

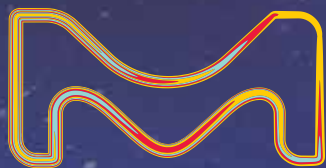
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EXPLORE WITH CONFIDENCE:

# Prestige Antibodies® in Neuroscience

 **ATLAS ANTIBODIES**

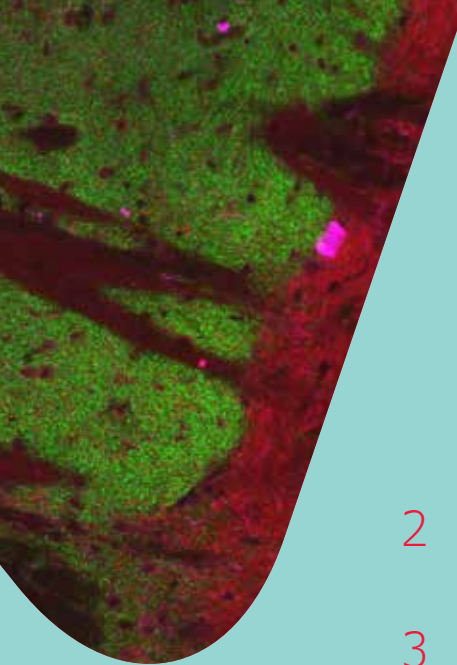
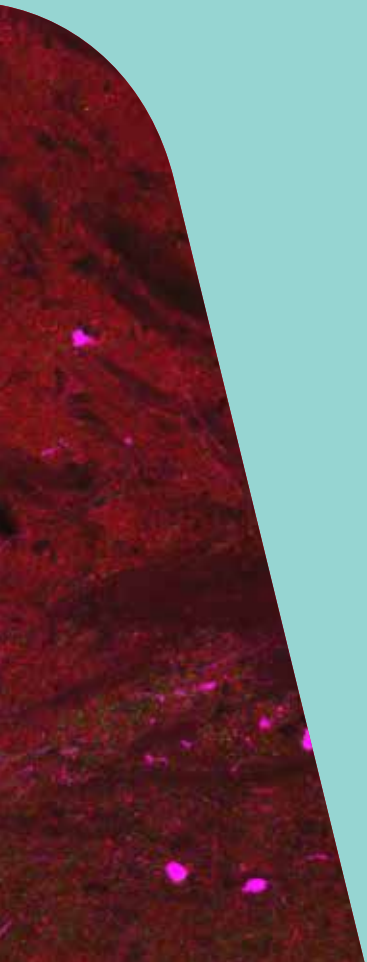


The life science business of Merck  
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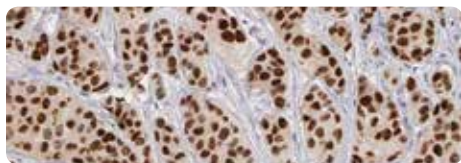
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A microscopic image of neurons, likely from a mouse brain, showing green and red staining. The green staining highlights certain cellular structures, while the red staining highlights others. The image is partially obscured by a large red and cyan graphic overlay.

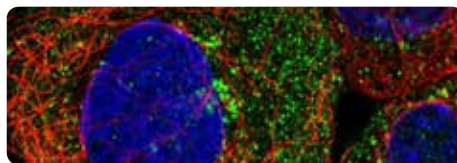
# Prestige Antibodies® in Neuroscience

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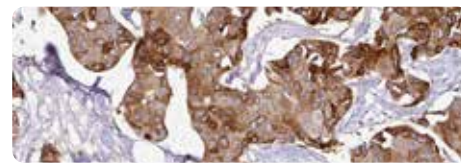
# The Human Protein Atlas



Tissue Atlas



Cell Atlas



Cancer Atlas

## The Human Protein Atlas is Characterizing the Human Proteome

The Human Protein Atlas project has created a complete map of protein expression in all major organs and tissues in the human body<sup>1,2</sup>. To accomplish this, highly specific antibodies have been developed to all protein coding human genes and protein profiling is established in a multitude of tissues and cells using tissue arrays. Applications applied are immunohistochemistry (IHC), Western blot (WB) analysis, protein array assay and immunofluorescent based confocal microscopy (ICC-IF).

The antibodies developed within the Human Protein Atlas project are carefully designed and manufactured to achieve the very highest level of specificity, reproducibility and versatility. You will find them in our catalog as Prestige Polyclonals.

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

The Human Protein Atlas is divided into three major parts, the Tissue Atlas, Cell Atlas and Cancer Atlas. In different ways, the atlases show gene and protein expression data and make it easy to access, search and navigate.

### The Tissue Atlas

For all proteins represented in the Tissue Atlas, the expression profiles are based on IHC analysis on a large number of human tissues. All IHC image scan be viewed in high resolution on the Tissue Atlas. The

presentation of protein expression data in correlation to RNA sequencing data for each gene is included.

Tissue microarrays containing samples from 44 different normal human tissues and from 20 different cancer types are utilized within the project. The 44 normal tissues are present in triplicate samples and annotated in 76 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. The mRNA expression data is derived from deep sequencing of RNA (RNASeq) from 37 major different normal tissue types.

### The Cell Atlas

The Cell Atlas presents subcellular localization by confocal microscopy. The results are displayed as high resolution, multicolor images of immunofluorescently stained cells. Three human cell lines for each antibody are selected for the immunofluorescence analysis. Two cell lines from a cell line panel are chosen based on RNA sequencing data and the third cell line is always U-2 OS.

### The Cancer Atlas

The Cancer Atlas contains gene expression data based on protein expression patterns in a multitude of human cancer specimens. Altogether 216 different cancer samples, corresponding to the 20 most common forms of human cancer, have been analyzed for all included genes. All cancer tissue images have been manually annotated by pathologists and just as for the normal Tissue Atlas, protein data includes protein expression levels corresponding to over 15,000 genes for which there are available antibodies.

## 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).

# Prestige Polyclonals

The uniqueness and low cross reactivity of Prestige 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 Prestige 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 Prestige 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.

## Prestige Polyclonal catalog

Today, there are more than 21,000 Prestige Polyclonals and new antibodies are added each year.

The antibodies developed and characterized within the Human Protein Atlas project are supplied by Merck under the brand name Prestige Polyclonals. The product numbers of Prestige Polyclonals start with "HPA"

# Prestige Monoclonals

We also provide a selected number of mouse monoclonal antibodies, under the brand name Prestige Monoclonals. The Prestige 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, the Prestige 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 Prestige Monoclonals antibodies are isotyped to allow for multiplexing using isotype-specific secondary antibodies.

## Hybridoma Cell Cultivation

*In-vitro* methods are used for the production scale up phase thus replacing the use of mice for production of ascites fluid.

## Antibody Characterization

The characterization of Prestige 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

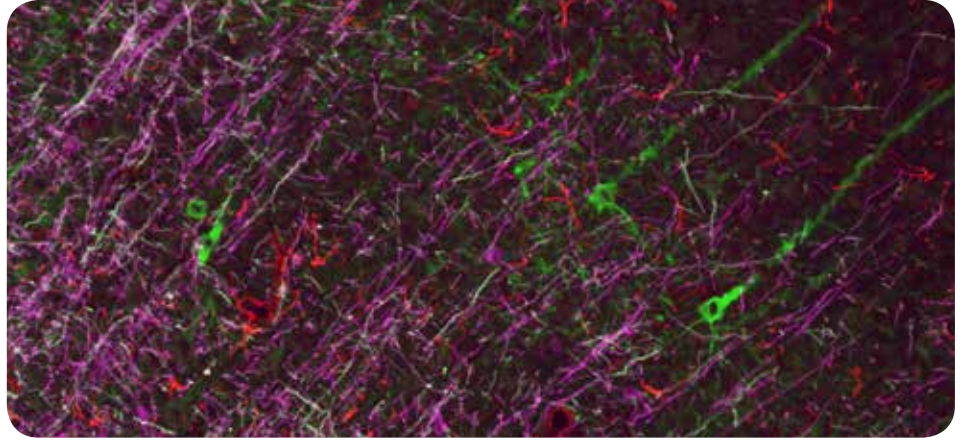
antibody. In addition to positive stained tissue, a negative control tissue staining is also displayed and if relevant, clinical cancer tissue staining.

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

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

Prestige Monoclonals are developed 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 Prestige Monoclonals.

