Anti-GFAP Antibody (Previously Covance catalog# SMI-21R)

Catalog# / Size	837201 / 100 µL 837202 / 500 µL
Clone	SMI 21
Regulatory Status	RUO
Other Names	Glial fibrillary acidic protein
Previously	Covance Catalog# SMI-21R
Isotype	Mouse IgG1, κ
Description	Glial fibrillary acidic protein is an intermediate filament (IF) protein that is expressed by numerous cell types of the central nervous system (CNS) including astrocytes and ependymal cells. GFAP has also been found to be expressed in glomeruli and peritubular fibroblasts, Leydig cells of the testis, keratinocytes, osteocytes and chondrocytes and stellate cells of the pancreas and liver. GFAP is a type III IF protein that is closely related to its non-epithelial family members, vimentin, desmin, and peripherin, which are all involved in the structure and function of the cell's cytoskeleton. GFAP is thought to help to maintain astrocyte mechanical strength, as well as the shape of cells. Type III intermediate filaments are highly conserved and contain three domains, named the head, rod and tail domains. This rod domain coils around that of another filament to form a dimer, with the N-terminal and C-terminal of each filament aligned. Type III filaments such as GFAP are capable of forming both homodimers and heterodimers; GFAP can polymerize with other type III proteins or with neurofilament protein (NF-L). Interestingly, GFAP and other type III IF proteins cannot assemble with keratins, the type I and II intermediate filaments: in cells that express both proteins, two separate intermediate filament networks form. To form networks, the initial GFAP dimers combine to make staggered tetramers, which are the basic subunits of an intermediate filament. The non-helical head and tail domains are necessary for filament formation. The head and tail regions have greater variability of sequence and structure. In spite of this increased variability, the head of GFAP contains two conserved arginines and an aromatic residue that are required for proper assembly.

Product Details

Verified Reactivity	Human, Monkey, Canine
Antibody Type	Monoclonal
Host Species	Mouse
Formulation	Ascites Fluid (Contains 0.01 M sodium azide).
Preparation	Ascites
Concentration	The concentration is not quantified as this product is sold as undiluted crude mouse ascites fluid. The concentration might vary from lot-to-lot and an estimated concentration would be 1-3 mg/ml.
Storage & Handling	Store at -20°C. Upon initial thawing, apportion into working aliquots and store at -20°C. Avoid repeated freeze-thaw cycles to prevent denaturing the antibody. For long-term storage, keep the antibody at -80°C.
Application	IHC-P - *Quality tested* WB - *Verified* ICC - *Reported in the literature, not verified in house*
Recommended Usage	Each lot of this antibody is quality control tested by formalin-fixed paraffin-embedded immunohistochemical staining. For immunohistochemistry, a dilution range of 1/1000 - 1/2000 is suggested. For Western blotting, the suggested use of this reagent is 1/1000 - 1/2000. It is recommended that the reagent be titrated for optimal performance for each application.
Application Notes	SMI 21 has been tested for immunocytochemical localization of GFAP in astrocytes and Bergmann glia in human, monkey and dog paraffin sections. Astrocytomas from human and dog show a

positive reaction with SMI 21. Rat, rabbit and mouse brain sections do not react with SMI 21. Other species have not been examined. No reactivity was observed on liver and kidney paraffin sections. SMI 21 reacts with GFAP and shows no cross reactivity with other intermediate filaments on tissue sections or Western blots of human brain proteins. Rat cytoskeletal proteins do not react with SMI 21.

