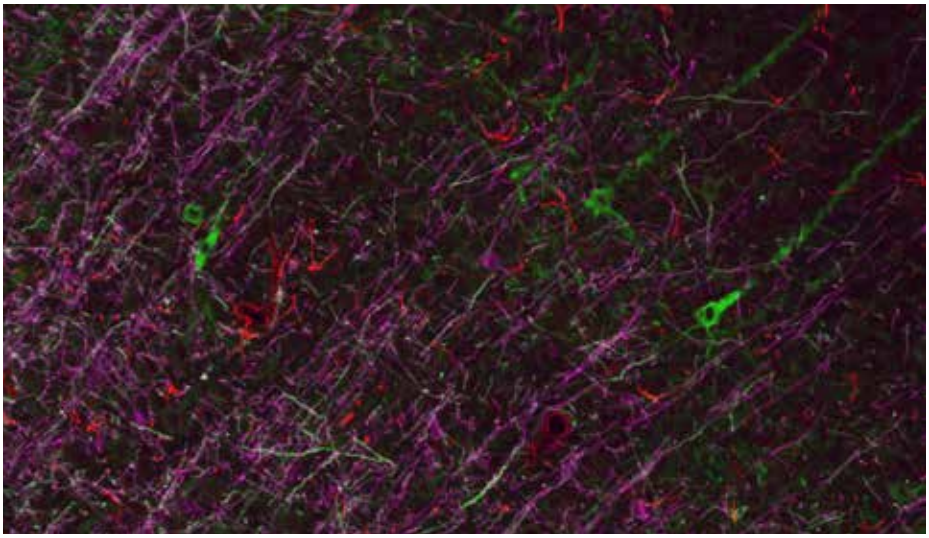


Figure 1.
Multiplexed IHC-IF staining of a coronal section of rat brain visualizing neurons in green, olygodendrocytes in magenta and astrocytes in red. Anti-NEFM antibody of isotype IgG2b (AMAb91030 is used to show neurons and their processes, olygodendrocytes are detected by Anti-CNP antibody of isotype IgG2a (AMAb91068) and astrocytes by Anti-GFAP antibody of isotype IgG1 (AMAb91033).

Markers for Neural Lineage and Signaling

The Neuroscience Marker panel consists of 34 antibodies targeting neural lineage markers and signaling markers. The panel includes neural lineage markers for neurons, astrocytes and oligodendrocytes/ Schwann cells. Signaling markers target the glutamate, GABA, acetylcholine, noradrenaline, dopamine and serotonin systems.

Figure 1 shows coronal section of rat brain labeled with markers for three different cell and astrocytes. The antibodies used are Anti-NEFM (AMAb91030), Anti-CNP (AMAb91068) and Anti-GFAP (AMAb91033) respectively.

In Figure 2, some of the major brain neurotransmitter systems are shown on sagittal mouse brain section. The image demonstrates the GABAergic system, glutamatergic system and acetylcholine system, here visualized by the Anti-GAD1 (AMAb91076), Anti-VGLUT1(AMAb91041) and Anti-CHAT (AMAb91129) antibodies respectively.

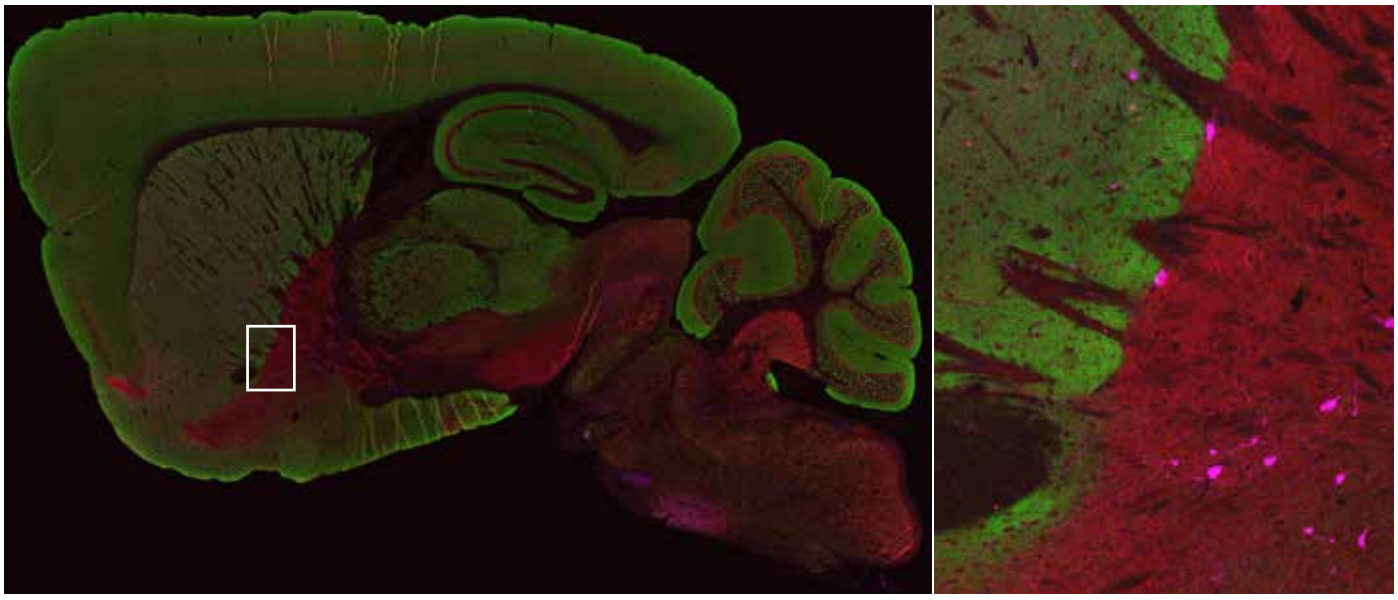


Figure 2.
Left: Multiplexed IHC-IF staining of sagittal mouse brain section showing the GABAergic system in red, glutamatergic system in green and acetylcholine system in magenta. The Anti-GAD1 antibody of isotype IgG2a (AMAb91076) is used as marker for the GABAergic system, Anti-VGLUT1 antibody of isotype IgG2b (AMAb91041) for the glutamatergic system and Anti-CHAT antibody of isotype IgG1 (AMAb91129) is used to visualize the acetylcholine system. Right: High-power image demonstrates the three systems in the basal forebrain (caudate putamen/globus pallidus), using the same antibodies.

High Specificity and Interspecies Reactivity

PrecisA Monoclonals Neuroscience markers show high specificity and selectivity for their target proteins. On the right, there is an example of the Anti-NET (AMAb91116) monoclonal antibody. This antibody recognizes the norepinephrine/noradrenaline transporter (NET, SLC6A2) and can be used to detect both noradrenergic cell bodies and processes in rat, mouse and human nervous system. The Anti-NET antibody AMAb91116 is highly-specific and does not show any cross-reactivity with e.g. dopamine transporter (SLC6A3, DAT).

Figure 3 shows specific staining of noradrenergic cell bodies and fibers in rat locus coeruleus (A), noradrenergic fibers in mouse cerebral cortex (B) and noradrenergic cell bodies and fibers in human locus coeruleus (C). The specificity of the AMAb91116 is further demonstrated on image D. It shows a coronal section of rat brain at the level of caudate putamen stained with Anti-NET (AMAb91116) in green and Anti-DAT (AMAb91125) in magenta. The caudate putamen is virtually devoid of noradrenaline fibers, only single ones can sometimes be observed (in green), while a dense network of thin dopamine fibers is seen in caudate putamen (in magenta).

Table 1.
Description of the PrecisA Monoclonals Neuroscience Markers.

Marker for	Product Name	Product Number	Validated Applications	Isotype
Neurons	Anti-NEFM (NF160)	AMAb91027	IHC*, WB*	IgG1 K
Neurons	Anti-NEFM (NF160)	AMAb91028	IHC*, WB*	IgG1 K
Neurons	Anti-NEFM (NF160)	AMAb91029	IHC*, WB*	IgG2a K
Neurons	Anti-NEFM (NF160)	AMAb91030	IHC*, WB*	IgG2b K
Neurons	Anti-NEFH (NF200)	AMAb91025	IHC, WB	IgG1 K
Neurons	Anti-UCHL1 (PGP9.5)	AMAb91145	IHC*, WB*	IgG1
Astrocytes	Anti-GFAP	AMAb91033	IHC*, WB*	IgG1 K
Astrocytes	Anti-S100B	AMAb91038	IHC*, WB	IgG1 K
Astrocytes	Anti-GLUL	AMAb91101	IHC*, WB*	IgG1
Astrocytes	Anti-GLUL	AMAb91102	IHC*, WB*	IgG1
Astrocytes	Anti-GLUL	AMAb91103	IHC*, WB*	IgG2a K
Schwann cells, oligodendrocytes	Anti-MBP	AMAb91062	IHC*, WB*	IgG2a K
Schwann cells, oligodendrocytes	Anti-MBP	AMAb91063	IHC*, WB*	IgG1
Schwann cells, oligodendrocytes	Anti-MBP	AMAb91064	IHC*, WB*	IgG1
Oligodendrocytes	Anti-MOG	AMAb91066	IHC*, WB	IgG1
Oligodendrocytes	Anti-MOG	AMAb91067	IHC*, WB	IgG1
Oligodendrocytes	Anti-CNP	AMAb91068	IHC*, WB*	IgG2a K
Oligodendrocytes	Anti-CNP	AMAb91069	IHC*, WB*	IgG1
Oligodendrocytes	Anti-CNP	AMAb91072	IHC*, WB*	IgG2b K
Acetylcholine neurons	Anti-CHAT	AMAb91130	IHC*	IgG2b
Acetylcholine neurons	Anti-CHAT	AMAb91129	IHC*	IgG1
Glutamate neurons	Anti-SLC17A7 (VGLUT1)	AMAb91041	IHC*, WB	IgG2b K
Glutamate neurons	Anti-SLC17A6 (VGLUT2)	AMAb91081	IHC*	IgG1
Glutamate neurons	Anti-SLC17A6 (VGLUT2)	AMAb91086	IHC*	IgG1
GABA neurons	Anti-SLC32A1 (VGAT)	AMAb91043	IHC*	IgG1 λ
GABA neurons	Anti-GAD1 (GAD67)	AMAb91076	IHC*, WB	IgG2a K
GABA neurons	Anti-GAD1 (GAD67)	AMAb91078	IHC*, WB	IgG1
GABA neurons	Anti-GAD1 (GAD67)	AMAb91079	IHC*, WB*	IgG2b K
GABA neurons	Anti-GAD2 (GAD65)	AMAb91048	IHC*, WB*	IgG1 K
Dopamine neurons	Anti-SLC6A3 (DAT)	AMAb91125	IHC*	IgG1
Dopamine neurons	Anti-DDC	AMAb91089	IHC*, WB	IgG1
Noradrenaline neurons	Anti-SLC6A2 (NET)	AMAb91116	IHC*	IgG1
Dopamine and noradrenaline	Anti-TH	AMAb91112	IHC*	IgG1
Serotonin neurons	Anti-TPH2	AMAb91108	IHC*	IgG1

* Validated for human and rodent samples

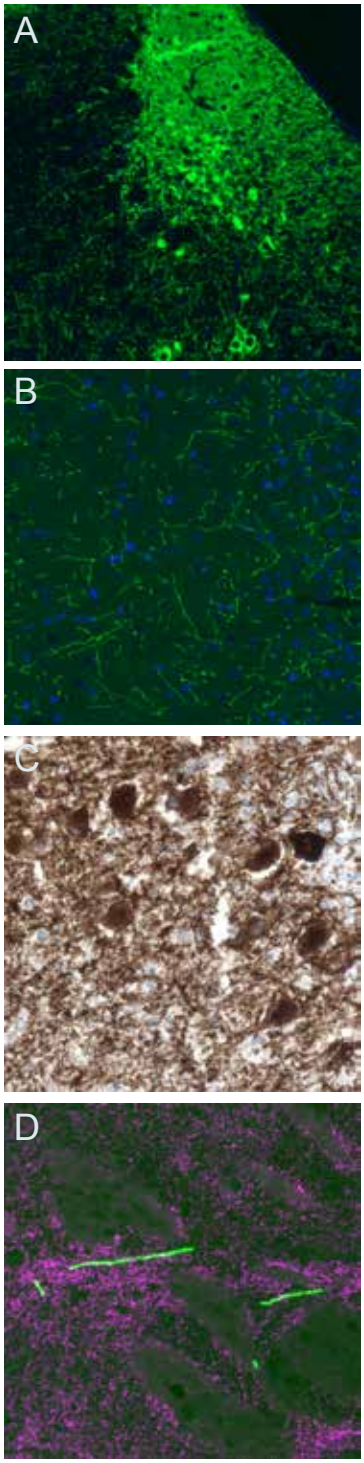
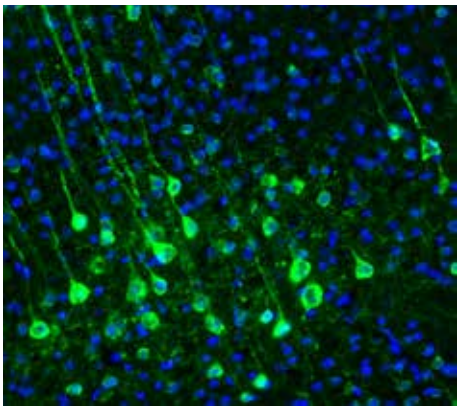


Figure 3.
IHC-IF (A, B, D) and bright-filed (C) IHC staining demonstrating specificity and selectivity of Anti-NET antibody (AMAb91116) in rat (A, D), mouse (B) and human (C) brain. Staining with Anti-NET (AMAb91116) is shown in green (A, B, D) and in brown (C). DAT immunoreactivity is visualized in magenta using Anti-DAT antibody (AMAb91125).