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



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

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

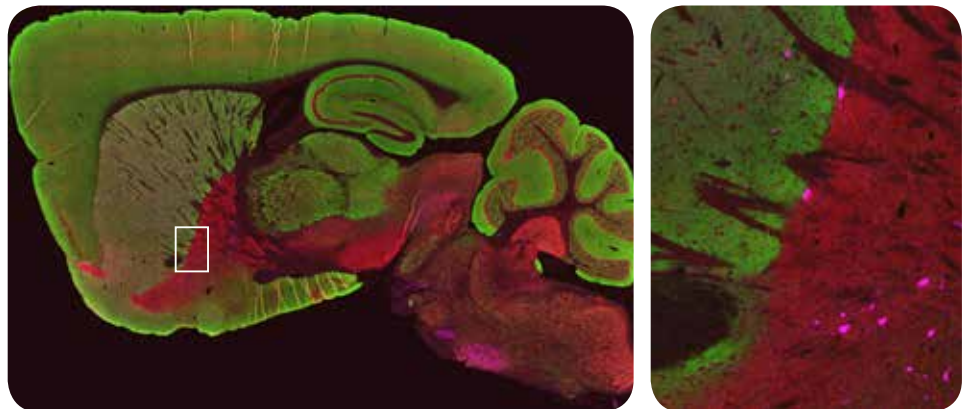
### Markers for Neural Lineage and Signaling

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 types, including neurons, oligodendrocytes 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

Prestige 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

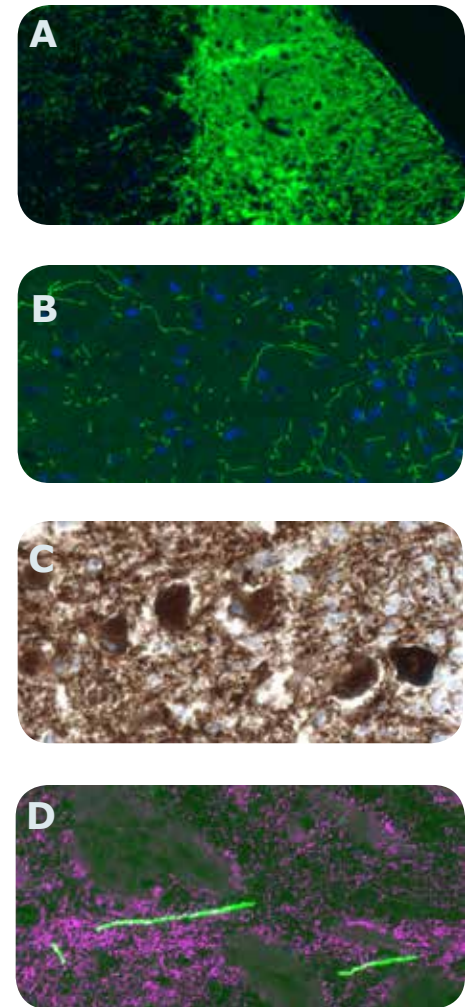
further demonstrated on image D. It shows a coronal section of rat brain at the level of caudate putamen stained with Anti-NET (AMAb91116) in green and Anti-DAT (AMAb91125) in magenta. The caudate putamen is virtually devoid of noradrenaline fibers, only single ones can sometimes be observed (in green), while a dense network of thin dopamine fibers is seen in caudate putamen (in magenta).

The product numbers of Prestige Polyclonals start with "HPA" and of Prestige Monoclonals with "AMAb".

**Table 1. Prestige Monoclonals Neuroscience Markers**

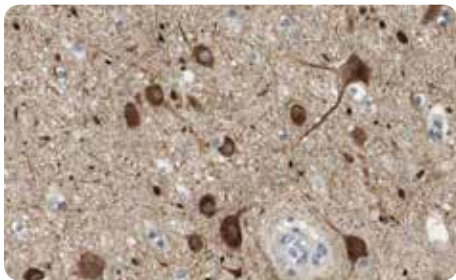
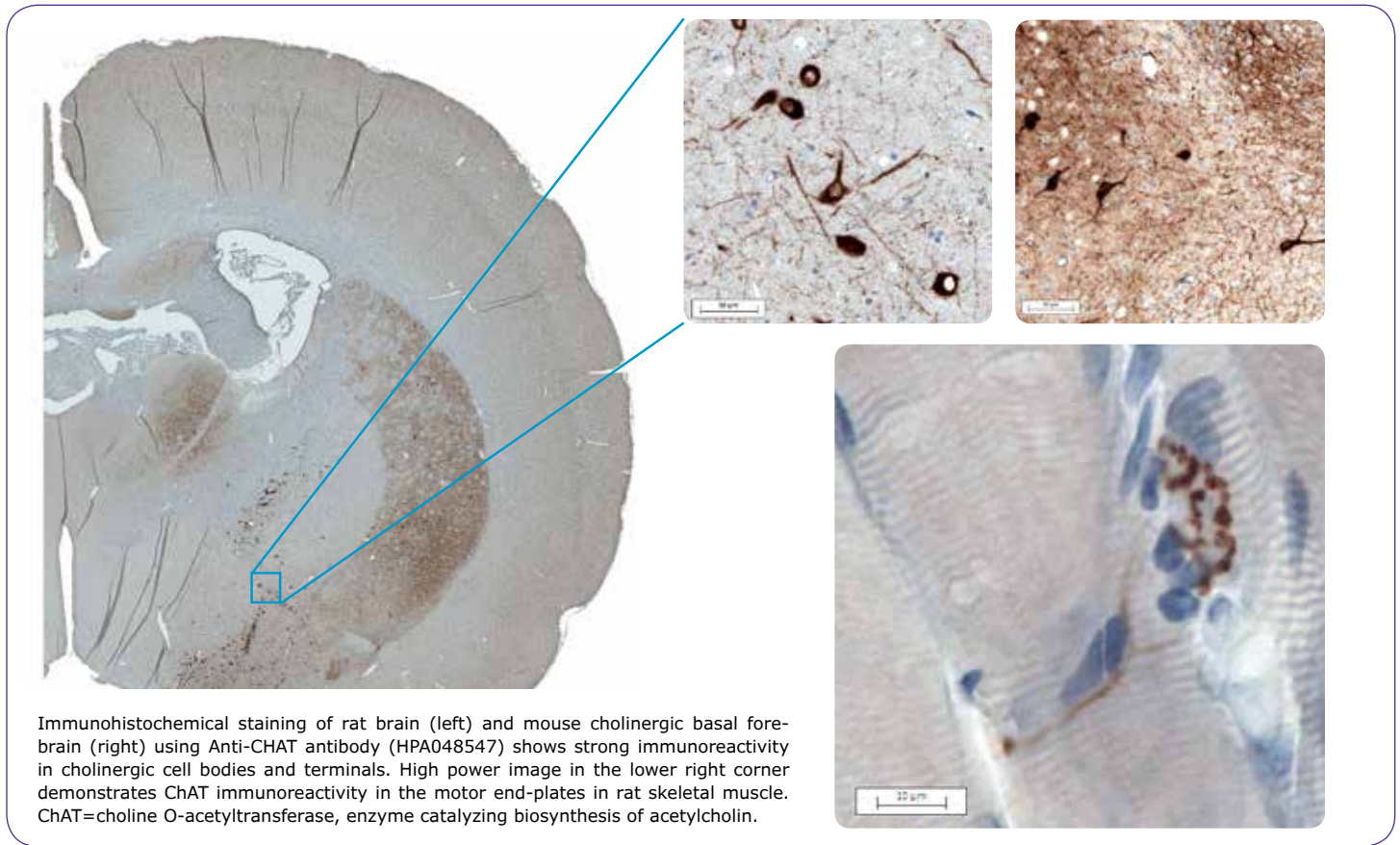
Marker for	Product Name	Product Number	Validated Applications	Isotype
Neurons	Anti-NEFM (NF160)	AMAb91027	IHC*, WB*	IgG1 K
Neurons	Anti-NEFM (NF160)	AMAb91028	IHC*, WB*	IgG1 K
Neurons	Anti-NEFM (NF160)	AMAb91029	IHC*, WB*	IgG2a K
Neurons	Anti-NEFM (NF160)	AMAb91030	IHC*, WB*	IgG2b K
Neurons	Anti-NEFH (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 neurons	Anti-TH	AMAb91112	IHC*	IgG1
Serotonin neurons	Anti-TPH2	AMAb91108	IHC*	IgG1

\* Validated for human and rodent samples

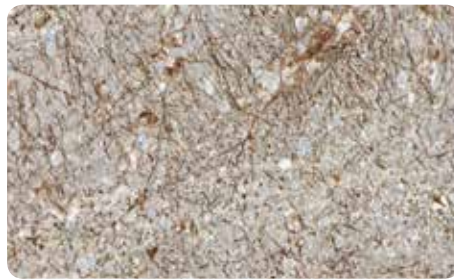


**Figure 3.** IHC-IF (A, B, D) and bright-filed (C) IHC staining demonstrating specificity and selectivity of Anti-NET antibody (AMAb91116) in rat (A, D), mouse (B) and human (C) brain. Staining with Anti-NET (AMAb91116) is shown in green (A, B, D) and in brown (C). DAT immunoreactivity is visualized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

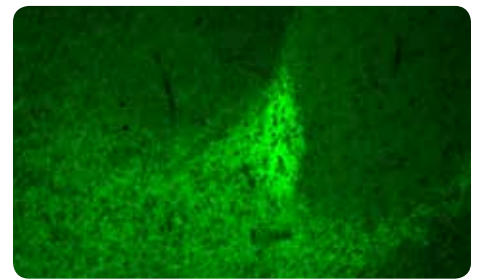
## Signaling



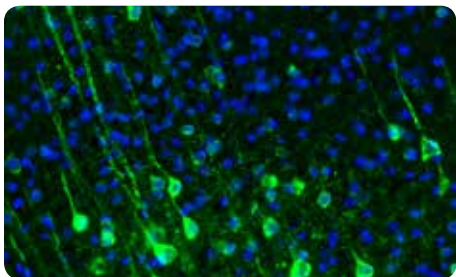
The Anti-MGLUR1 antibody (HPA015701) against glutamate receptor, metabotropic 1 strongly labels cortical perikarya, shown by IHC in human cerebral cortex tissue.



