Revision 1

Store at -20C

#35574

Mature Neuron Marker Antibody Sampler Kit

1 Kit (8 x 20 microliters)

Cell Signaling TECHNOLOGY®

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Product Includes	Product #	Quantity	Mol. Wt	Isotype/Source
NeuN (D4G4O) XP® Rabbit mAb	24307	20 µl	46-55 kDa	Rabbit IgG
GAP43 (D9C8) Rabbit mAb	8945	20 µl	38, 43 kDa	Rabbit IgG
MAP2 (D5G1) XP® Rabbit mAb	8707	20 µl	75, 82, 280 kDa	Rabbit IgG
Neurofilament-L (C28E10) Rabbit mAb	2837	20 µl	70 kDa	Rabbit IgG
β3-Tubulin (D71G9) XP® Rabbit mAb	5568	20 µl	55 kDa	Rabbit IgG
Synaptophysin (D8F6H) XP® Rabbit mAb	36406	20 µl	38 kDa	Rabbit IgG
PSD95 (D27E11) XP® Rabbit mAb	3450	20 µl	95 kDa	Rabbit IgG
UCHL1 (D3T2E) XP® Rabbit mAb	13179	20 µl	27 kDa	Rabbit IgG
Anti-rabbit IgG, HRP-linked Antibody	7074	100 µl		Goat

Please visit cellsignal.com for individual component applications, species cross-reactivity, dilutions, protocols, and additional product information.

Description

The Mature Neuron Marker Antibody Sampler Kit provides an economical means for detecting mature neuron proteins by western and labeling mature neuronal structures by immunofluorescence (IF). This kit includes enough primary antibodies to perform two western blot experiments or at least forty IF tests per primary antibody.

Storage

Supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA, 50% glycerol and less than 0.02% sodium azide. Store at –20°C. *Do not aliquot the antibodies.*

Background

The antibodies in this kit serve to characterize and identify mature neurons. Neural stem cells differentiate into mature post-mitotic neurons that are incapable of cellular division. Several neuron-enriched markers can be used to identify mature neurons. Neuronal nuclei (NeuN, Fox-3, RBFOX3) is a nuclear protein expressed in most post-mitotic neurons of the central and peripheral nervous systems. NeuN is not detected in Purkinje cells, sympathetic ganglion cells, Cajal-Retzius cells, INL retinal cells, inferior olivary, or dentate nucleus neurons (1). This neuronal protein was originally identified by immunoreactivity with a monoclonal antibody also called NeuN. Using MS-analysis, NeuN was later identified as the *Fox-3* gene product, which contains an RNA recognition motif and functions as a splicing regulator (2). As neurons mature, they develop elaborate processes like axons and dendrites that are necessary to drive core neuronal functions, including synaptic transmission.

GAP43 is a nervous system specific, growth-associated protein enriched in growth cones and areas of high plasticity (3). GAP43 is integral to growth cone formation, neurite outgrowth, and the development of a functional cerebral cortex (4). The cytoskeleton, which is important in generating neuronal processes, consists of three types of cytosolic fibers: actin microfilaments, intermediate filaments, and microtubules. β3-tubulin is one of six β-tubulin isoforms that make up the building blocks of microtubules (5). Microtubule-associated protein 2 (MAP2) is a neuronal phosphoprotein that regulates the structure and stability of microtubules, neuronal morphogenesis, cytoskeleton dynamics, and organelle trafficking in axons and dendrites (6). MAP2 is preferentially localized to dendrites in cultured neurons (7). Neurofilaments are the major intermediate filaments found in neurons and consist of light (NFL), medium (NFM), and heavy (NFH) subunits (8). Similar in structure to other intermediate filament proteins, neurofilaments have a globular amino-terminal head, a central α-helical rod domain, and a carboxy-terminal tail. A heterotetrameric unit (NFL-NFM and NFL-NFH) forms a protofilament, with eight protofilaments comprising the typical 10 nm intermediate filament (9). Neurofilaments are critical for radial axon growth and determine axon caliber, serving as markers for neuronal axons.

Mature neurons function as cellular mediators of synaptic transmission. Synaptophysin is a neuronal synaptic vesicle glycoprotein (10). Synaptophysin is responsible for targeting synaptobrevin 2/VAMP2 to synaptic vesicles, and is a critical component and marker for the presynaptic fusion complex (11). Postsynaptic Density protein 95 (PSD95) is a member of the membrane-associated guanylate kinase (MAGUK) family of proteins. These family members consist of an amino-terminal variable segment

followed by three PDZ domains, an SH3 domain, and an inactive guanylate kinase (GK) domain. PSD95 is a scaffolding protein involved in the assembly and function of mature postsynaptic density complexes (12,13).

Several cellular processes are required to support dynamic functions existing in mature neurons, including protein regulation by protein ubiquitination. Ubiquitin C-terminal hydrolase L1 (UCH-L1) is a deubiquitinating enzyme that is selectively and abundantly expressed in the brain, and its activity is required for normal synaptic function (14).

Background References

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