SIGNALING

Product Name	Product Number	Applications	Antigen seq identity to mouse / rat
Anti-ATF2	HPA022134	IHC,WB*,ICC-IF	99 / 99%
Anti-ATF3	AMAb90909	IHC	92 / 92%
Anti-ATF3	HPA001562[1-3]	IHC,WB*,ICC-IF	92 / 92%
Anti-ATP1B1	HPA012911	IHC,WB	93 / 93%
Anti-ATP1B2	HPA010698	IHC	96 / 88%
Anti-CAMK2B	HPA026307	IHC,WB*	96 / 96%
Anti-CAMK2D	HPA026281	IHC	100 / 97%
Anti-C-FOS	HPA018531[4]	IHC,WB*,ICC-IF	94 / 94%
Anti-CHAT	AMAb91130	IHC	96 / 96%
Anti-CHAT	HPA048547	IHC	96 / 96%
Anti-CHRM1 (M1 mAChR)	HPA014101	IHC	98 / 97%
Anti-CHRM2 (M2 AChR)	HPA029795	IHC	88 / 86%
Anti-CHRNA7 (alpha7 nAChR)	HPA029422	IHC,WB	98 / 95%
Anti-CLIC4	HPA008019[5,6]	IHC,WB,ICC-IF	98 / 97%
Anti-CREB1	HPA019150	IHC,WB*,ICC-IF	100 / 100%

* WB both in human and rodent samples



Calmodulin-dependent protein kinase II beta is expressed in various neuron populations in the mouse brain including pyramidal neurons in the somatosensory cortex. This is illustrated using the Anti-CAMK2B antibody (HPA026307).

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4. Pio R *et al.* Early Growth Response 3 (Egr3) Is Highly Over-Expressed in Non-Relapsing Prostate Cancer but Not in Relapsing Prostate Cancer. *PLoS One* 2013 28(1):e54096.

5. Lomnytska MI *et al.* Impact of genomic stability on protein expression in endometrioid endometrial cancer *Br J Cancer* 2012 Mar 27; 106(7):1297-1305. Epub 2012/03/13.

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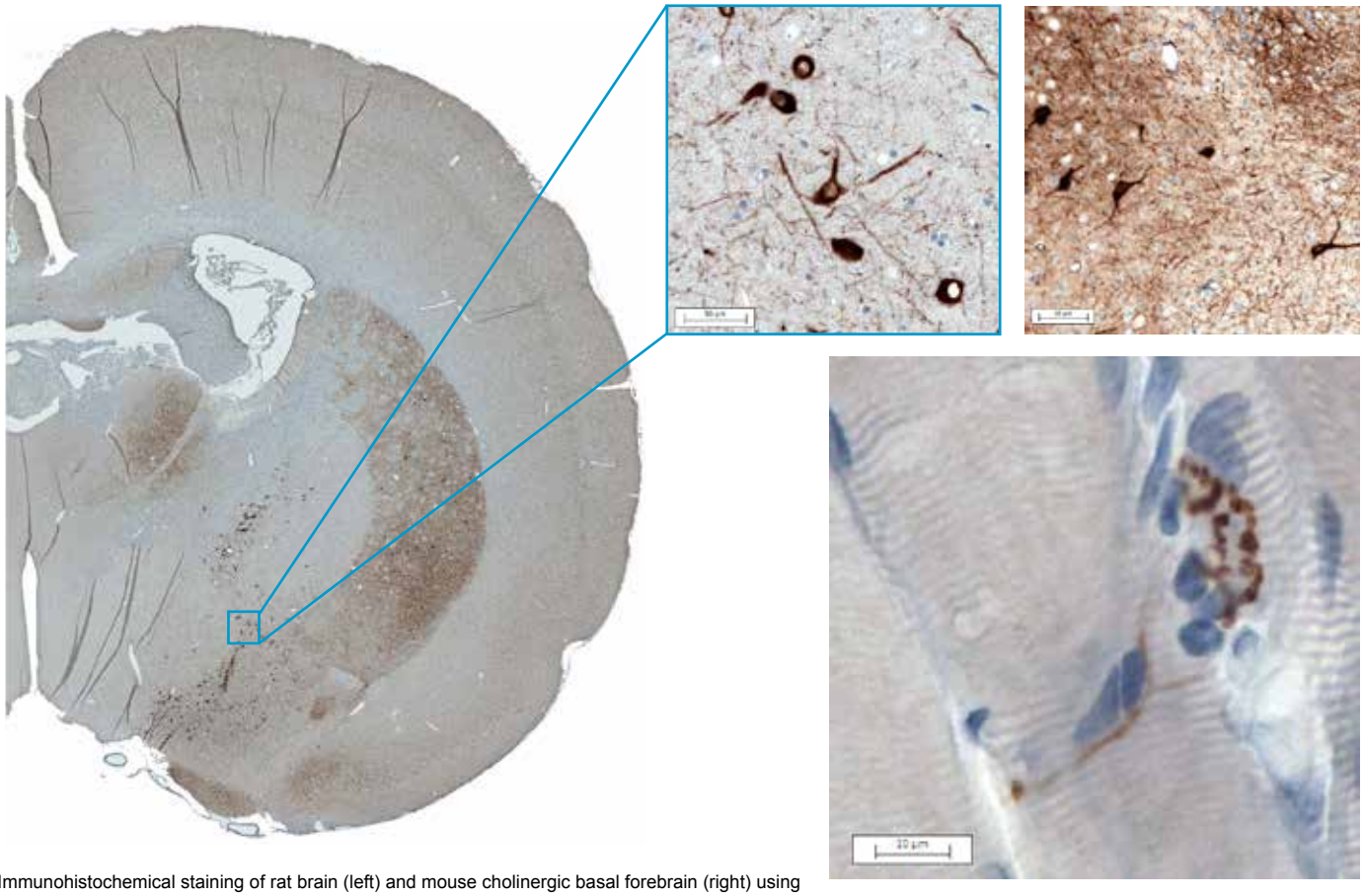

Immunohistochemical staining of rat brain (left) and mouse cholinergic basal forebrain (right) using Anti-CHAT antibody (HPA048547) shows strong immunoreactivity in cholinergic cell bodies and terminals. High power image in the lower right corner demonstrates ChAT immunoreactivity in the motor end-plates in rat skeletal muscle. ChAT=choline O-acetyltransferase, enzyme catalyzing biosynthesis of acetylcholin.

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-DAT	HPA013602	IHC,WB	85 / 85%
Anti-DDC	AMAb91089	IHC,WB	90 / 88%
Anti-DDC	HPA017742	IHC,WB*,ICC-IF	90 / 88%
Anti-EAAC1	HPA020086	IHC	77 / 79%
Anti-EAAT2	HPA009172	IHC	87 / 89%
Anti-GABRA3	HPA000839	IHC,WB*	91 / 93%
Anti-GABRB1	HPA051297	IHC	97 / 100%
Anti-GABRG1	HPA035622[7]	IHC	96 / 94%
Anti-GAD1 (GAD67)	AMAb91076	IHC,WB	
Anti-GAD1	HPA058412	IHC,WB	94 / 94%
Anti-GAD2	AMAb91048	IHC,WB*	
Anti-GAD2	HPA044637	IHC	84 / 88%
Anti-GAT1	HPA013341	IHC,WB*	98 / 98%
Anti-GAT3	HPA037981	IHC,WB	85 / 87%
Anti-GLUR2 (AMPA2)	HPA008441[8,9]	IHC	100 / 100%
Anti-HTR2A	HPA014011	IHC	95 / 97%
Anti-KCC4	HPA041652	IHC,WB*	84 / 82%
Anti-KCNJ5 (KIR3.4)	HPA017353[10]	IHC,WB	89 / 89%
Anti-KCNN2 (KCA2.2)	HPA038221	IHC	96 / 97%
Anti-KIF11[11]	HPA010568	IHC,WB*,ICC-IF	88 / 83%

* WB both in human and rodent samples

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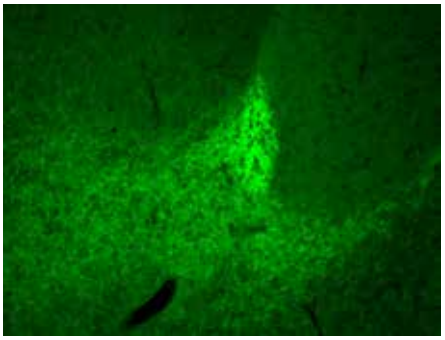
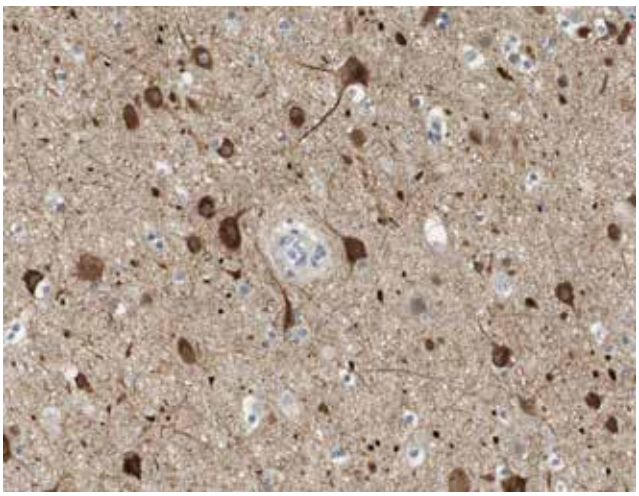


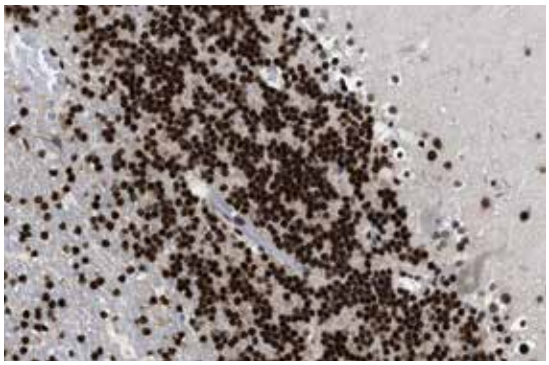
The gamma-aminobutyric acid (GABA) A receptor, alpha 3 (Anti-GABRA3) antibody (HPA000839) strongly labels fibers in various brain regions including the rat central amygdala.

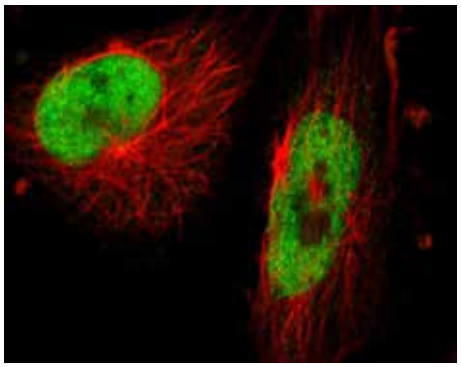


The Anti-MGLUR1 antibody (HPA015701) against glutamate receptor, metabotropic 1 strongly labels cortical perikarya, shown by IHC in human cerebral cortex tissue.

The Anti-KIF11 antibody (HPA010568) against Kinesin family member 11 strongly labels fibers in human hippocampus tissue.

The cAMP responsive element binding protein 1 is strongly expressed in the granular layer of the cerebellum and in human neuronal glioblastoma U251 cells. This is illustrated using the Anti-CREB1 antibody (HPA019150).