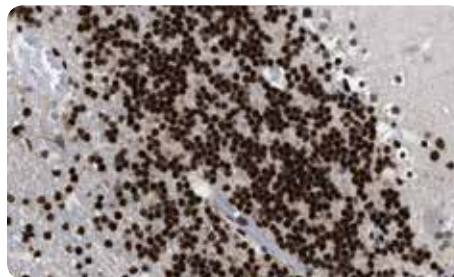
The Anti-KIF11 antibody (HPA010568) against Kinesin family member 11 strongly labels fibers in human hippocampus tissue.



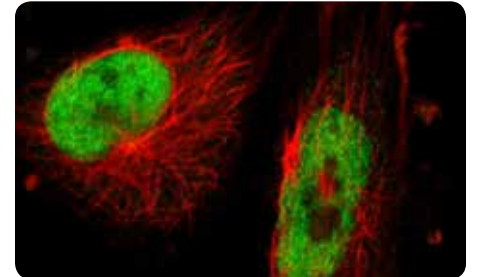
The gamma-aminobutyric acid (GABA) A receptor, alpha 3 (Anti-GABRA3) antibody (HPA000839) strongly labels fibers in various brain regions including the rat central amygdala.



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).



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).



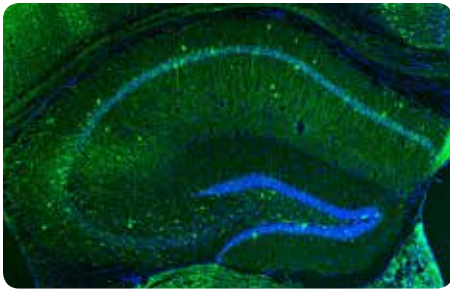


Product Name	Product Number	Applications	Antigen seq identity to mouse/rat
Anti-ATF2	HPA022134	IHC,WB*,ICC-IF	99 / 99%
Anti-ATF3	AMAb90909	IHC	92 / 92%
Anti-ATF3	HPA001562 <sup>1-3</sup>	IHC,WB*,ICC-IF	92 / 92%
Anti-ATP1B1	HPA012911 <sup>4</sup>	IHC,WB	93 / 93%
Anti-ATP1B2	HPA010698 <sup>5</sup>	IHC	96 / 88%
Anti-CAMK2B	HPA026307	IHC,WB*	96 / 96%
Anti-CAMK2D	HPA026281	IHC	100 / 97%
Anti-C-FOS	HPA018531 <sup>6</sup>	IHC,WB*,ICC-IF	94 / 94%
Anti-CHAT	AMAb91130	IHC	96 / 96%
Anti-CHAT	HPA048547	IHC	96 / 96%
Anti-CHRM1 (M1 mAChR)	HPA014101 <sup>7</sup>	IHC	98 / 97%
Anti-CHRM2 (M2 AChR)	HPA029795	IHC	88 / 86%
Anti-CLIC4	HPA008019 <sup>8,9</sup>	IHC,WB,ICC-IF	98 / 97%
Anti-CREB1	HPA019150	IHC,WB*,ICC-IF	100 / 100%
Anti-DAT	HPA013602	IHC	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 <sup>10</sup>	IHC,WB*	91 / 93%
Anti-GABRB1	HPA051297	IHC	97 / 100%
Anti-GABRG1	HPA035622 <sup>11</sup>	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		IHC	98 / 98%
Anti-GAT3	HPA013341	IHC,WB	85 / 87%
Anti-GLUR2 (AMPA2)	HPA037981	IHC	100 / 100%
Anti-HTR2A	HPA008441 <sup>12,13</sup>	IHC	95 / 97%
Anti-KCC4	HPA014011	IHC,WB*	84 / 82%
Anti-KCNJ5 (KIR3.4)	HPA041652	IHC,WB	89 / 89%
Anti-KCNN2 (KCA2.2)	HPA017353 <sup>14</sup>	IHC	96 / 97%
Anti-KIF11	HPA010568 <sup>15</sup>	IHC,WB*,ICC-IF	88 / 83%
Anti-KIF17	HPA032085	IHC,ICC-IF	85 / 82%
Anti-KIF18A	HPA039312 <sup>16</sup>	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%

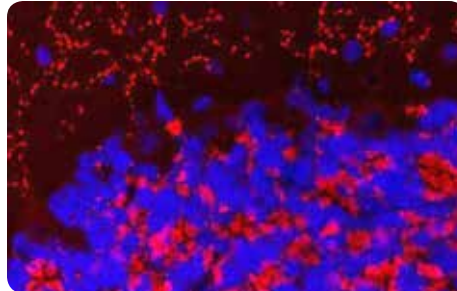
\* WB both in human and rodent samples

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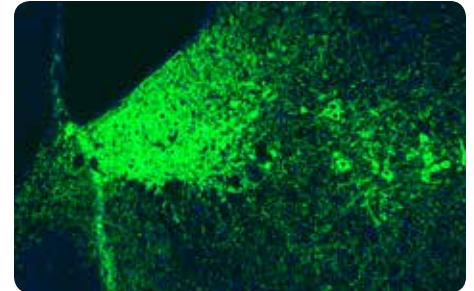
## Signaling (continued)



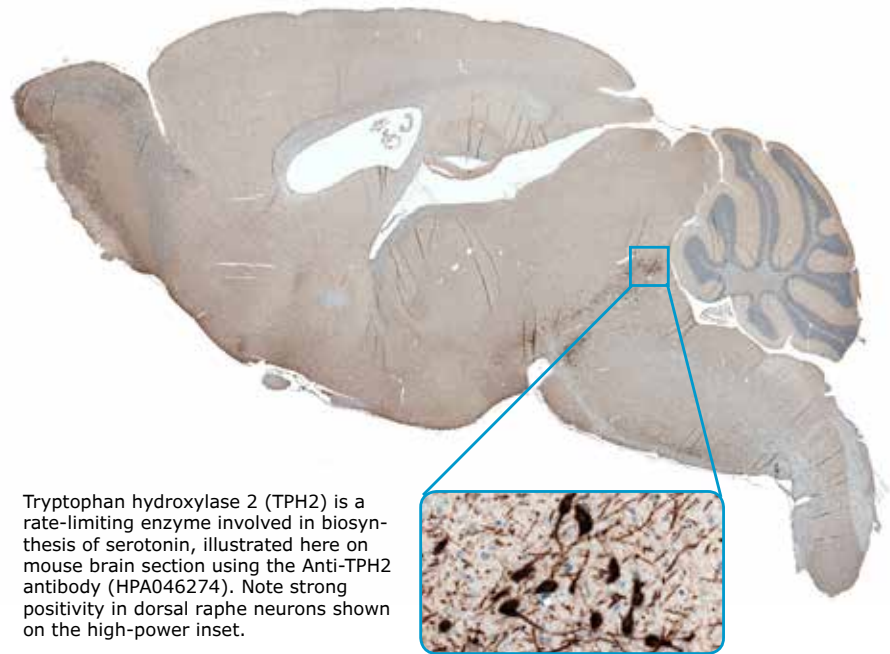
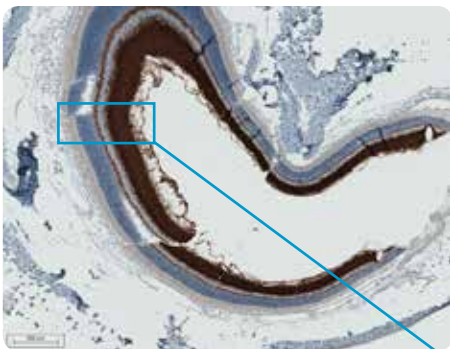
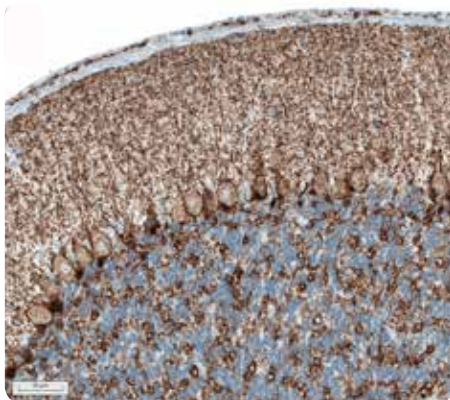
The GTPase-activating protein RAP1GAP is expressed in a subset of neurons including hippocampal interneurons in the mouse brain. This is illustrated using the Anti-RAP1GAP antibody (HPA001922).



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.

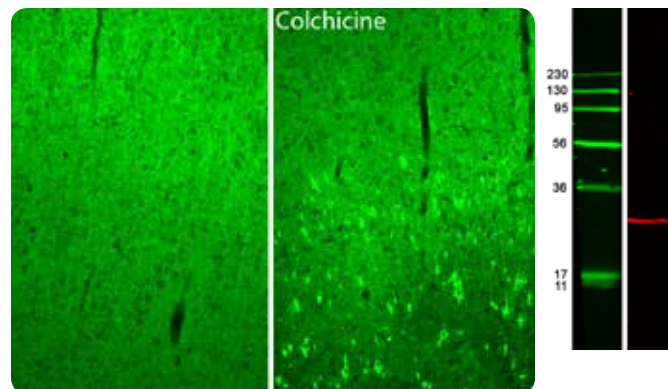


The noradrenaline transporter (NET/SLC6A2) is responsible for reuptake of noradrenaline into presynaptic nerve terminals and stains noradrenergic fibers throughout the brain and labels noradrenergic neurons in the rat locus coeruleus. Illustrated here by the Anti-SLC6A2/NET antibody (AMAb91116).