Application References

(PubMed link indicates BioLegend citation)

1. Perng MD, Wen SF, Gibbon T, Middeldorp J, Sluijs J, Hol EM, Quinlan RA. Glial Fibrillary Acidic Protein Filaments Can Tolerate the Incorporation of Assembly-compromised GFAP-?, but with Consequences for Filament Organization and ?B-Crystallin Association. *Mol. Biol. Cell*; 19: 4521 - 4533, Oct 2008. **(ICC, WB)**
2. Chen MH, Hagemann TL, Quinlan RA, Messing A, Perng MD. Caspase Cleavage of GFAP Produces an Assembly-Compromised Proteolytic Fragment that Promotes Filament Aggregation. *ASN Neuro*; 5: AN20130032, Oct 2013. **(ICC, WB)** PubMed
3. Chort A, *et al.* 2013. *Brain* 136:1732. **(IHC-P, WB)** PubMed

Product Citations

1. Benraiss A, *et al.* 2016. Nat Commun. 7:11758. PubMed
2. Padmashri R, *et al.* 2020. J Comp Neurol. . PubMed
3. Chort A, *et al.* 2013. Brain. 136:1732-1745. PubMed
4. Shah D, *et al.* 2022. Cell Rep. 40:111280. PubMed
5. Lutgen V, *et al.* 2020. PLoS Pathog. 16:e1008381. PubMed
6. Chen M, *et al.* 2013. ASN Neuro. 5:e00125. PubMed
7. Guo X, *et al.* 2022. J Neuroinflammation. 19:285. PubMed
8. Windrem MS, *et al.* 2017. Cell Stem Cell. 21:195. PubMed
9. Koeppen AH, *et al.* 2017. J Neuropathol Exp Neurol. 76:969. PubMed

RRID

AB_2565371 (BioLegend Cat. No. 837201)
AB_2565372 (BioLegend Cat. No. 837202)

Antigen Details

Structure

GFAP is a 432 amino acid protein with a molecular mass of approximately 50 kD

Distribution

Tissue distribution: brain, cerebral cortex, hippocampus, cerebellum, and spinal cord. GFAP is expressed by numerous cell types of the central nervous system (CNS) including astrocytes, ependymal cells, and Bergmann glia cells (protoplasmic astrocyte). GFAP is expressed in cells lacking fibronectin.

Cellular distribution: cytoskeleton and cytosol.