SIGNALING continued

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-KIF17	HPA032085	IHC,ICC-IF	85 / 82%
Anti-KIF18A	HPA039312	IHC,WB,ICC-IF	80 / 82%
Anti-KIF1A	HPA005442	IHC	95 / 96%
Anti-KIF1C	HPA024602	IHC,WB*,ICC-IF	81 / 83%
Anti-KIF21B	HPA027249	IHC	91 / 93%
Anti-KIF26B	HPA028562	IHC,ICC-IF	88 / 80%
Anti-KIF4A (KIF4A & B)	HPA034745	IHC,WB,ICC-IF	64 / 63%
Anti-KIF5A	HPA004469	IHC,WB*	91 / 88%
Anti-KIF5C	HPA035210	IHC,WB,ICC-IF	100/100%
Anti-KIF7	HPA043145	IHC,WB	69 / 69%
Anti-KIFAP3	HPA023742	IHC	100 / 100%
Anti-KCNC2	HPA019664	IHC,WB	71 / 99%
Anti-MAPK1 (ERK)	HPA030069	IHC,WB,ICC-IF	100 / 100%
Anti-MAPK3 (ERK1)	HPA005700	IHC,WB*	98 / 98%
Anti-MGLUR1	HPA015701	IHC	80 / 80%
Anti-MGLUR7	HPA036659	IHC	100 / 58%
Anti-MGLUR8	HPA051481	IHC	95 / 90%
Anti-NCS1	HPA019713	IHC,WB,ICC-IF	100 / 100%
Anti-PRKCA	HPA006563	IHC,WB*,ICC-IF	99 / 99%
Anti-PRKCH	HPA053709	IHC,ICC-IF	97 / 64%
Anti-PNMT	HPA051005	IHC,WB	89 / 92%
Anti-PRKACB (PKACB)	HPA029754	IHC	73 / 76%
Anti-PRKCZ	HPA021851	IHC,WB	94 / 94%
Anti-RAB3A	HPA003160	IHC	99 / 99%
Anti-RAP1GAP	HPA001922	IHC,WB*	92 / 91%
Anti-RAP1GAP2	HPA022896[12]	IHC,WB*,ICC-IF	94 / 95%
Anti-SLC17A6 (VGLUT2)	AMAb91981	IHC	85 / 85%
Anti-SLC17A6 (VGLUT2)	HPA039226	IHC,WB	85 / 85%
Anti-SLC17A7 (VGLUT1)	AMAb91041	IHC,WB	94 / 94%
Anti-SLC17A7 (VGLUT1)	HPA063679	IHC,WB	94 / 94%
Anti-SLC22A2	AMAb90792	IHC	84 / 77%
Anti-SLC22A2	HPA008567[13]	IHC,WB	84 / 77%
Anti-SLC32A1 (VGAT)	AMAb91943	IHC	95 / 93%
Anti-SLC32A1 (VGAT)	HPA058859	IHC	95 / 93%

* WB both in human and rodent samples

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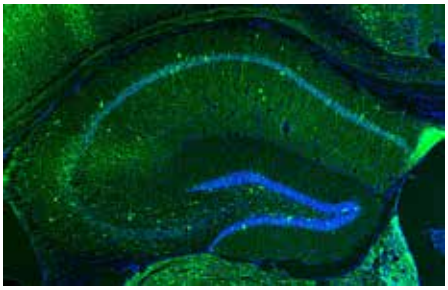
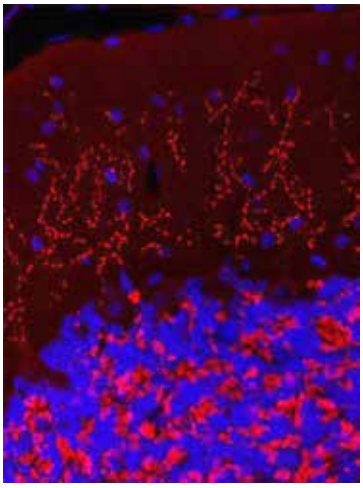
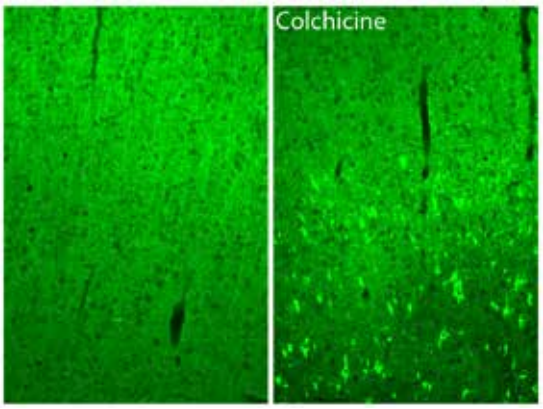
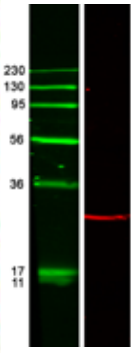


The GTPase-activating protein RAP1GAP is expressed in a subset of neurons including hippocampal interneurons in the mouse brain. This is illustrated using the Anti-RAP1GAP antibody (HPA001922).



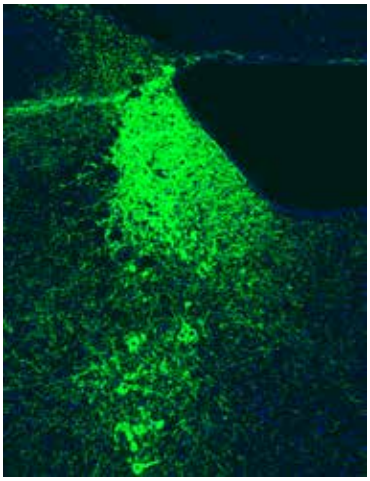
Vesicular glutamate transporter 2 (SLC17A6/VGluT2) mediates the uptake of glutamate into synaptic vesicles at presynaptic nerve terminals. Here shown using the Anti-SLC17A6 antibody (HPA039226) on rat cerebellum section.





The Anti-SNAP25 antibody (HPA001830) against synaptosomal-associated protein 25 strongly labels the synaptic field in the rat somatosensory cortex. Inhibition of axonal transport with colchicine arrests SNAP25 in perikarya.

In Western Blot, the HPA001830 antibody recognizes a band of expected target size (23 kDa).



The noradrenaline transporter (NET/SLC6A2) is responsible for reuptake of noradrenaline into presynaptic nerve terminals and stains noradrenergic fibers throughout the brain and labels noradrenergic neurons in the rat locus coeruleus. Illustrated here by the Anti-SLC6A2/NET antibody (AMAb91116).

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-SLC6A2 (NET)	AMAb91116	IHC	
Anti-SLC6A3 (DAT)	AMAb91125	IHC	85 / 85%
Anti-SLC6A3 (DAT)	HPA013602	IHC,WB	85 / 85%
Anti-SNAP25	HPA001830[14-16]	IHC,WB,ICC-IF	100 / 100%
Anti-SNAP29	HPA031823	IHC	89 / 92%
Anti-SST (SOM)	HPA019472	IHC,WB	98 / 98%
Anti-STXBP1	HPA008209	IHC,WB*,ICC-IF	100 / 100%
Anti-STXBP5	HPA039991[17]	IHC,WB,ICC-IF	98 / 98%
Anti-STXBP6	HPA003552	IHC,WB	99 / 99%
Anti-SYNGR1	HPA029673	IHC	90 / 88%
Anti-SYNPR	HPA061671	IHC,WB	97 / 97%
Anti-SYP	HPA002858	IHC,WB	83 / 83%
Anti-SYT1	HPA008394	IHC,WB	100 / 100%
Anti-SYT12	HPA011006	IHC,WB*	96 / 98%
Anti-SYT13	HPA046224	IHC	96 / 93%
Anti-SYT14	HPA036963	IHC,WB*,ICC-IF	87 / 27%
Anti-SYT16	HPA004199	IHC,WB	95 / 95%
Anti-TGFA	HPA042297	IHC,WB	93 / 93%
Anti-TH	AMAb91112	IHC	88 / 88%
Anti-TH	HPA061003	IHC	88 / 88%
Anti-TPH2 (NTPH)	AMAb91108	IHC	100 / 100%
Anti-TPH2 (NTPH)	HPA046274	IHC	100 / 100%
Anti-VAMP4	HPA050418	IHC,WB,ICC-IF	100 / 100%
Anti-VAMP7	HPA036733[18]	IHC,ICC-IF	98 / 93%

* WB both in human and rodent samples

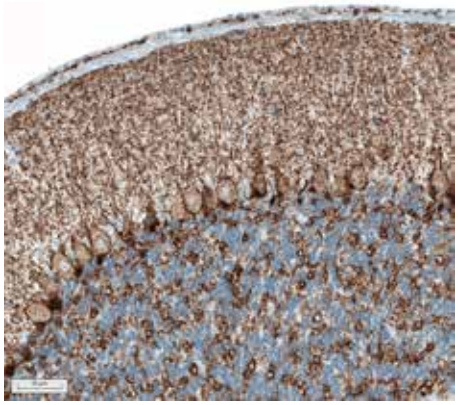
14. Mulder J *et al*. Tissue profiling of the mammalian central nervous system using human antibody-based proteomics. *Mol Cell Proteomics* 2009 Jul;8(7):1612-22.

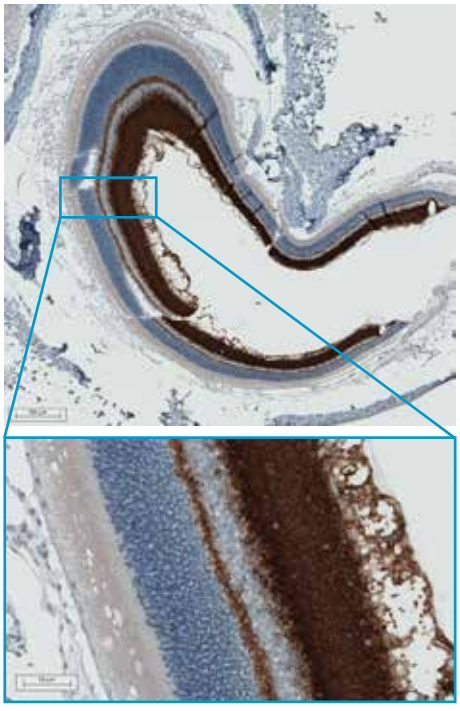
15. Lindskog C *et al*. Novel pancreatic beta cell-specific proteins: antibody-based proteomics for identification of new biomarker candidates. *J Proteomics* 2012 May 17;75(9):2611-20.

16. Cardoso TC *et al*. Immunohistochemical approach to the pathogenesis of clinical cases of bovine Herpesvirus type 5 infections. *Diagn Pathol* 2010 Sep 10;5:57.

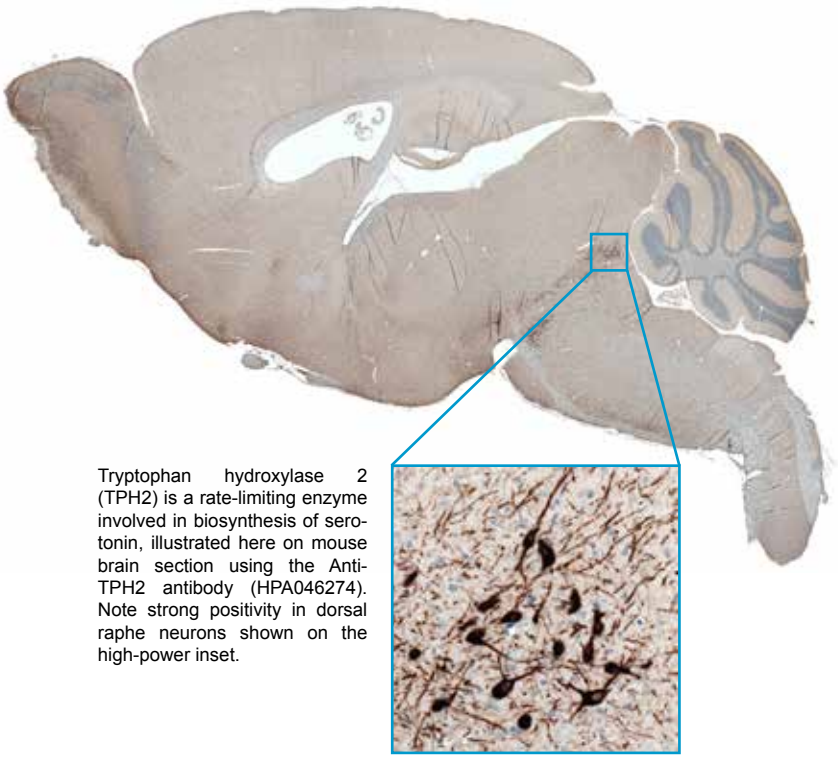
17. Ye S *et al*. Platelet secretion and hemostasis require syntaxin-binding protein STXBP5. *J Clin Invest* 2014/10/01 00:00; 124(10):4517-4528. Epub 2014/09/17.

18. Tannour-Louet M *et al*. Increased gene copy number of the vesicle SNARE VAMP7 disrupts human male urogenital development through altered estrogen action. *Nat Med* 2014/07/01 00:00; 20(7):715-724. Epub 2014/06/01.