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.

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



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).

Product Name	Product Number	Applications	Antigen seq identity to mouse/rat
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-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 <sup>17</sup>	IHC,WB*	92 / 91%
Anti-RAP1GAP2	HPA022896 <sup>18</sup>	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 <sup>19</sup>	IHC,WB	84 / 77%
Anti-SLC32A1 (VGAT)	AMAb91943	IHC	95 / 93%
Anti-SLC32A1 (VGAT)	HPA058859	IHC	95 / 93%
Anti-SLC6A2 (NET)	AMAb91116	IHC	
Anti-SLC6A3 (DAT)	AMAb91125	IHC	85 / 85%
Anti-SLC6A3 (DAT)	HPA013602	IHC,WB	85 / 85%
Anti-SNAP25	HPA001830 <sup>20-22</sup>	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-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-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 <sup>23</sup>	IHC,ICC-IF	98 / 93%

\* WB both in human and rodent samples

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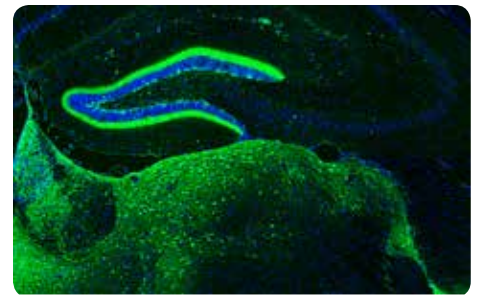
20. Mulder J *et al.* Tissue profiling of the mammalian central nervous system using human antibody-based proteomics. *Mol Cell Proteomics* 2009 Jul;8(7):1612-22.

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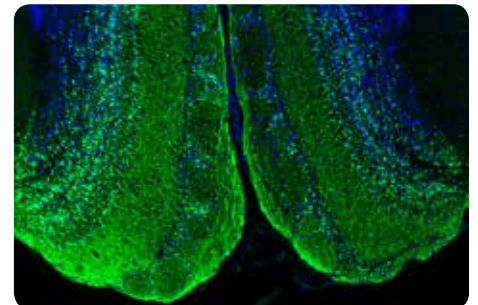
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23. Tannour-Louet M *et al.* Increased gene copy number of the vesicle SNARE VAMP7 disrupts human male urogenital development through altered estrogen action. *Nat Med* 2014/07/01 00:00; 20(7):715-724. Epub 2014/06/01.

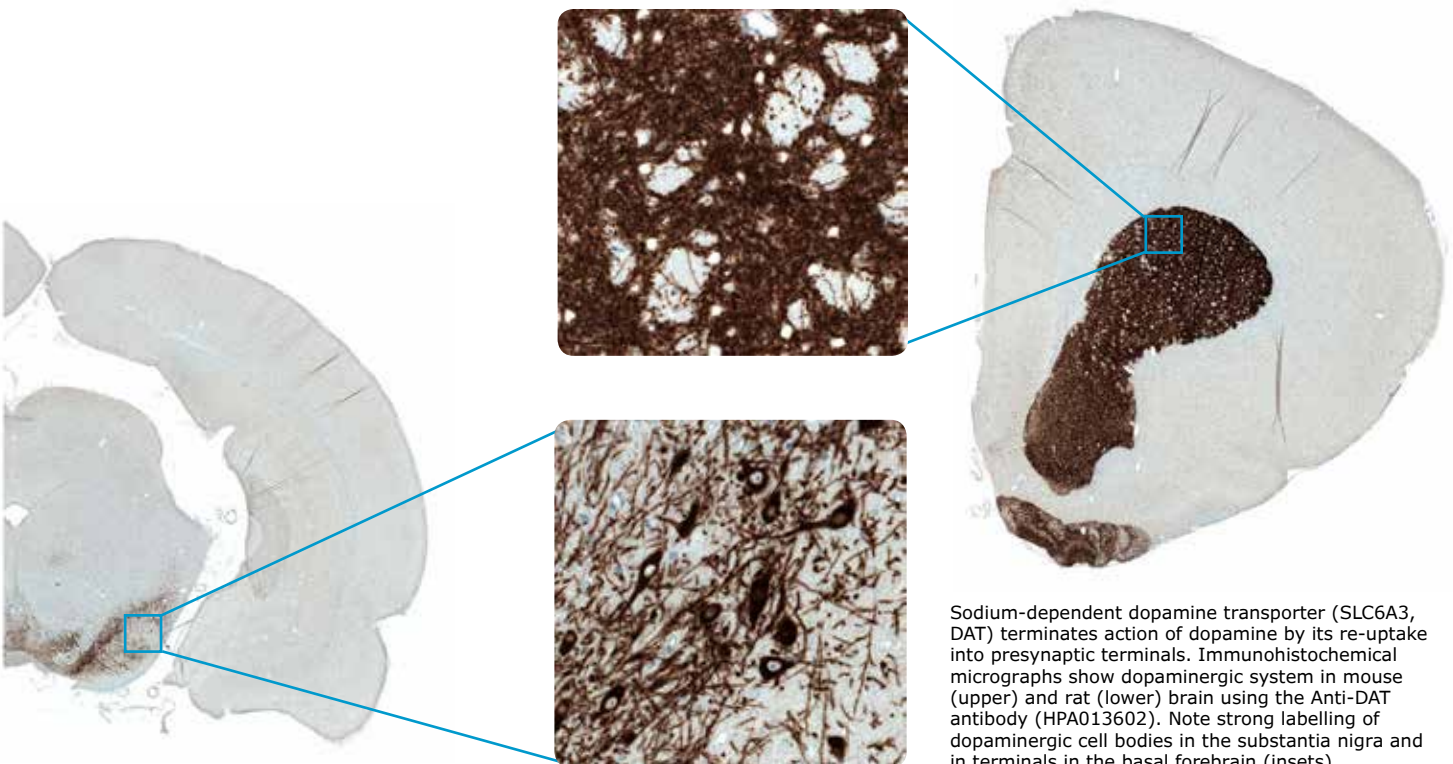
## Signaling (continued)



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.



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



Sodium-dependent dopamine transporter (SLC6A3, DAT) terminates action of dopamine by its re-uptake into presynaptic 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 <sup>1</sup>	cytoskeleton	IHC,WB*	98 / 99%
Anti-ACTN4	HPA001873	cytoskeleton	IHC,WB*,ICC-IF	99 / 98%
Anti-AIF	HPA049234 <sup>2</sup>	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 <sup>3</sup>	microglia	IHC	76 / 76%
Anti-CNP	AMAb91068	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 <sup>4,5</sup>	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 <sup>6,7</sup>	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 11920(CD11b)	HPA002274 <sup>8,9</sup>	microglia	IHC,WB	67 / 68%
Anti-MAP1A	HPA039064	cytoskeleton	IHC	60 / 52%
Anti-MAP1B	HPA022275 <sup>10</sup>	cytoskeleton	IHC,ICC-IF	85 / 86%
Anti-MAP2	HPA008273 <sup>11</sup>	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 <sup>12,13</sup>	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%
Anti-NCAM2	HPA030900 <sup>13</sup>	adhesion molecule	IHC,ICC-IF	89 / 91%
Anti-NECAB1	AMAb90801	calcium binding protein; interneurons	IHC,WB	98 / 98%
Anti-NECAB1	HPA023629 <sup>14</sup>	calcium binding protein; interneurons	IHC,WB	98 / 98%
Anti-NECAB2	AMAb90808	calcium binding protein; interneurons	IHC	85 / 84%
Anti-NECAB2	HPA013998 <sup>14</sup>	calcium binding protein; interneurons	IHC,ICC-IF	98 / 97%

\* WB both in human and rodent samples

1. Stadler C *et al.* Immunofluorescence and fluorescent-protein tagging show high correlation for protein localization in mammalian cells. *Nat Methods*, 2013 Apr; 10(4):315-23. Epub 2013 Feb 24.