Biology Area

Cell Biology, Neuroscience, Neuroscience Cell Markers

Molecular Family

Intermediate Filaments

Gene ID

2670

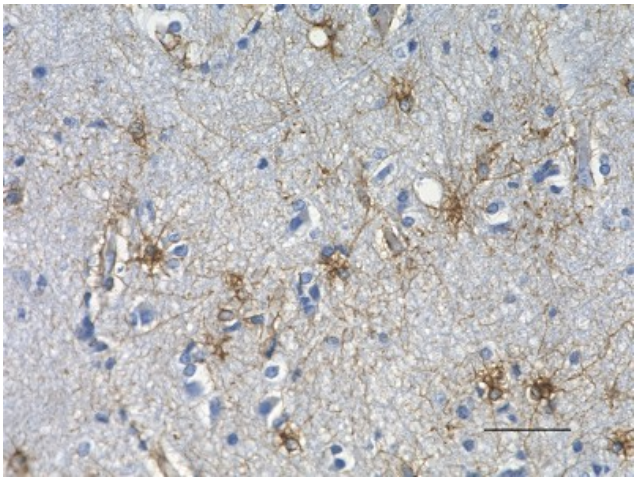
Related Protocols

Immunohistochemistry Protocol for Sternberger Monoclonal Antibodies

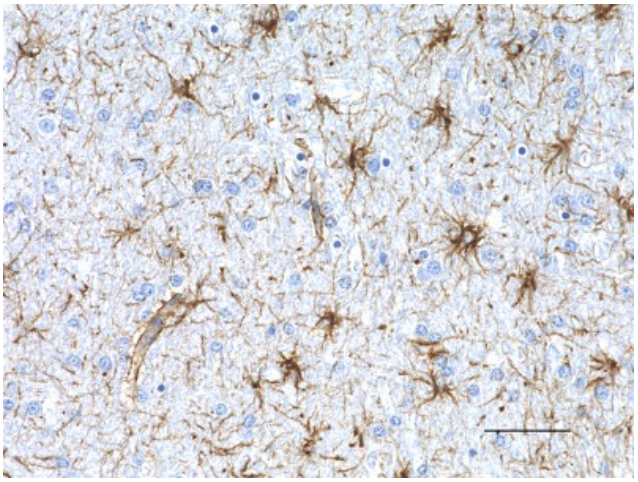
Other Formats

Anti-GFAP, Purified anti-GFAP

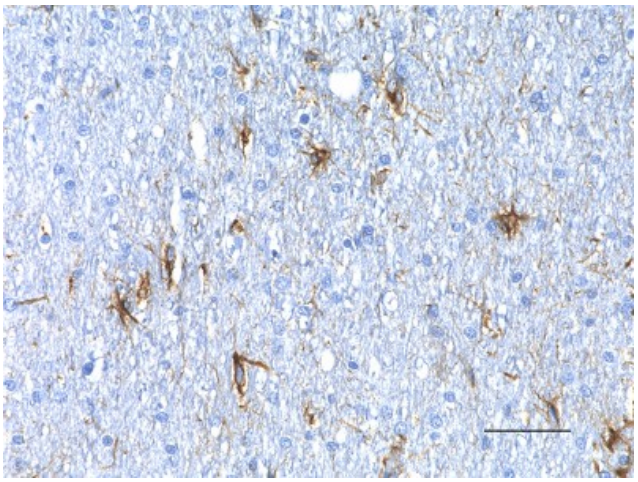
Product Data



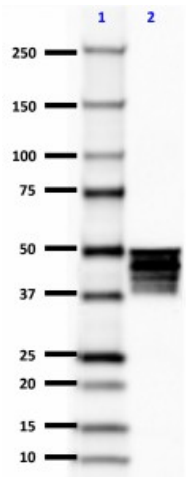
IHC staining of anti-GFAP antibody (clone SMI 21) on formalin-fixed paraffin-embedded human brain tissue. Following antigen retrieval using Retrieve-All Antigen Unmasking System 3: Acidic, 100X (Cat. No. 927601), the tissue was incubated with a 1:1000 dilution of the primary antibody for 60 minutes at room temperature. BioLegend's Ultra-Streptavidin (USA) HRP kit (Multi-Species, DAB, Cat. No. 929901) was used for detection followed by hematoxylin counterstaining, according to the protocol provided. The image was captured with a 40X objective. Scale bar: 50 µm



IHC staining of anti-GFAP antibody (clone SMI 21) on formalin-fixed paraffin-embedded monkey brain tissue. Following antigen retrieval using Retrieve-All Antigen Unmasking System 3: Acidic, 100X (Cat. No. 927601), the tissue was incubated with a 1:1000 dilution of the primary antibody for 60 minutes at room temperature. BioLegend's Ultra-Streptavidin (USA) HRP kit (Multi-Species, DAB, Cat. No. 929901) was used for detection followed by hematoxylin counterstaining, according to the protocol provided. The image was captured with a 40X objective. Scale bar: 50 µm



IHC staining of anti-GFAP antibody (clone SMI 21) on formalin-fixed paraffin-embedded canine brain tissue. Following antigen retrieval using Retrieve-All Antigen Unmasking System 3: Acidic, 100X (Cat. No. 927601), the tissue was incubated with a 1:1000 dilution of the primary antibody for 60 minutes at room temperature. BioLegend's Ultra-Streptavidin (USA) HRP kit (Multi-Species, DAB, Cat. No. 929901) was used for detection followed by hematoxylin counterstaining, according to the protocol provided. The image was captured with a 40X objective. Scale bar: 50 µm



Western blot of anti-GFAP antibody (clone SMI 21). Lane 1: Molecular weight marker; Lane 2: 20 µg of human brain lysate. The blot was incubated with a 1:2000 dilution of the primary antibody overnight at 4°C, followed by incubation with HRP labeled goat anti-mouse IgG (Cat. No. 405306). Enhanced chemiluminescence was used as the detection system.

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