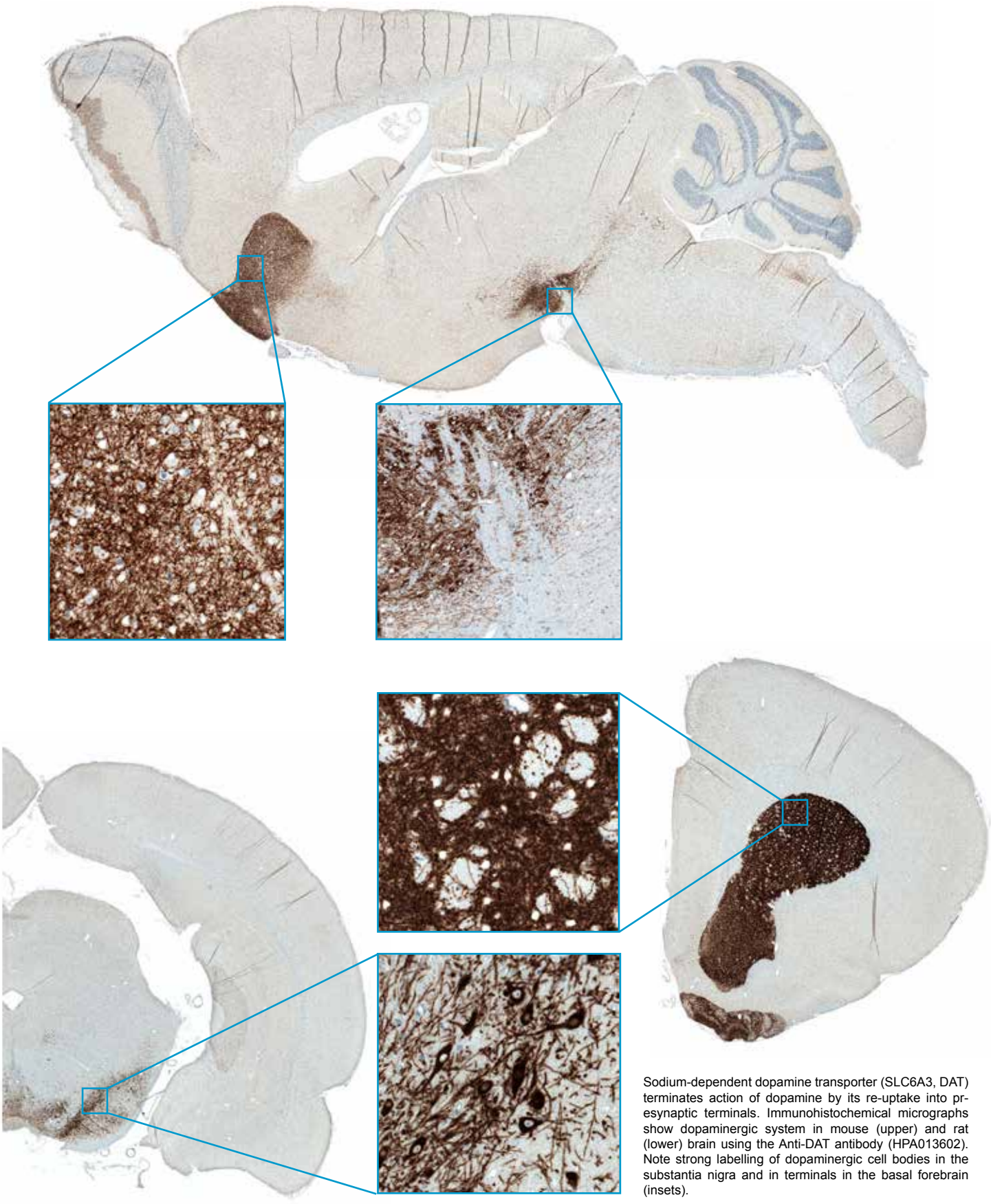


Vesicular inhibitory amino acid transporter SLC32A1 is crucial for uptake of the inhibitory neurotransmitters GABA and glycin into the synaptic vesicles. The micrographs show strong immunoreactivity in rat cerebellar cortex and retina using the Anti-SLC32A1 antibody (HPA058859).



Tryptophan hydroxylase 2 (TPH2) is a rate-limiting enzyme involved in biosynthesis of serotonin, illustrated here on mouse brain section using the Anti-TPH2 antibody (HPA046274). Note strong positivity in dorsal raphe neurons shown on the high-power inset.

SIGNALING continued



Sodium-dependent dopamine transporter (SLC6A3, DAT) terminates action of dopamine by its re-uptake into pr-esynaptic terminals. Immunohistochemical micrographs show dopaminergic system in mouse (upper) and rat (lower) brain using the Anti-DAT antibody (HPA013602). Note strong labelling of dopaminergic cell bodies in the substantia nigra and in terminals in the basal forebrain (insets).

NEURAL LINEAGE MARKERS

Product Name	Product Number	Subcategory	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-ACTN1	HPA006035	cytoskeleton	IHC,WB*	98 / 99%
Anti-ACTN4	HPA001873	cytoskeleton	IHC,WB*,ICC-IF	99 / 98%
Anti-AIF	HPA049234[1]	microglia	IHC	84 / 84%
Anti-CALB1 (CB)	HPA023099	calcium binding protein	IHC,WB,ICC-IF	98 / 99%
Anti-CALB2 (CR)	HPA007305	calcium binding protein	IHC,WB*,ICC-IF	100 / 100%
Anti-CD68	AMAb90874	microglia	IHC,WB	76 / 76%
Anti-CD68	HPA048982[2]	microglia	IHC	76 / 76%
Anti-CNP	AMAb91067	oligodendrocytes	IHC,WB*	76 / 77%
Anti-CNP	HPA023280	oligodendrocytes	IHC,WB,ICC-IF	76 / 77%
Anti-EZR	AMAb90976	astroglia	IHC,WB,ICC-IF	93 / 93%
Anti-EZR	HPA021616[3,4]	astroglia	IHC,WB*,ICC-IF	93 / 93%
Anti-GFAP	AMAb91033	astrocytes	IHC,WB	98 / 100%
Anti-GFAP	HPA056030	astrocytes	IHC,WB	98 / 100%
Anti-GLUL	AMAb91101	astrocytes	IHC,WB*	95 / 53%
Anti-GLUL	HPA007316[5,6]	astrocytes	IHC,WB	95 / 53%
Anti-ICAM5	HPA009083	adhesion molecule	IHC,ICC-IF	85 / 86%
Anti-INA	HPA008057	cytoskeleton	IHC,WB*,ICC-IF	83 / 84%
Anti-ITGAM (CD11b)	AMAb90911	microglia	IHC,WB	67 / 68%
Anti-ITGAM	HPA002274[7,8]	microglia	IHC,WB	67 / 68%
Anti-MAP1A	HPA039064	cytoskeleton	IHC	60 / 52%
Anti-MAP1B	HPA022275[9]	cytoskeleton	IHC,ICC-IF	85 / 86%
Anti-MAP2	HPA008273[10]	cytoskeleton	IHC,ICC-IF	96 / 96%
Anti-MBP	AMAb91062	Schwann cells	IHC,WB	97 / 97%
Anti-MBP	HPA049222	Schwann cells	IHC,WB	97 / 97%
Anti-MCAM	HPA008848	adhesion molecule	IHC	75 / 73%
Anti-MKI67 (Ki67)	AMAb90870	progenitors	IHC	68 / 68%
Anti-MKI67 (Ki67)	HPA000451[11,12]	progenitors	IHC,ICC-IF	66 / 67%
Anti-MOG	AMAb92066	oligodendrocytes	IHC,WB	91 / 89%
Anti-MOG	HPA021873	oligodendrocytes	IHC,WB	91 / 89%
Anti-MYO5A	HPA001356	cytoskeleton	IHC,ICC-IF	99 / 98%

* WB both in human and rodent samples

1. Silva K *et al.* Cortical neurons are a prominent source of the proinflammatory cytokine osteopontin in HIV-associated neurocognitive disorders. *J Neurovirol* 2015/01/01 21(2):174-185. Epub 2015/01/31.

2. Antoine Louveau *et al.* Structural and functional features of central nervous system lymphatic vessels *Nature* June 01, 2015.

3. Andersson G *et al.* Reduced expression of ezrin in urothelial bladder cancer signifies more advanced tumours and an impaired survival: validatory study of two independent patient cohorts. *BMC Urol* 1/01/01 14:36. Epub 2014/05/12.

4. Antoine Louveau *et al.* Structural and functional features of central nervous system lymphatic vessels *Nature* June 01, 2015.

5. Perisic L *et al.* Profiling of atherosclerotic lesions by gene and tissue microarrays reveals PCSK6 as a novel protease in unstable carotid atherosclerosis. *Arterioscler Thromb Vasc Biol* , 2013 Oct; 33(10):2432-43. Epub 2013 Aug 1.

6. Ko YH *et al.* Glutamine fuels a vicious cycle of autophagy in the tumor stroma and oxidative mitochondrial metabolism in epithelial cancer cells: Implications for preventing chemotherapy resistance *Cancer Biol Ther* 2011/12/15 00:00; 12(12):1085-1097. Epub 2011/12/15.

7. Zibert JR *et al*. Halting angiogenesis by non-viral somatic gene therapy alleviates psoriasis and murine psoriasiform skin lesions. *J Clin Invest* 2011 Jan 4;121(1):410-21.

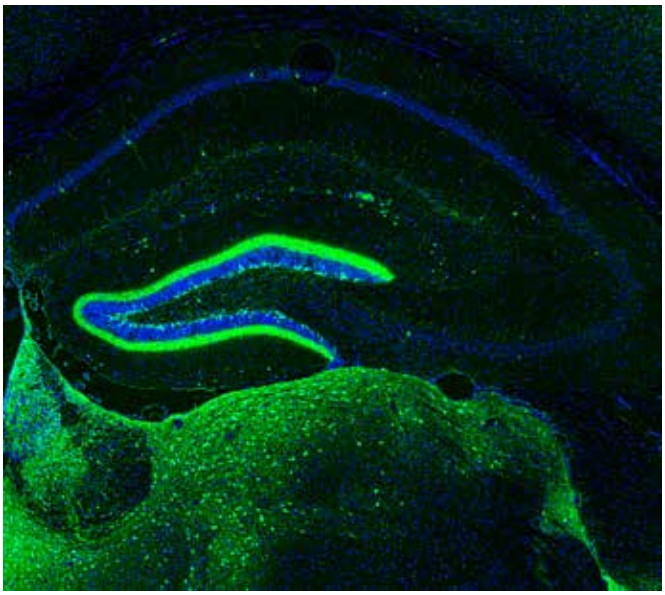
8. Pedersen ED *et al*. In situ deposition of complement in human acute brain ischaemia. *Scand J Immunol* 2009 Jun;69(6):555-62.

9. Claudio Isella *et al.* Stromal contribution to the colorectal cancer transcriptome. *Nature Genetics* February 23, 2015.

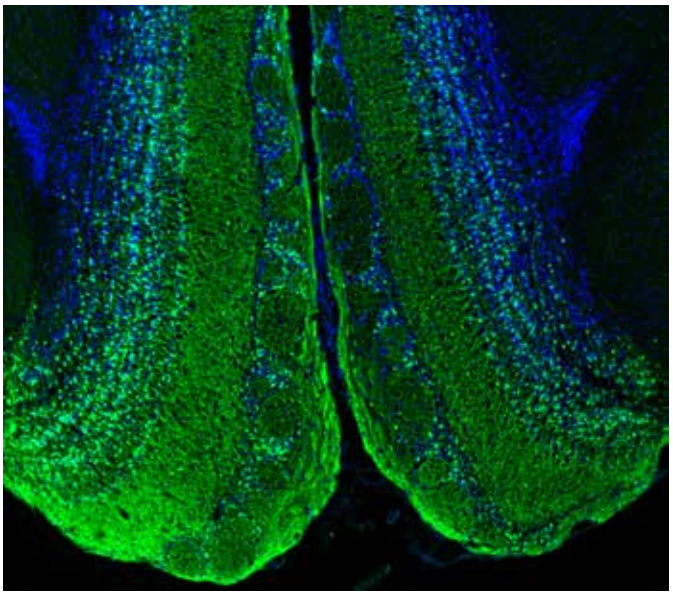
10. Lee DA *et al*. Tanycytes of the hypothalamic median eminence form a diet-responsive neurogenic niche. *Nat Neurosci* 2012 Mar 25;15(5):700-2.

11. Pohler E *et al*. Haploinsufficiency for AAGAB causes clinically heterogeneous forms of punctate palmoplantar keratoderma. *Nat Genet* 2012 Oct 14;44(11):1272-6.

12. Li S *et al*. Endothelial VEGF Sculpts Cortical Cytoarchitecture. *J Neurosci* 2013 Sep 11; 33(37):14809-14815.



Calretinin is a neuron specific EF-hand calcium binding protein expressed in subsets of neurons throughout the nervous system. The image shows the labeling of a mouse hippocampus and dorsal thalamus using the Anti-CALB2 antibody HPA007305. Note the strong labeling in the dentate gyrus.

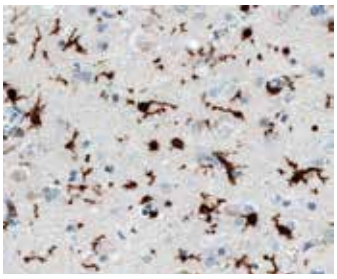


Secretagogin is a newly discovered EF-hand calcium binding protein strongly expressed in the mouse olfactory bulb. Here visualized using the Anti-SCGN antibody HPA006641.