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## Neural Lineage Markers (continued)

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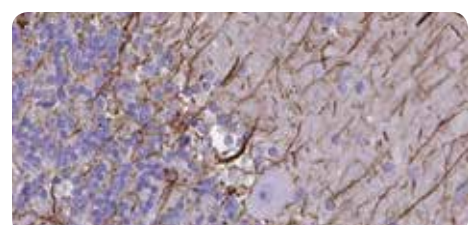
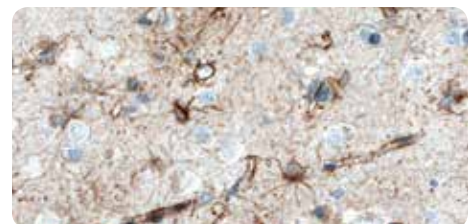
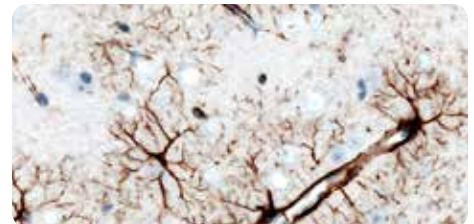
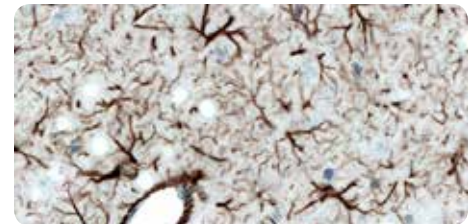
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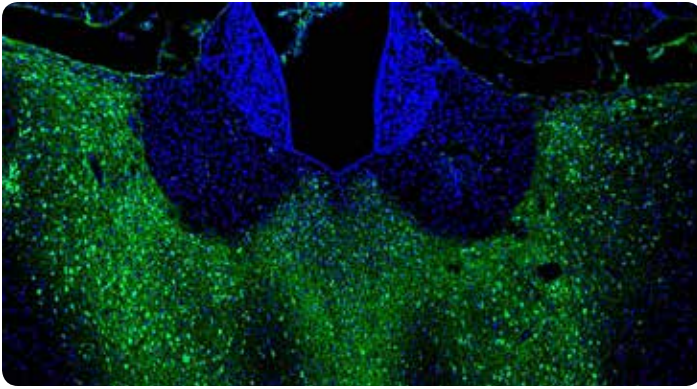
28. Chen Y, *et al.* The prognostic potential and oncogenic effects of PRR11 expression in hilar cholangiocarcinoma. *Oncotarget*, 2015 Aug 21; 6(24):20419-20433. Epub 2015 May 4.

Product Name	Product Number	Subcategory	Applications (human tissues)	Antigen seq identity to mouse/rat
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 <sup>15,16</sup>	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 <sup>17</sup>	microgila	IHC,WB	35 / 37%
Anti-RBFOX3	HPA030790 <sup>18,19</sup>	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 <sup>20-22</sup>	S100 calcium binding protein B	IHC,WB,ICC-IF	99 / 98%
Anti-SCGN	AMAb90630 <sup>23</sup>	calcium binding protein;interneurons	IHC,WB	96 / 96%
Anti-SCGN	HPA006641 <sup>14,24,25</sup>	calcium binding protein;interneurons	IHC	96 / 96%
Anti-UCHL1	AMAb91145	neurons	IHC,WB*	97 / 97%
Anti-UCHL1	HPA005993 <sup>27,28</sup>	neurons	IHC,WB*,ICC-IF	97 / 97%

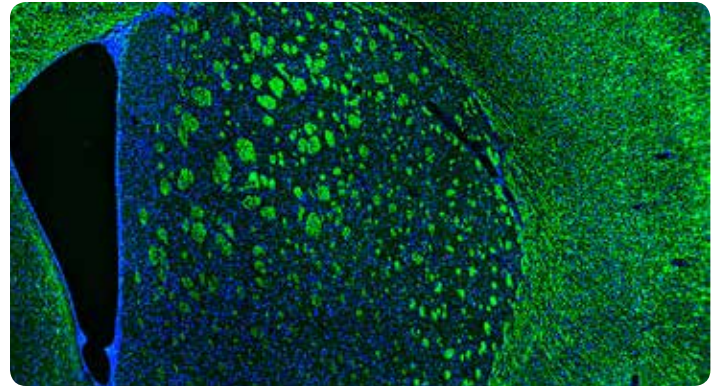


Glial fibrillary acidic protein (GFAP) is a cell-specific marker for astrocytes. Here illustrated by the Anti-GFAP antibody HPA056030 in rat cerebral cortex (upper left), mouse cerebral cortex (upper right), human cerebral cortex (lower left) and human cerebellum (lower right) tissue.

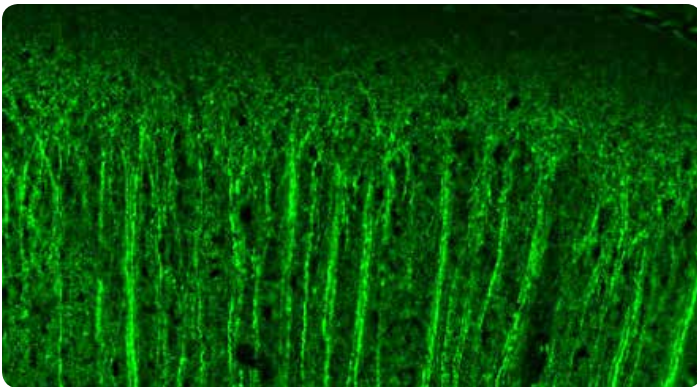
\* WB both in human and rodent samples



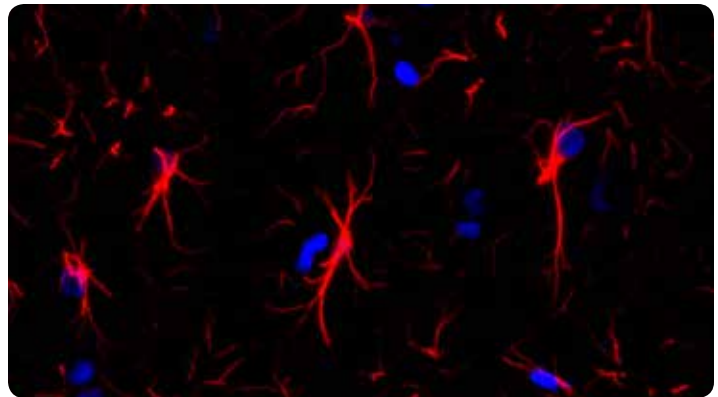
Distribution of NECAB1 (green) in the mouse dorsal medial thalamus. The Prestige Monoclonal Anti-NECAB1 antibody AMAb90801 strongly labels neurons and their processes in the paraventricular and mediodorsal thalamic nuclei. Blue is the nuclear staining Hoechst.



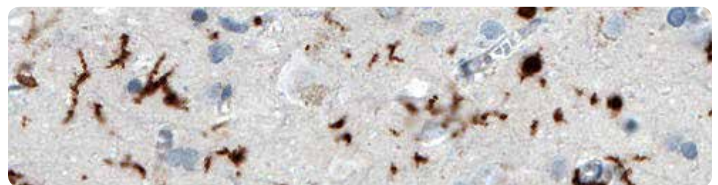
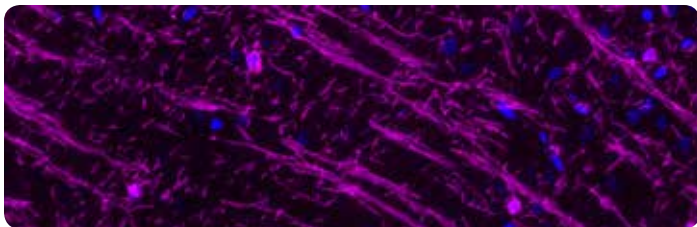
The image shows Anti-INA antibody (HPA008057) targeting internexin neuronal intermediate filament protein alpha (INA). Note the strong labeling of axons in striatal nerve bundles in the mouse brain.



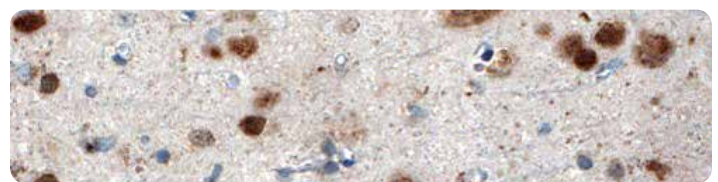
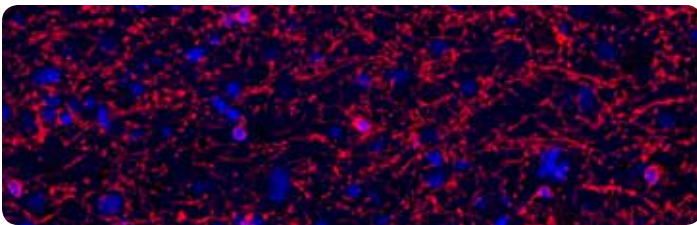
Anti-MAP2 antibody (HPA008273) against microtubule-associated protein 2 (MAP2) strongly labels dendrites in the mouse cortex.



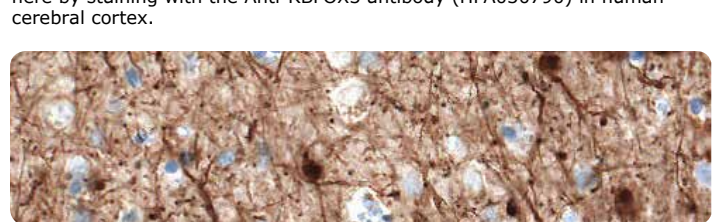
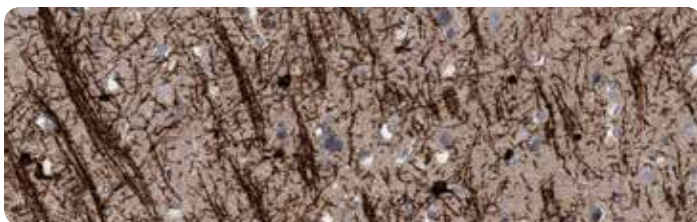
Glial fibrillary acidic protein (GFAP) is a cell specific marker distinguishing astrocytes from the other glial cells in the central nervous system. Labelling with the Anti-GFAP antibody HPA056030 shows astrocytes in rat cerebral cortex.



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



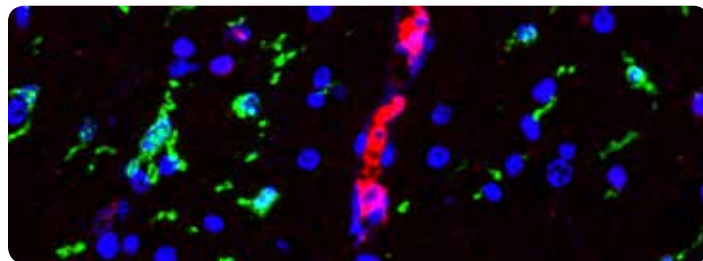
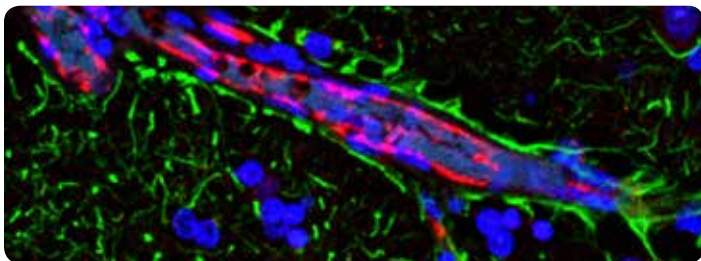
RBFOX3 (=NeuN) is a neuronal specific nuclear protein which can be used to distinguish neurons from glial cells in tissue cultures and sections. Illustrated here by staining with the Anti-RBFOX3 antibody (HPA030790) in human cerebral cortex.



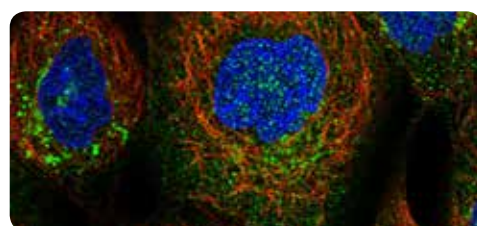
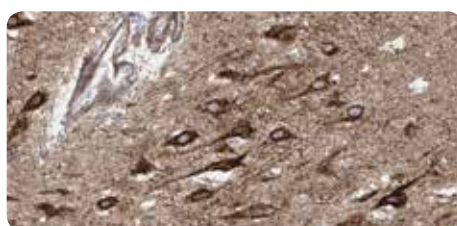
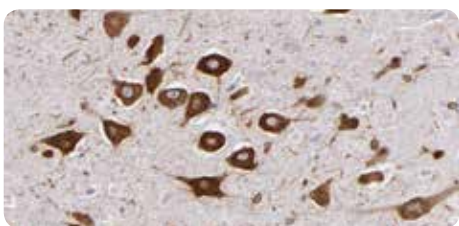
2',3'-cyclic-nucleotide 3'-phosphodiesterase (CNP) is a marker for oligodendrocytes in the central nervous system. Illustrated here by the Anti-CNP antibody HPA023280 (IHC) and HPA023266 (IF) in human cerebral cortex (left, middle) and in rat cerebral cortex (right).

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

## Aging and Neurological Disorders



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).



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-ADAR	AMAb90535 <sup>1</sup>	IHC,WB	86 / 85%
Anti-ADAR	HPA003890 <sup>2-3</sup>	IHC,WB,ICC-IF	86 / 85%
Anti-AIMP1	HPA018476	IHC,WB*,ICC-IF	96 / 97%
Anti-AKT1	AMAb90834	WB	97 / 97%
Anti-AOX1	HPA040199	IHC,ICC-IF	84 / 86%
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-APOA4	AMAb90769	IHC, WB	65 / 28%
Anti-APP	HPA001462 <sup>4</sup>	IHC,ICC-IF	95 / 95%
Anti-AQP4	AMAb90537	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-ATRAX	AMAb90784	ICC-IF, IHC, WB	96 / 97%
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 <sup>6</sup>	IHC,WB*,ICC-IF	84 / 88%
Anti-CD4	AMAb90754	IHC, WB	55 / 57%
Anti-CD40	AMAb90905	IHC, WB	58 / 54%
Anti-CHGA	AMAb90525	IHC, WB	62 / 64%
Anti-COX1	HPA002834 <sup>7</sup>	IHC,WB	93 / 90%
Anti-COX2/PTGS2	HPA001335 <sup>8,9</sup>	IHC	88 / 88%
Anti-CTSB	HPA018156 <sup>10,11</sup>	IHC,WB*,ICC-IF	79 / 79%

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-CTSD	HPA003001 <sup>12</sup>	IHC,WB	86 / 86%
Anti-CXorf27	HPA003356	IHC	47 / 46%
Anti-FBXO7 (PARK15)	HPA032114	IHC	78 / 81%
Anti-FUS	AMAb90549	ICC-IF, IHC, WB	91 / 91%
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 <sup>13,14</sup>	IHC,WB	67 / 68%
Anti-ITM2B	HPA029292	IHC,WB,ICC-IF	95 / 96%
Anti-LRP2	HPA005980 <sup>15</sup>	IHC	78 / 36%
Anti-MSR1	HPA000272	IHC,WB	60 / 59%
Anti-NFKB1	HPA027305	IHC,WB,ICC-IF	60 / 62%
Anti-OPTN	HPA003360 <sup>16</sup>	IHC,WB,ICC-IF	64 / 68%
Anti-PADI4	HPA017007	IHC,WB	66 / 69%
Anti-PARK7	HPA004190 <sup>17</sup>	IHC,WB*	89 / 90%
Anti-PFN1	AMAb91181	IHC, WB	87 / 87%
Anti-PHGDH	AMAb90786	IHC, WB	99 / 99%
Anti-PHGDH	HPA021241 <sup>18-21</sup>	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%



Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-RHOT1	HPA010687 <sup>22,24</sup>	IHC,WB	100 / 100%
Anti-S100A8	HPA024372 <sup>25</sup>	IHC,WB	56 / 60%
Anti-SERPINA3	HPA002560 <sup>26,27</sup>	IHC,WB	60 / 59%
Anti-SNCB	HPA035876	IHC,WB,ICC-IF	97 / 97%
Anti-SOD1	HPA001401 <sup>28,29</sup>	IHC,WB*,ICC-IF	82 / 81%
Anti-SOD2	HPA001814 <sup>30,31</sup>	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-TTR	AMAb90649	IHC, WB	81 / 83%

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-UBE2K	HPA028869	IHC,ICC-IF	100 / 100%
Anti-UCHL1	HPA005993 <sup>32</sup>	IHC,WB*,ICC-IF	97 / 97%
Anti-USP46	AMAb90722	WB	100 / 99%
Anti-VPS26A	AMAb90967	ICC-IF, IHC, WB	96 / 100%
Anti-WHSC1	AMAb90851	IHC,WB	91 / 91%
Anti-WHSC1	HPA015801 <sup>33</sup>	IHC,WB*,ICC-IF	91 / 91%
Anti-VWF	AMAb90928	IHC,WB	80 / 80%
Anti-VWF	HPA002082 <sup>34,35</sup>	IHC	82 / 78%

\* WB both in human and rodent samples

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## Development

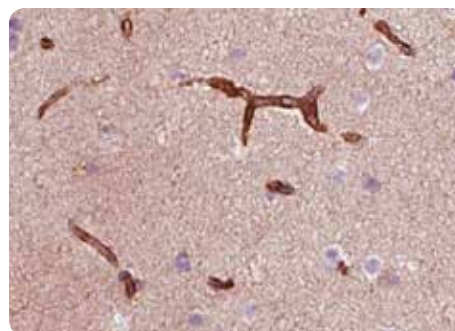


DNA-binding protein SATB2 is required for initiation of the upper-layer neurons specific genetic program and for inactivation of deep-layer neurons specific genes. Here illustrated by Anti-SATB2 antibody AMAb90679 in rat brain. Note strong nuclear immunoreactivity in cerebral cortex and in the CA1 layer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