NEURAL LINEAGE MARKERS continued

Product Name	Product Number	Subcategory	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-NCAM2	HPA030900[13]	adhesion molecule	IHC,ICC-IF	89 / 91%
Anti-NECAB1	AMAb90801	calcium binding protein;interneurons	IHC,WB	98 / 98%
Anti-NECAB1	HPA023629[14]	calcium binding protein;interneurons	IHC,WB	98 / 98%
Anti-NECAB2	AMAb90808	calcium binding protein;interneurons	IHC	85 / 84%
Anti-NECAB2	HPA013998[14]	calcium binding protein;interneurons	IHC,ICC-IF	98 / 97%
Anti-NEFH (NF200)	AMAb91025	neurons	IHC,WB	88 / 94%
Anti-NEFH (NF200)	HPA061615	neurons	IHC,ICC-IF	88 / 94%
Anti-NEFM (NF160)	AMAb91027	neurons	IHC,WB*	98 / 98%
Anti-NEFM (NF160)	HPA022845[15,16]	cytoskeleton	IHC	98 / 98%
Anti-NLGN1	HPA006680	adhesion molecule	IHC,WB	98 / 98%
Anti-PBK	HPA005753	progenitors	IHC,WB*,ICC-IF	91 / 94%
Anti-PTPRC	AMAb90518	microgila	IHC,WB	35 /37%
Anti-PTPRC	HPA000440[17]	microgila	IHC,WB	35 /37%
Anti-RBFOX3	HPA030790[18,19]	neuron nuclear marker	IHC,WB,ICC-IF	93 / 94%
Anti-S100A8	HPA024372	macrophages	HC,WB	56 / 60%
Anti-S100B	AMAb91038	astrocytes	IHC,WB	99 / 98%
Anti-S100B	HPA015768[20-22]	S100 calcium binding protein B	IHC,WB,ICC-IF	99 / 98%
Anti-SCGN	AMAb90630[23]	calcium binding protein;interneurons	IHC,WB	96 / 96%
Anti-SCGN	HPA006641[14,24,25]	calcium binding protein;interneurons	IHC	96 / 96%
Anti-UCHL1	AMAb91145	neurons	IHC,WB*	97 / 97%
Anti-UCHL1	HPA005993[27]	neurons	IHC,WB*,ICC-IF	97 / 97%

* WB both in human and rodent samples



The Anti-Allograft inflammatory factor 1 (AIF1) antibody (HPA049234) shows immunoreactivity in the microglia cells in human cortex.

13. Rodrigues RM *et al*. Human Skin-Derived Stem Cells as a Novel Cell Source for In Vitro Hepatotoxicity Screening of Pharmaceuticals. *Stem Cells Dev* 2014/01/01 23(1):44-55. Epub 2013/08/17.

14. Zhang MD *et al*. Neuronal calcium-binding proteins 1/2 localize to dorsal root ganglia and excitatory spinal neurons and are regulated by nerve injury. *Proc Natl Acad Sci U S A* 2014 Mar 25;111(12):E1149-58.

15. Häggmark A *et al* Plasma profiling reveals three proteins associated to amyotrophic lateral sclerosis. *Ann Clin Transl Neurol*, 2014/08/01; 1(8):544-553. Epub 2014/07/14.

16. Bachmann J *et al.* Affinity Proteomics Reveals Elevated Muscle Proteins in Plasma of Children with Cerebral Malaria. *PLoS Pathog* 1/01/01 10(4):e1004038. Epub 2014/04/17.

17. Edlund K *et al.* CD99 is a novel prognostic stromal marker in non-small cell lung cancer. *Int J Cancer* 2012 Nov 15; 131(10):2264-73. Epub 2012 Apr 24.

18. Bergmann O *et al.* The age of olfactory bulb neurons in humans. *Neuron* 2012 May 24;74(4):634-9.

19. Huttner HB *et al.* The age and genomic integrity of neurons after cortical stroke in humans. *Nat Neurosci* 2014 Jun; 17(6):801-3. Epub 2014 Apr 20.

20. Chaichana KL *et al.* Intra-operatively obtained human tissue: protocols and techniques for the study of neural stem cells. *J Neurosci Methods.* 2009 May 30;180(1):116-25.

21. Kielar M *et al.* Mutations in Eml1 lead to ectopic progenitors and neuronal heterotopia in mouse and human. *Nat Neurosci* 2014 Jul; 17(7):923-33. Epub 2014 May 25.

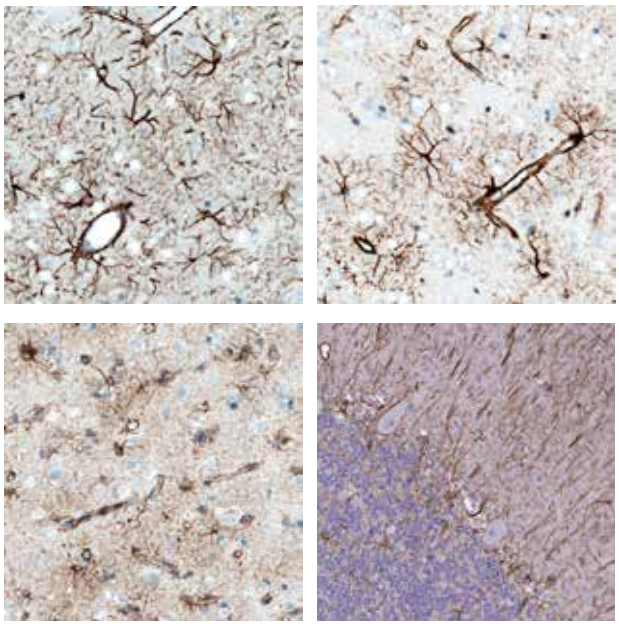
22. Darcy MJ *et al* Age-Dependent Role for Ras-GRF1 in the Late Stages of Adult Neurogenesis in the Dentate Gyrus. *Hippocampus* 2014/03/01 24(3):315-325.

23. Shi TJ *et al.* Secretagogin is expressed in sensory CGRP neurons and in spinal cord of mouse and complements other calcium-binding proteins, with a note on rat and human. *Mol Pain* 2012 Oct 29;8:80.

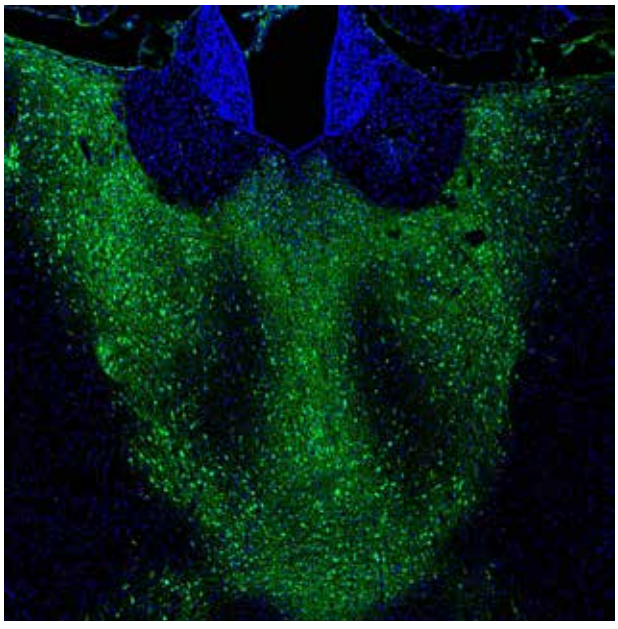
24. Mulder J et al. Secretagogin is a Ca2+-binding protein specifying subpopulations of telencephalic neurons. *Proc Natl Acad Sci U S A* 2009/12/29; 06(52):22492-22497. Epub 2009/12/16.

25. Attems J *et al.* Clusters of secretagogin-expressing neurons in the aged human olfactory tract lack terminal differentiation. *Proc Natl Acad Sci U S A* , 2012 Apr 17; 109(16):6259-64. Epub 2012 Apr 2.

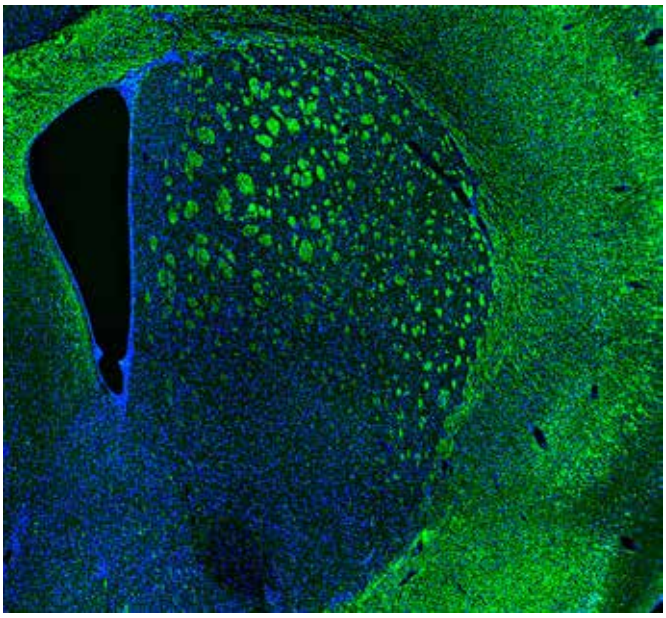
27. Lindskog C *et al.* Antibody-based proteomics for discovery and exploration of proteins expressed in pancreatic islets. *Discov Med* 2010 Jun; 9(49):565-78.



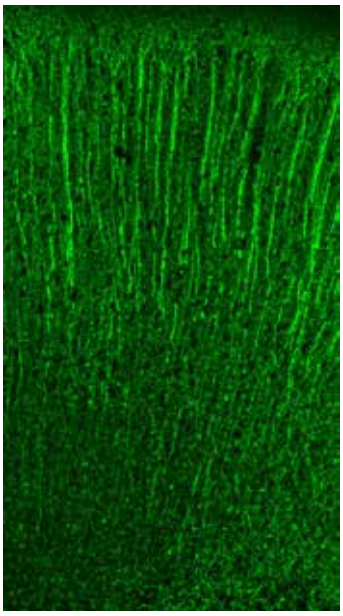
Glial fibrillary acidic protein (GFAP) is a cell-specific marker for astrocytes. Here illustrated by the Anti-GFAP antibody HPA056030 in rat cerebral cortex (upper left), mouse cerebral cortex (upper right), human cerebral cortex (lower left) and human cerebellum (lower right) tissue.



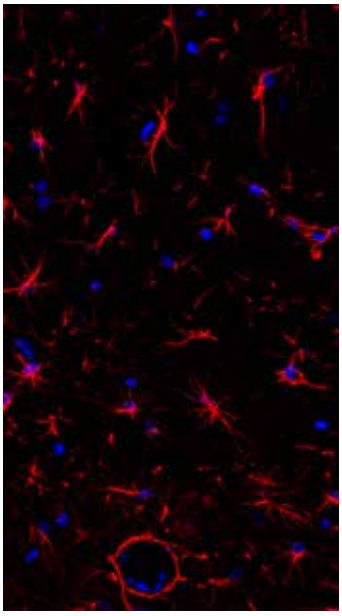
Distribution of NECAB1 (green) in the mouse dorsal medial thalamus. The PrecisA Monoclonal Anti-NECAB1 antibody AMAb90801 strongly labels neurons and their processes in the paraventricular and mediodorsal thalamic nuclei. Blue is the nuclear staining Hoechst.



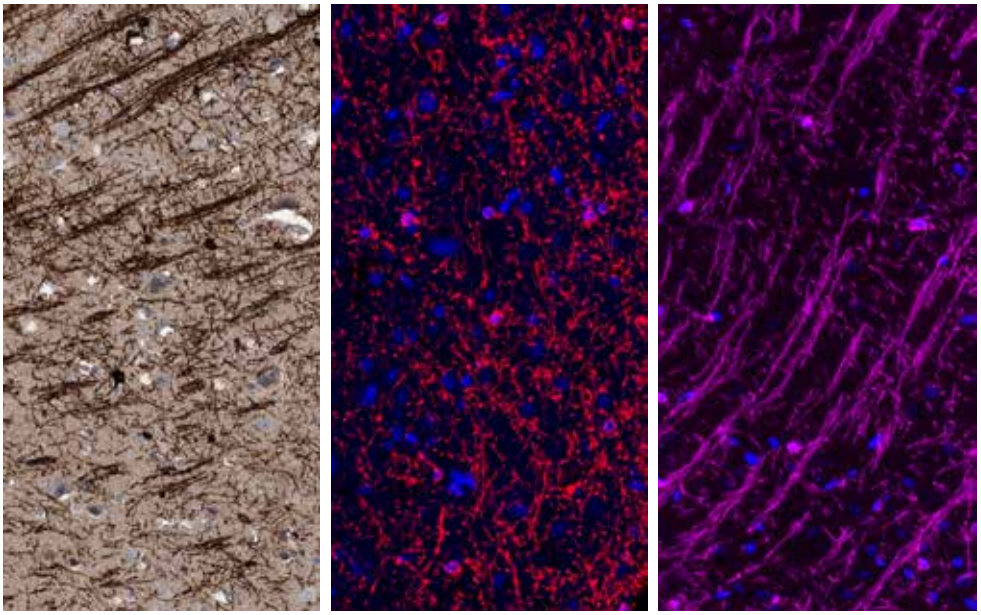
The image shows Anti-INA antibody (HPA008057) targeting internexin neuronal intermediate filament protein alpha (INA). Note the strong labeling of axons in striatal nerve bundles in the mouse brain.