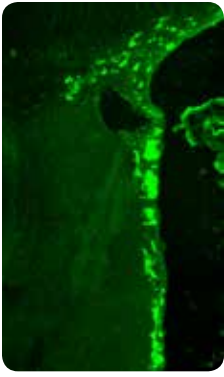
Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-CRBN	AMAb91227	WB	96 / 97 %
Anti-ENG	AMAb90925	IHC	66 / 22%
Anti-ENG	HPA011862 <sup>1</sup>	IHC,WB,ICC-IF	66 / 22%
Anti-FABP7	AMAb90595	IHC,WB	89 / 90%
Anti-FABP7	HPA028825 <sup>2,3</sup>	IHC,WB	89 / 90%
Anti-FLT1	AMAb90704	IHC,WB	80 / 82%
Anti-GAP43	HPA015600 <sup>4</sup>	IHC,WB	71 / 70%
Anti-CRBN	AMAb91227	WB	96 / 97 %
Anti-ENG	AMAb90925	IHC	66 / 22%
Anti-ENG	HPA011862 <sup>1</sup>	IHC,WB,ICC-IF	66 / 22%
Anti-FABP7	AMAb90595	IHC,WB	89 / 90%
Anti-FABP7	HPA028825 <sup>2,3</sup>	IHC,WB	89 / 90%
Anti-FLT1	AMAb90704	IHC,WB	80 / 82%
Anti-GAP43	HPA015600 <sup>4</sup>	IHC,WB	71 / 70%
Anti-GLI3	HPA005534	IHC,ICC-IF,WB	74 / 76%
Anti-MEF2C	AMAb90727	IHC,WB	97 / 47%
Anti-MEF2C	HPA005533 <sup>5-8</sup>	IHC,WB,ICC-IF	97 / 47%
Anti-MKI67 (Ki67)	HPA000451 <sup>9,10</sup>	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 <sup>11</sup>	IHC,WB,ICC-IF	47 / 42%
Anti-NKX2-2	HPA003468 <sup>12,13</sup>	IHC,WB	96 / 97%
Anti-PAX6	HPA030775	IHC,ICC-IF	100 / 100%
Anti-PBK	HPA005753	IHC,WB*,ICC-IF	91 / 94%
Anti-REST	AMAb90740	IGC	41 / 43%
Anti-RUNX1	HPA004176 <sup>14</sup>	IHC,WB,ICC-IF	93 / 93%
Anti-RUNX2	AMAb90591	IHC,WB	100 / 81%
Anti-RUNX2	HPA022040 <sup>15,16</sup>	IHC,WB,ICC-IF	100 / 81%

Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-SATB2	AMAb90679 <sup>17</sup>	IHC,WB	100 / 100%
Anti-SATB2	HPA029543 <sup>18</sup>	IHC,ICC-IF	100 / 100%
Anti-SOX4	HPA029901	IHC,ICC-IF	100 / 39%
Anti-SOX6	HPA001923 <sup>19,20</sup>	IHC,WB,ICC-IF	96 / 96%
Anti-SOX7	HPA009065 <sup>21,22</sup>	IHC,WB	91 / 91%
Anti-SOX9	AMAb90795	IHC, WB	97 / 96%
Anti-SOX11	AMAb90502 <sup>23</sup>	IHC,WB	82 / 82%
Anti-SOX11	HPA000536 <sup>24-28</sup>	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 <sup>29,30</sup>	IHC,WB	96 / 96%
Anti-TM4SF2/TSPAN7	AMAb90621	IHC,WB	96 / 96%
Anti-VANGL1	AMAb90600	WB	95 / 95%
Anti-VIM (vimentin)	AMAb90516	IHC,WB	99 / 99%
Anti-VIM	HPA001762 <sup>31</sup>	IHC,WB*,ICC-IF	99 / 99%

\* WB both in human and rodent samples

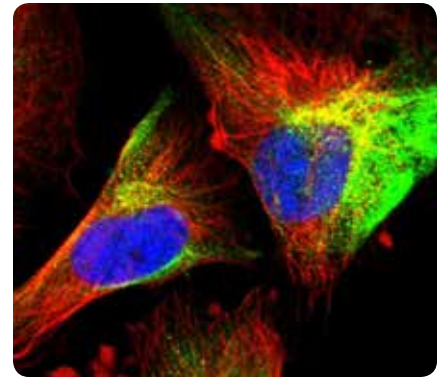
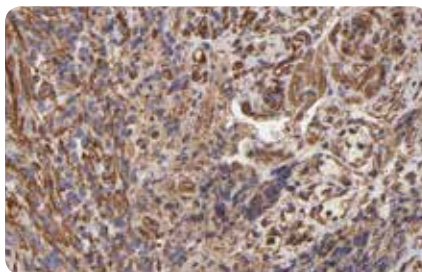
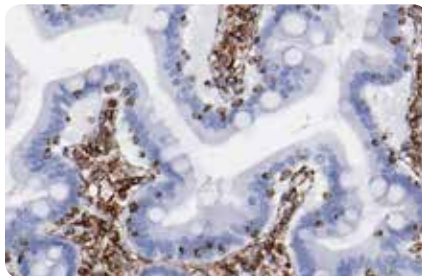


Immunohistochemical staining using the Anti-NES (Nestin) antibody AMAb90556 of human cerebral cortex shows strong immunoreactivity in the endothelial cells.



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

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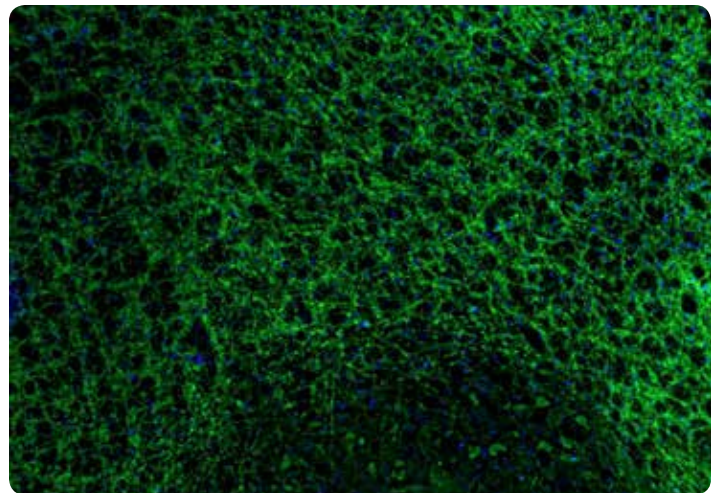


Immunohistochemical staining using the Anti-VIM (Vimentin) antibody HPA001762 of human duodenum shows distinct positivity in mesenchymal and lymphoid cells (upper left). In glioma tissue, immunoreactivity is strong in tumor cells (lower left). Immunofluorescent staining of human cell line U-251MG shows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

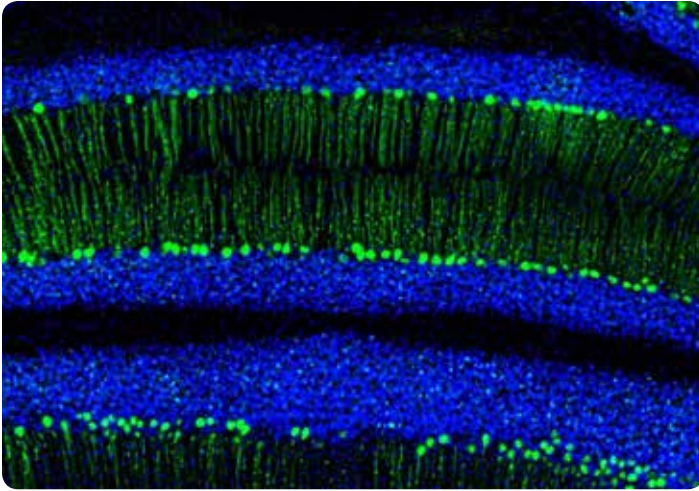
## Antibodies on HPA Mouse Brain Atlas

Product Name	Product Number	Applications (human tissues)	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 <sup>1</sup>	IHC,WB,ICC-IF	98% / 98%
Anti-BCAR1	HPA042282	IHC,WB,ICC-IF	75% / 93%
Anti-BCL11B	HPA049117	IHC	96% / 48%
Anti-BIRC3	HPA002317 <sup>2-4</sup>	IHC,WB,ICC-IF	75% / 74%
Anti-C17orf75	HPA004061 <sup>5</sup>	IHC,WB,ICC-IF	84% / 83%
Anti-C21orf59	HPA028849	IHC,WB	95% / 93%
Anti-CALB2	HPA007305 <sup>3</sup>	IHC,WB,ICC-IF	98% / 98%
Anti-CAMK2B	HPA026307	IHC,WB	96% / 96%
Anti-DDX3X	HPA001648 <sup>3,6</sup>	IHC,WB	97% / 97%
Anti-DPP6	HPA050509	IHC,WB	86% / 86%
Anti-DTX4	HPA059294	IHC,ICC-IF	86% / 33%
Anti-ECH1	HPA005835 <sup>3</sup>	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 <sup>5,7</sup>	IHC	91% / 90%
Anti-FRMD6	HPA001297 <sup>8</sup>	IHC,WB,ICC-IF	94% / 94%
Anti-GABRA3	HPA000839 <sup>3</sup>	IHC,WB	91% / 93%
Anti-GFAP	HPA056030	IHC,WB	98% / 100%
Anti-GKAP1	HPA035117	IHC,WB,ICC-IF	93% / 93%
Anti-GMFB	HPA002954 <sup>9</sup>	IHC,WB	97% / 94%
Anti-GOLGA5	HPA000992 <sup>10</sup>	IHC,WB,ICC-IF	70% / 76%
Anti-HSPA2	HPA000798 <sup>11-13</sup>	IHC,WB	95% / 95%
Anti-IER5	HPA029894	IHC,WB,ICC-IF	86% / 33%
Anti-INA	HPA008057 <sup>3</sup>	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 <sup>3</sup>	IHC,WB,ICC-IF	81% / 80%
Anti-MAP2	HPA012828 <sup>14,15</sup>	IHC,ICC-IF	91% / 89%
Anti-MARS	HPA004125 <sup>16</sup>	IHC,WB,ICC-IF	92% / 92%
Anti-MBP	HPA049222	IHC,WB	97% / 97%
Anti-NAGLU	HPA038815	IHC	88% / 89%
Anti-NDUFV2	HPA003404 <sup>17</sup>	IHC,WB	95% / 95%
Anti-NECAB1	HPA023629 <sup>18</sup>	IHC,WB	98% / 98%
Anti-NECAB2	HPA013998 <sup>18</sup>	IHC,ICC-IF	98% / 97%
Anti-NPAS2	HPA019674	IHC,WB,ICC-IF	85% / 87%
Anti-OGFOD1	HPA003215 <sup>19,20</sup>	IHC,WB,ICC-IF	80% / 81%