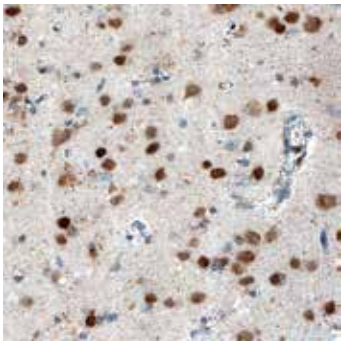
Anti-MAP2 antibody (HPA008273) against microtubule-associated protein 2 (MAP2) strongly labels dendrites in the mouse cortex.



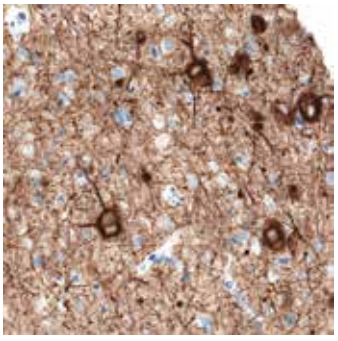
Glial fibrillary acidic protein (GFAP) is a cell specific marker distinguishing astrocytes from the other glial cells in the central nervous system. Labelling with the Anti-GFAP antibody HPA056030 shows astrocytes in rat cerebral cortex.



2',3'-cyclic-nucleotide 3'-phosphodiesterase (CNP) is a marker for oligodendrocytes in the central nervous system. Illustrated here by the Anti-CNP antibody HPA023280 (IHC) and HPA023266 (IF) in human cerebral cortex (left, middle) and in rat cerebral cortex (right).



RBFOX3 (=NeuN) is a neuronal specific nuclear protein which can be used to distinguish neurons from glial cells in tissue cultures and sections. Illustrated here by staining with the Anti-RBFOX3 antibody (HPA030790) in human cerebral cortex.



The Anti-Neurofilament medium polypeptide (NEFM) antibody (HPA022845) shows positivity in a subset of neuronal cells in human cerebral cortex.

AGING AND NEUROLOGICAL DISORDERS

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-ADAR	AMAb90535	IHC,WB	86 / 85%
Anti-ADAR	HPA003890[1-3]	IHC,WB,ICC-IF	86 / 85%
Anti-AIMP1	HPA018476	IHC,WB*,ICC-IF	96 / 97%
Anti-AOX1	HPA040199	IHC,ICC-IF	84 / 86%
Anti-APBA1	HPA019850	IHC,WB*	95 / 95%
Anti-APBA3	HPA045577	IHC,WB,ICC-IF	70 / 68%
Anti-APBB2	HPA023542	IHC,WB,ICC-IF	85 / 83%
Anti-APBB3	HPA005571	IHC,WB,ICC-IF	84 / 84%
Anti-APP	HPA001462[4]	IHC,ICC-IF	95 / 95%
Anti-AQP4	AMAb90537	IHC,WB	93 / 92%
Anti-AQP4	HPA014784	IHC,WB*	93 / 92%
Anti-ATF2	HPA022134	IHC,WB*,ICC-IF	99 / 99%
Anti-ATF3	AMAb90909	IHC	92 / 92%
Anti-ATF3	HPA001562	IHC,WB*,ICC-IF	92 / 92%
Anti-ATXN1	HPA008335	IHC,ICC-IF	81 / 81%
Anti-ATXN2	HPA018295	IHC,WB*,ICC-IF	90 / 91%
Anti-C3	HPA020432	IHC	78 / 23%
Anti-CASP3	HPA002643[5]	IHC,WB*,ICC-IF	84 / 88%
Anti-COX1	HPA002834[6]	IHC,WB	93 / 90%
Anti-COX2/PTGS2	HPA001335[7-9]	IHC	88 / 88%
Anti-CTSB	HPA018156[10,11]	IHC,WB*,ICC-IF	79 / 79%
Anti-CTSD	HPA003001[12]	IHC,WB	86 / 86%
Anti-CXorf27	HPA003356	IHC	47 / 46%
Anti-FBXO7 (PARK15)	HPA032114	IHC	78 / 81%
Anti-GSK3B	HPA028017	IHC,WB*,ICC-IF	100 / 100%
Anti-HIP1	HPA017964	IHC,WB	79 / 77%
Anti-HTRA2 (PARK13)	HPA027366	IHC,WB	57 / 63%
Anti-ITGAM (CD11b)	AMAb90911	IHC,WB	67 / 68%
Anti-ITGAM (CD11b)	HPA002274[13,14]	IHC,WB	67 / 68%
Anti-ITM2B	HPA029292	IHC,WB,ICC-IF	95 / 96%
Anti-LRP1	HPA022903	IHC,WB,ICC-IF	93 / 92%
Anti-LRP2	HPA005980[15]	IHC	78 / 36%
Anti-MSR1	HPA000272	IHC,WB	60 / 59%
Anti-NFKB1	HPA027305	IHC,WB,ICC-IF	60 / 62%
Anti-OPTN	HPA003360[16]	IHC,WB,ICC-IF	64 / 68%
Anti-PADI4	HPA017007	IHC,WB	66 / 69%
Anti-PARK7	HPA004190[17]	IHC,WB*	89 / 90%

* WB both in human and rodent samples

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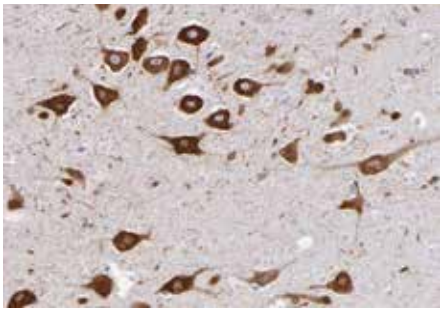
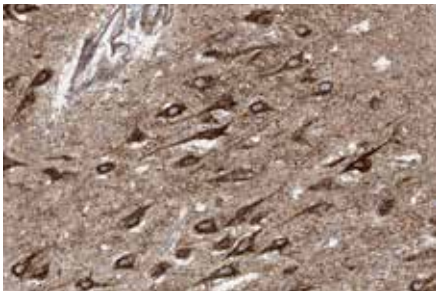
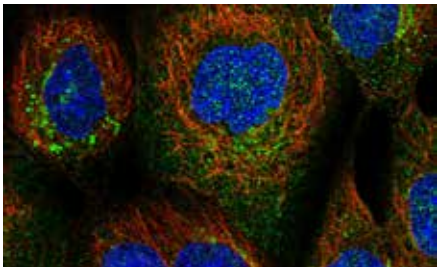


Prostaglandin-endoperoxide synthase 1 (PTGS1) is strongly expressed in perikarya from hippocampal neurons (human tissue). Here shown using the Anti-COX1 (HPA002834) antibody.

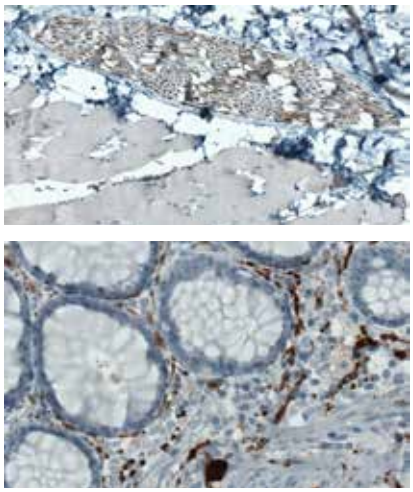




The Anti-ITM2B antibody (HPA029292), targeting Integral membrane protein 2B, strongly labels the soma and processes of hippocampal neurons (human tissue). Note the labeling of the Golgi apparatus in A-431 cells.

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-PHGDH	AMAb90786	IHC,WB	99 / 99%
Anti-PHGDH	HPA021241[18-21]	IHC,WB*,ICC-IF	99 / 99%
Anti-PRNP	HPA042754	IHC	91 / 91%
Anti-PSEN1	HPA030760	IHC	82 / 81%
Anti-RHOT1	AMAb90852	IHC,WB	100 / 100%
Anti-RHOT1	HPA010687[22-24]	IHC,WB	100 / 100%
Anti-S100A8	HPA024372	IHC,WB	56 / 60%
Anti-SERPINA3	HPA002560[25,26]	IHC,WB	60 / 59%
Anti-SNCB	HPA035876	IHC,WB,ICC-IF	97 / 97%
Anti-SOD1	HPA001401[27,28]	IHC,WB*,ICC-IF	82 / 81%
Anti-SOD2	HPA001814[29,30,31]	IHC,WB	88 / 87%
Anti-THY1	AMAb90844	IHC,WB	64 / 68%
Anti-THY1	HPA003733	IHC	64 / 68%
Anti-TNFRSF21	HPA006746	IHC,WB	86 / 85%
Anti-UBE2K	HPA028869	IHC,ICC-IF	100 / 100%
Anti-UCHL1	HPA005993[32]	IHC,WB*,ICC-IF	97 / 97%
Anti-WHSC1	AMAb90851	IHC,WB	91 / 91%
Anti-WHSC1	HPA015801[33]	IHC,WB*,ICC-IF	91 / 91%
Anti-VWF	AMAb90928	IHC,WB	80 / 80%
Anti-VWF	HPA002082[34,35]	IHC	82 / 78%

* WB both in human and rodent samples



Ubiquitin-carboxyl-terminal hydrolase isozyme L1 (UCHL1, PGP9.5) is expressed in the neuronal cells of the central and peripheral nervous system. Expression of this protein is down-regulated in Parkinson´s and in Alzheimer´s disease patients. The micrographs show expression of UCHL1 protein in the peripheral nervous system (skin nerve and local nerves in colon) of human using the Anti-UCHL1 antibody HPA005993.

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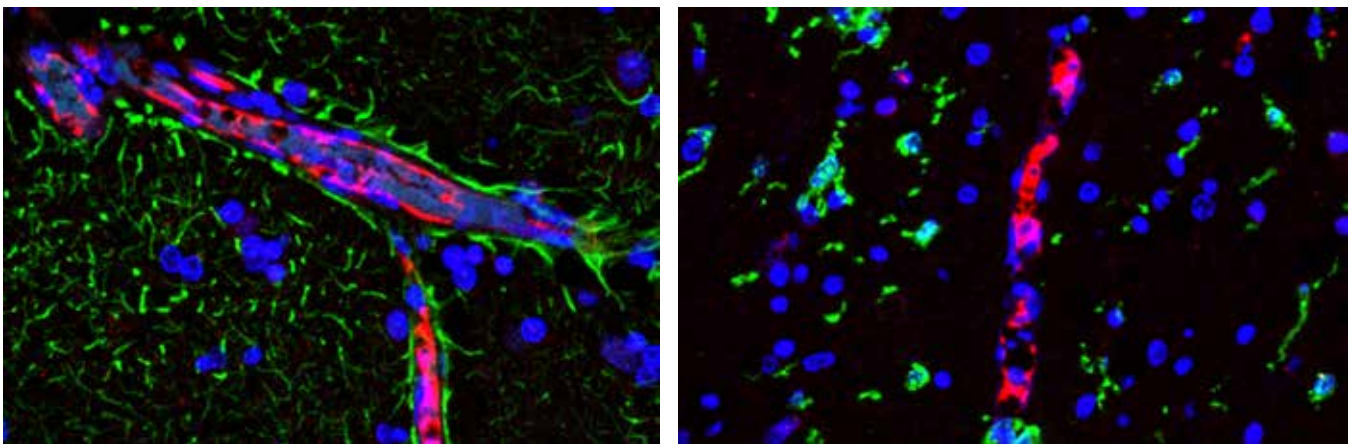
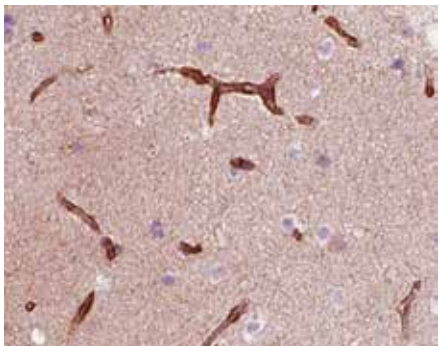


Complement component C3 plays an important role in the activation of complement system and has been associated with neuro-inflammation. The Anti-C3 antibody (HPA020432) strongly labels capillaries in MS affected brain tissue. (Blue = Hoechst, Green = IBA1 or GFAP (clone GA5), Red = C3).

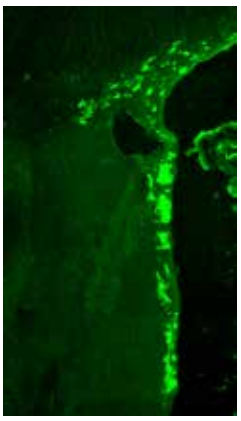
DEVELOPMENT

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-BMP3	HPA045344	IHC,WB	74 / 75%
Anti-ENG	AMAb90925	IHC	66 / 22%
Anti-ENG	HPA011862[1]	IHC,WB,ICC-IF	66 / 22%
Anti-FABP7	AMAb90595	IHC,WB	89 / 90%
Anti-FABP7	HPA028825[2,3]	IHC,WB	89 / 90%
Anti-FLT1	AMAb90704	IHC,WB	80 / 82%
Anti-FLT1	HPA014290	IHC	77 / 78%
Anti-GAP43	HPA015600[4]	IHC,WB	71 / 70%
Anti-GLI3	HPA005534	IHC,ICC-IF,WB	74 / 76%
Anti-MEF2C	AMAb90727	IHC,WB	97 / 47%
Anti-MEF2C	HPA005533[5-8]	IHC,WB,ICC-IF	97 / 47%
Anti-MKI67 (Ki67)	HPA000451[9,10]	IHC,ICC-IF	66 / 67%
Anti-NACC1	HPA021238	IHC,ICC-IF	91 / 89%
Anti-NES (Nestin)	AMAb90556	IHC,WB	47 / 42%
Anti-NES (Nestin)	HPA007007[11]	IHC,WB,ICC-IF	47 / 42%
Anti-NKX2-2	HPA003468[12,13]	IHC,WB	96 / 97%
Anti-PAX6	HPA030775	IHC,ICC-IF	100 / 100%
Anti-PBK	HPA005753	IHC,WB*,ICC-IF	91 / 94%

* WB both in human and rodent samples



Immunohistochemical staining using the Anti-NES (Nestin) antibody AMAb90556 of human cerebral cortex shows strong immunoreactivity in the endothelial cells.



PDZ binding kinase (PBK) is expressed in neural progenitors in both the dentate gryrus and subventricular zone of the lateral ventricle in the adult rat. Here visualized using the Anti-PBK antibody (HPA005753).

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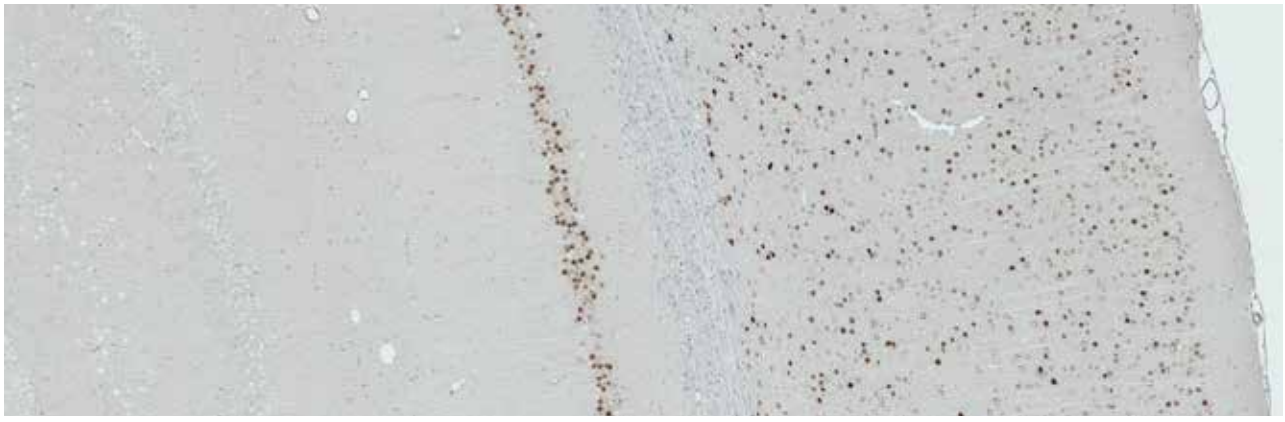
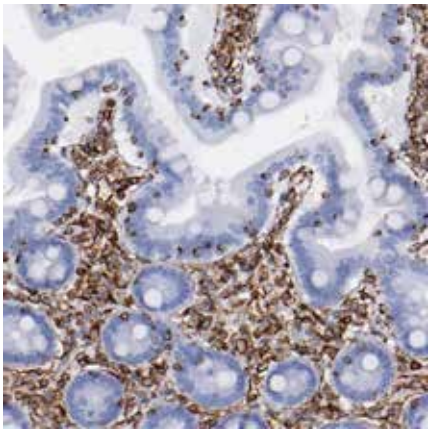
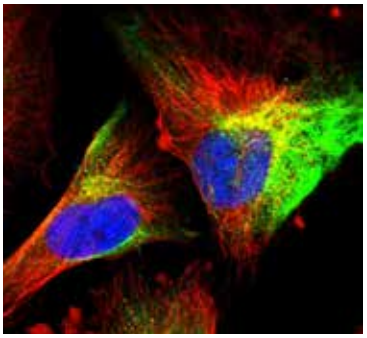


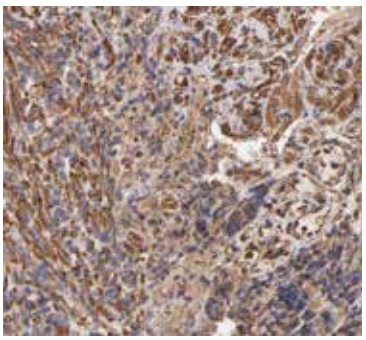
DNA-binding protein SATB2 is required for initiation of the upper-layer neurons specific genetic program and for inactivation of deep-layer neurons specific genes. Here illustrated by Anti-SATB2 antibody AMAb90679 in rat brain. Note strong nuclear immunoreactivity in cerebral cortex and in the CA1 layer of the hippocampus and absence of positivity in the dentate gyrus.

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse / rat
Anti-REST	AMAb90740	IHC	41 / 43%
Anti-RUNX1	HPA004176[14]	IHC,WB,ICC-IF	93 / 93%
Anti-RUNX2	AMAb90591	IHC,WB	100 / 81%
Anti-RUNX2	HPA022040[15,16]	IHC,WB,ICC-IF	100 / 81%
Anti-SATB2	AMAb90679	IHC,WB	100 / 100%
Anti-SATB2	HPA029543[17]	IHC,ICC-IF	100 / 100%
Anti-SOX4	HPA029901	IHC,ICC-IF	100 / 39%
Anti-SOX6	HPA001923[18,19]	IHC,WB,ICC-IF	96 / 96%
Anti-SOX7	HPA009065[20,21]	IHC,WB	91 / 91%
Anti-SOX11	AMAb90502[22]	IHC,WB	82 / 82%
Anti-SOX11	HPA000536[23-27]	IHC,WB	82 / 82%
Anti-SOX30	HPA006159	IHC,WB	68 / 70%
Anti-THY1	AMAb90844	IHC,WB	64 / 68%
Anti-THY1	HPA003733	IHC	64 / 68%
Anti-TM4SF2/TSPAN7	HPA003140[28,29]	IHC,WB	96 / 96%
Anti-TM4SF2/TSPAN7	AMAb90621	IHC,WB	96 / 96%
Anti-VIM (vimentin)	AMAb90516	IHC,WB	99 / 99%
Anti-VIM	HPA001762[30]	IHC,WB*,ICC-IF	99 / 99%

* WB both in human and rodent samples







Immunohistochemical staining using the Anti-VIM (Vimentin) antibody HPA001762 of human duodenum shows distinct positivity in mesenchymal and lymphoid cells (upper left). In glioma tissue, immunoreactivity is strong in tumor cells (lower right). Immunofluorescent staining of human cell line U-251MG shows positivity in cytoskeleton (upper right).

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30. Yamasaki T *et al.* Tumor suppressive microRNA-138 contributes to cell migration and invasion through its targeting of vimentin in renal cell carcinoma. *Int J Oncol* 2012 241(3):805-817. Epub 2012/07/03.

Antibodies on HPA Mouse Brain Atlas

Product Name	Product Number	Validated Applications	Antigen seq identity to mouse / rat
Anti-AMPD2	HPA045760	IHC,WB,ICC-IF	99% / 99%
Anti-AQP4	HPA014784	IHC,WB	93% / 92%
Anti-ARFGEF1	HPA023822	IHC,WB,ICC-IF	90% / 90%
Anti-ARHGAP1	HPA004689[1]	IHC,WB,ICC-IF	98% / 98%
Anti-BCAR1	HPA042282	IHC,WB,ICC-IF	75% / 93%
Anti-BCL11B	HPA049117	IHC	96% / 48%
Anti-BIRC3	HPA002317[2-4]	IHC,WB,ICC-IF	75% / 74%
Anti-C17orf75	HPA004061[5]	IHC,WB,ICC-IF	84% / 83%
Anti-C21orf59	HPA028849	IHC,WB	95% / 93%
Anti-CALB2	HPA007305[3]	IHC,WB,ICC-IF	98% / 98%
Anti-CAMK2B	HPA026307	IHC,WB	96% / 96%
Anti-DDX3X	HPA001648[3,6]	IHC,WB	97% / 97%
Anti-DPP6	HPA050509	IHC,WB	86% / 86%
Anti-DTX4	HPA059294	IHC,ICC-IF	86% / 33%
Anti-ECH1	HPA005835[3]	IHC,WB	78% / 81%
Anti-EIF1AY	HPA002561	IHC,WB	99% / 99%
Anti-FAM213B	HPA006403	IHC,WB	92% / 89%
Anti-FGF3	HPA012692	IHC,ICC-IF	80% / 81%
Anti-FH	HPA025770	IHC,WB,ICC-IF	99% / 100%
Anti-FOXO1	HPA001252[5,7]	IHC	91% / 90%
Anti-FRMD6	HPA001297[8]	IHC,WB,ICC-IF	94% / 94%
Anti-GABRA3	HPA000839[3]	IHC,WB	91% / 93%
Anti-GFAP	HPA056030	IHC,WB	98% / 100%
Anti-GKAP1	HPA035117	IHC,WB,ICC-IF	93% / 93%
Anti-GMFB	HPA002954[9]	IHC,WB	97% / 94%
Anti-GOLGA5	HPA000992[10]	IHC,WB,ICC-IF	70% / 76%

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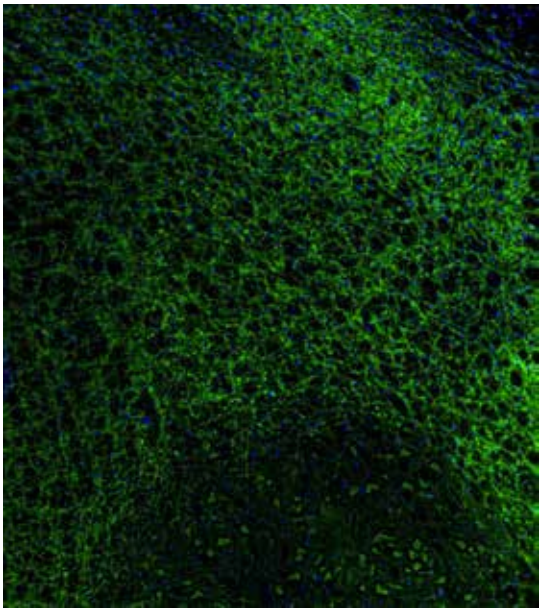
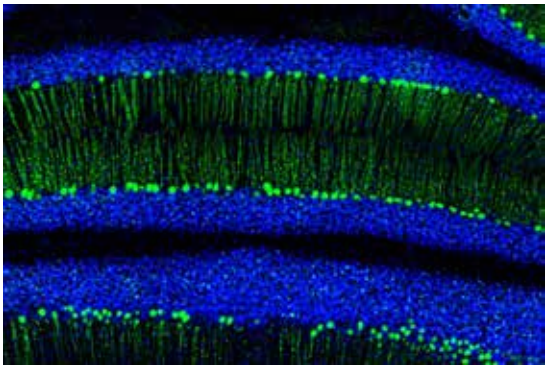
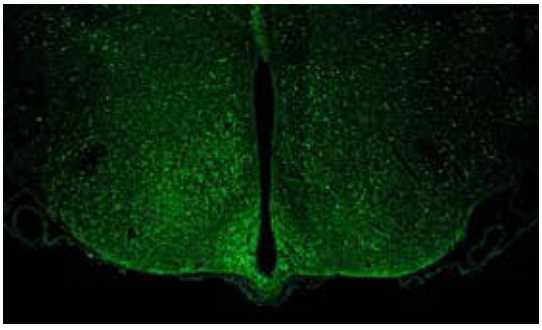


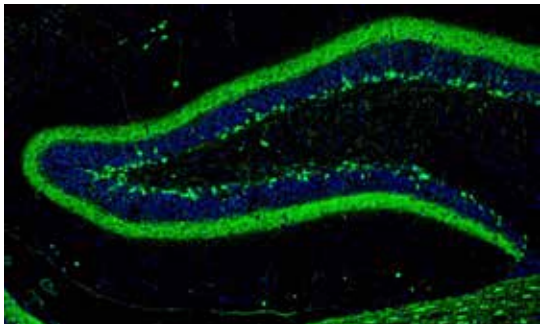
Immunofluorescence IHC staining of mouse medulla with Anti-GABRA3 antibody (HPA000839) shows strong immunoreactivity in neuronal processes and cell bodies.