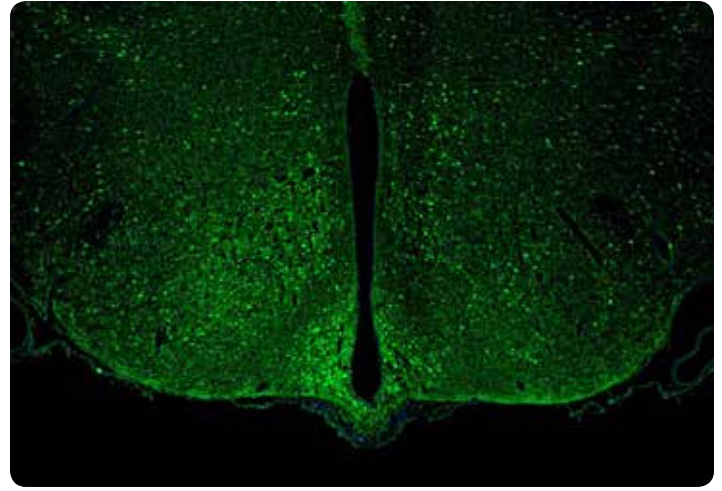
Product Name	Product Number	Applications (human tissues)	Antigen seq identity to mouse/rat
Anti-OTUB1	HPA039176	IHC,WB,ICC-IF	100% / 100%
Anti-PBK	HPA005753	IHC,WB,ICC-IF	91% / 94%
Anti-PCP4	HPA005792 <sup>21-24</sup>	IHC,WB	96% / 96%
Anti-PPP1R1B	HPA048630	IHC,WB	87% / 91%
Anti-QK1	HPA019123	IHC,WB,ICC-IF	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 <sup>3,25</sup>	IHC,WB,ICC-IF	99% / 98%
Anti-SCGN	HPA006641 <sup>26-29</sup>	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 <sup>30</sup>	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%



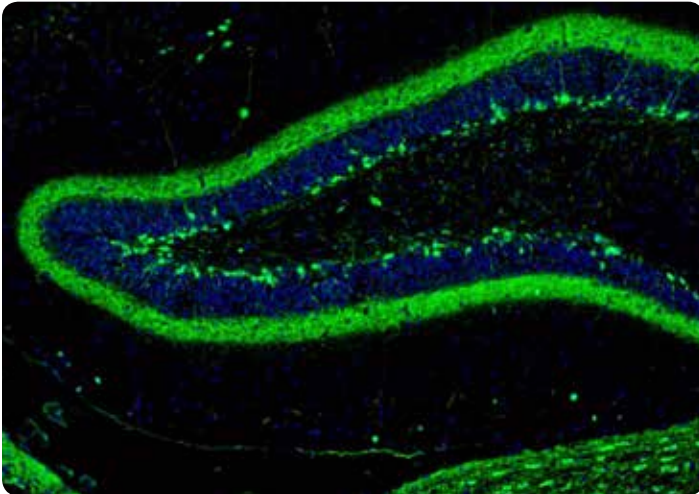
Immunofluorescence IHC staining of mouse medulla with Anti-GABRA3 antibody (HPA000839) shows strong immunoreactivity in neuronal processes and cell bodies.



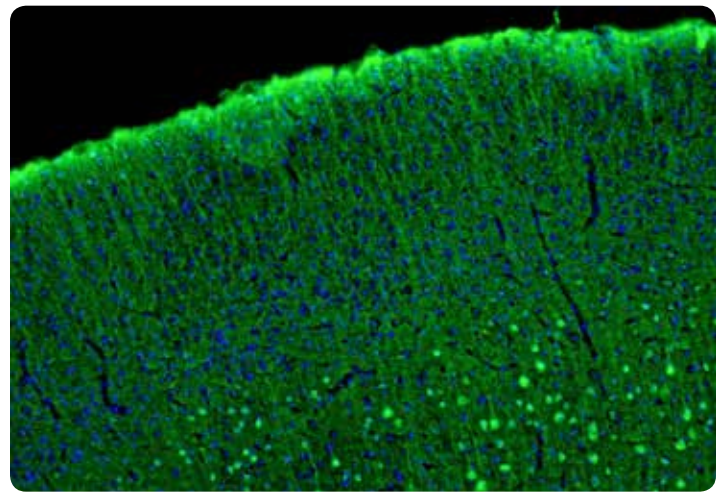
Immunohistochemical staining of mouse cerebellum with Anti-CAMK2B antibody (HPA026307) shows neuronal positivity in Purkinje cells.



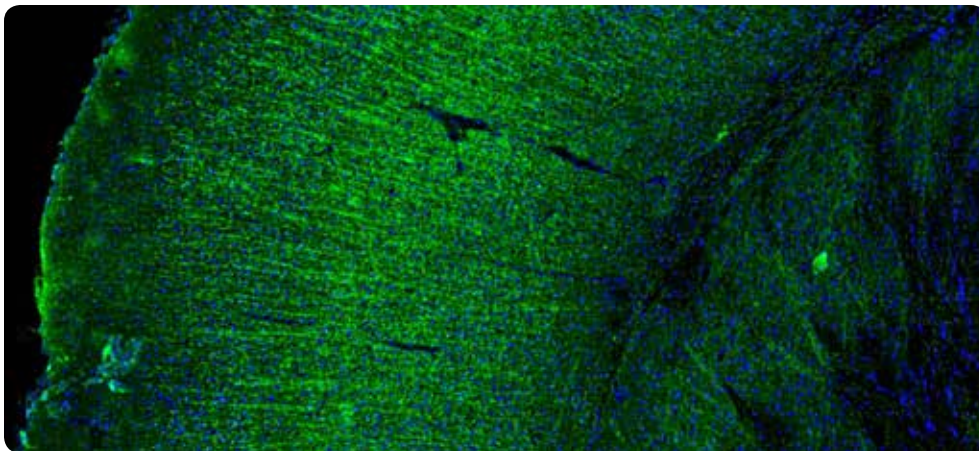
Immunohistochemical staining of mouse hypothalamus with Anti-CALB antibody (HPA007305) shows selective staining in a subset of neurons and fibers in the arcuate nucleus.



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

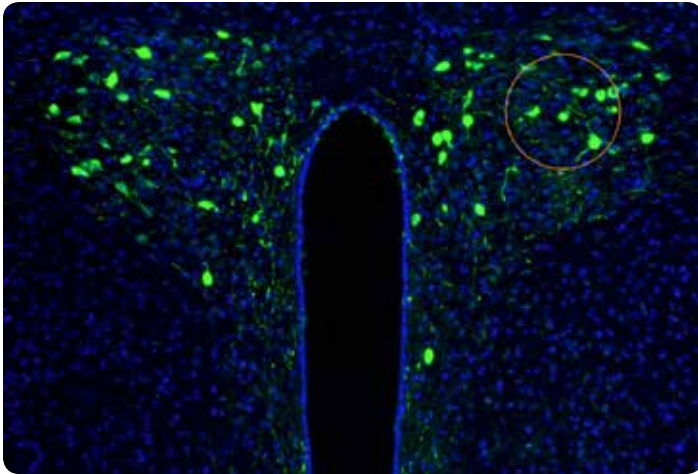


Immunohistochemical staining of mouse cerebral cortex with Anti-MBP antibody (HPA049222) shows strong staining in myelinated fibres.

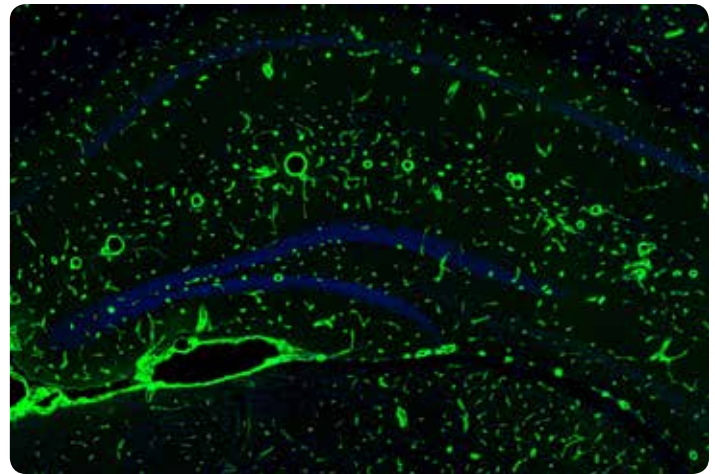


Immunofluorescence IHC staining of mouse cerebral cortex with Anti-PCP4 antibody (HPA005792) shows strong immunoreactivity in neuronal cell bodies in the deep cortical layers.

## Antibodies on HPA Mouse Brain Atlas (continued)



Immunofluorescence IHC staining of mouse hypothalamus with Anti-SAYS1 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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*Proc Natl Acad Sci U S A* 2014 Mar 25;111(12):E1149-58.

## Dr. Jan Mulder

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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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