Immunohistochemical staining of mouse cerebellum with Anti-CAMK2B antibody (HPA026307) shows neuronal positivity in Purkinje cells.



Immunohistochemical staining of mouse hypothalamus with Anti-CALB antibody (HPA007305) shows selective staining in a subset of neurons and fibers in the acrcuate nucleus.



Immunohistochemical staining of mouse hippocampus Anti-CALB antibody (HPA007305) shows selective staining in subsets of neurons and fibers in dentate gyrus.

Product Name	Product Number	Validated Applications	Antigen seq identity to mouse / rat
Anti-HSPA2	HPA000798[11-13]	IHC,WB	95% / 95%
Anti-IER5	HPA029894	IHC,WB,ICC-IF	86% / 33%
Anti-INA	HPA008057[3]	IHC,WB,ICC-IF	83% / 84%
Anti-ITPKA	HPA040454	IHC,WB,ICC-IF	91% / 89%
Anti-KIF5A	HPA004469	IHC,WB	91% / 88%
Anti-LIAS	HPA018842	IHC,WB,ICC-IF	89% / 92%
Anti-LRPAP1	HPA008001[3]	IHC,WB,ICC-IF	81% / 80%
Anti-MAP2	HPA012828[14,15]	IHC,ICC-IF	91% / 89%
Anti-MARS	HPA004125[16]	IHC,WB,ICC-IF	92% / 92%
Anti-MBP	HPA049222	IHC,WB	97% / 97%
Anti-NAGLU	HPA038815	IHC	88% / 89%
Anti-NDUFV2	HPA003404[17]	IHC,WB	95% / 95%
Anti-NECAB1	HPA023629[18]	IHC,WB	98% / 98%
Anti-NECAB2	HPA013998[18]	IHC,ICC-IF	98% / 97%
Anti-NPAS2	HPA019674	IHC,WB,ICC-IF	85% / 87%
Anti-OGFOD1	HPA003215[19,20]	IHC,WB,ICC-IF	80% / 81%
Anti-OTUB1	HPA039176	IHC,WB,ICC-IF	100% / 100%
Anti-PBK	HPA005753	IHC,WB,ICC-IF	91% / 94%
Anti-PCP4	HPA005792[21-24]	IHC,WB	96% / 96%
Anti-PPP1R1B	HPA048630	IHC,WB	87% / 91%
Anti-QK1	HPA019123	IHC,WB,ICC-IF	100% / 100%
Anti-RABGGTB	HPA026585	IHC,WB,ICC-IF	97% / 96%
Anti-RAP1GAP	HPA001922	IHC,WB	92% / 91%
Anti-RCN2	HPA030694	IHC,WB,ICC-IF	91% / 90%
Anti-RPL9	HPA003372[3,25]	IHC,WB,ICC-IF	99% / 98%

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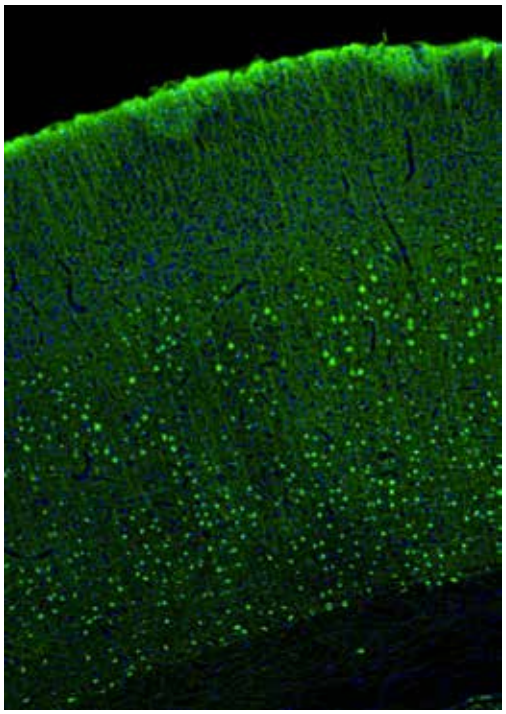
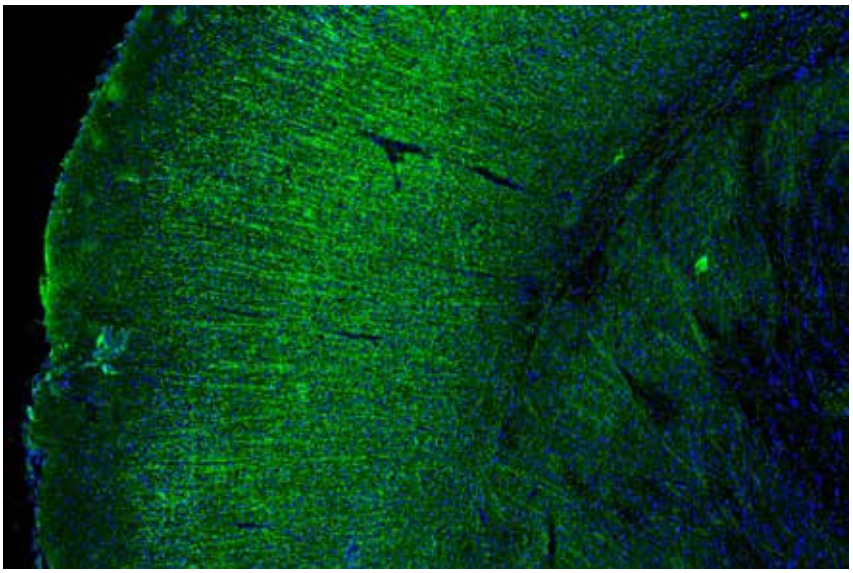
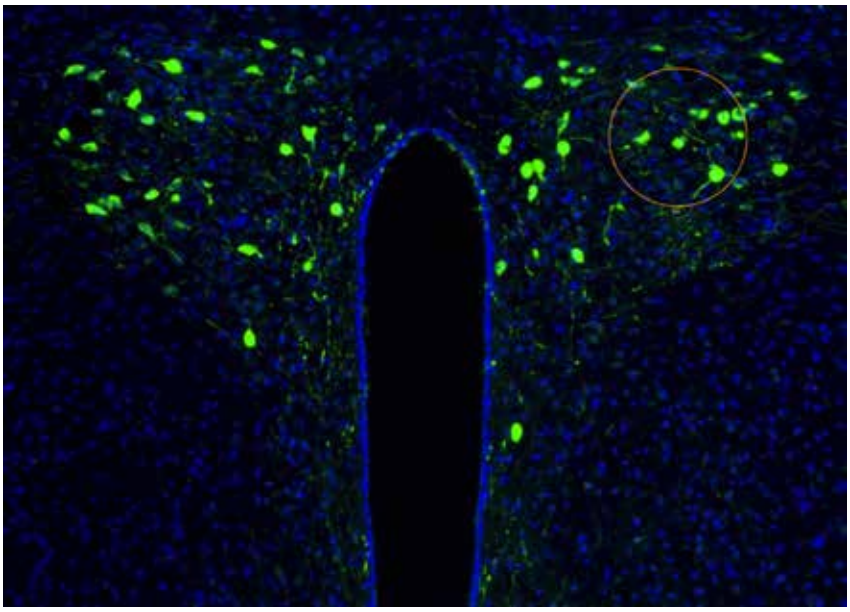


Immunofluorescence IHC staining of mouse cerebral cortex with Anti-PCP4 antibody (HPA005792) shows strong immunoreactivity in neuronal cell bodies in the deep cortical layers.

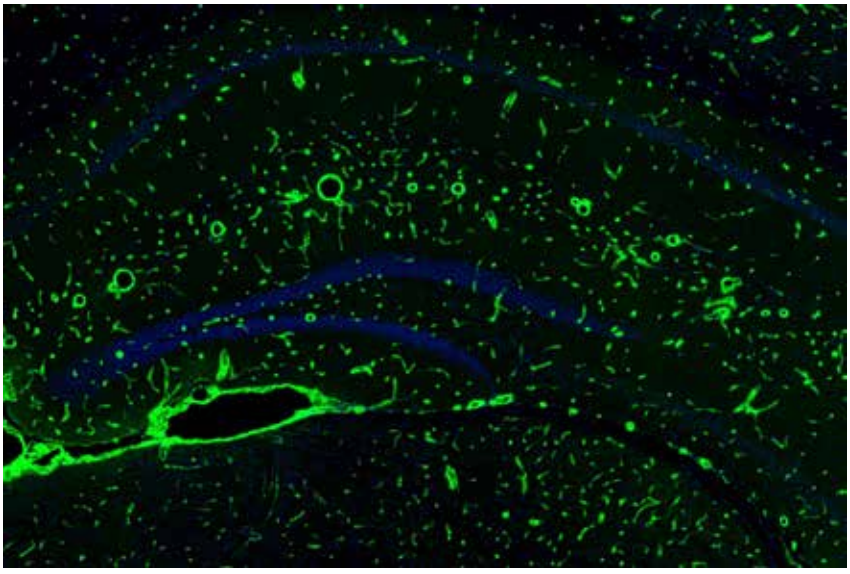


Immunohistochemical staining of mouse cerebral cortex with Anti-MBP antibody (HPA049222) shows strong staining in myelinated fibres.

Product Name	Product Number	Validated Applications	Antigen seq identity to mouse / rat
Anti-SAYSD1	HPA007959	IHC,WB,ICC-IF	92% / 32%
Anti-SCGN	HPA006641[26-29]	IHC	96% / 96%
Anti-SEMA3E	HPA029419	IHC	86% / 86%
Anti-SLC2A1	HPA031345	IHC	100% / 100%
Anti-SSR3	HPA014906	IHC,WB	100% / 43%
Anti-SST	HPA019472	IHC,WB	98% / 98%
Anti-SYNJ2BP	HPA000866	IHC,WB,ICC-IF	96% / 95%
Anti-TH	HPA061003	IHC	88% / 88%
Anti-TXNL1	HPA002828	IHC,WB,ICC-IF	98% / 98%
Anti-UBTF	HPA006385[30]	IHC,WB,ICC-IF	98% / 98%
Anti-USP11	HPA037536	IHC,ICC-IF	82% / 83%
Anti-USP48	HPA030046	IHC,WB,ICC-IF	95% / 94%
Anti-ZNF3	HPA003719	IHC,ICC-IF	77% / 78%



Immunofluorescence IHC staining of mouse hypothalamus with Anti-SAYSD1 antibody (HPA007959) shows selective neuronal staining in the paraventricular nucleus.



Immunohistochemical staining of mouse hippocampus Anti-SLC2A1 antibody (HPA031345) shows strong staining in endothelial cells.

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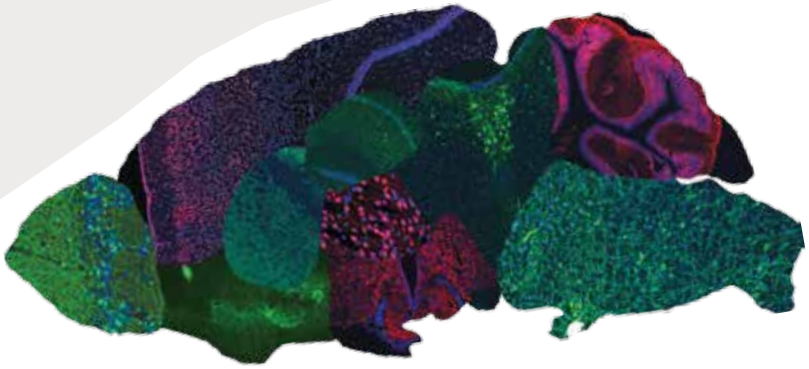
Dr. Mulder´s group performs antibody based profiling of proteins in the human and rodent nervous system using biochemical and immunofluorescence techniques in combination with automated microscopy. The aim is to quantify and visualize regional, cellular and subcellular distribution of proteins in the developing, healthy and diseased nervous system.

In collaboration with the Human Protein Atlas (HPA) project, utilizing the unique antibody resource created within the project, they aim to 1) investigate protein distribution in a large portion of the nervous system using the smaller rodent brain and 2) identify changes in protein expression and distribution in the human brain affected by neurodegenerative disorders.

Many of the images within this catalog are from the work by Mulder *et al* as well as the list of Antibodies on the HPA Mouse Brain Atlas.



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