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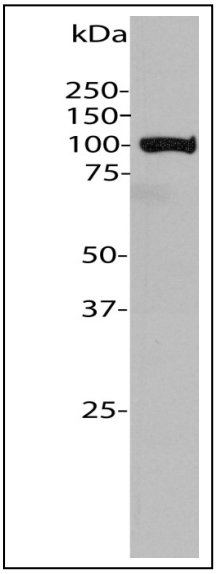
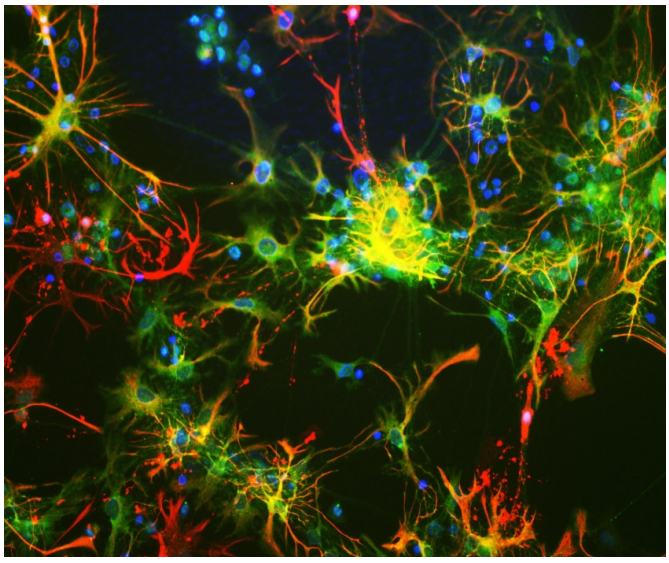
Catalogue# MCA-4A12: Mouse Monoclonal Antibody to Aldehyde Dehydrogenase H1 L1

The Immunogen: Aldehyde dehydrogenases (ALDH) are a group of enzymes that catalyze oxidation (dehydrogenation) of aldehydes. 19 ALDH genes have been identified within the human genome and are classified into 15 different subfamilies. Aldehyde dehydrogenase family 1, member 1 (ALDH1L1) catalyzes the conversion of 10-formyltetrahydrofolate, nicotinamide adenine dinucleotide phosphate (NADP+), and water to tetrahydrofolate, NADPH, and carbon dioxide. ALDH1L1 expression is tissue-specific and is highly expressed in the liver, representing up to 1% of the total pool of soluble cell proteins in the mammalian liver (1).

The Barres lab in Stanford used fluorescence-activated cell sorting to isolate fluorescent cells from transgenic mice expressing green fluorescent protein under the S100β promoter, expected to direct expression in astrocytes (2). They then created a transcriptome database of the expression levels of 20,000 genes in astrocytes and also oligodendrocytes and neurons. They identified ALDH1L1 as a highly and specifically expressed gene in astrocytes and confirmed this finding at the protein level. ALDH1L1 is more widely expressed throughout the brain, while astrocyte marker GFAP shows more predominant expression in white matter. Other studies in cancer research show that loss of function or expression of ALDH1L1 is associated with decreased apoptosis, increased cell motility, and cancer progression, suggesting its role as a biomarker and a target in cancer therapy (3-5).

Monoclonal antibody MCA-4A12 was raised against amino acids 1- 401 of human ALDH1L1 expressed in and purified from *E. coli.* The HGNC name for this protein is ALDH1L1.





Left: Western blot of rat liver tissue homogenates probed with MCA-4A12. MCA-4A12 binds strongly to a band at about 100 kDa. **Right:** Neuron-glia cell mixed cultures stained with MCA-4A12 (green) and our rabbit polyclonal antibody against GFAP: **RPCA-GFAP** (red). Blue is a DNA stain with Dapi. MCA-4A12 stains astrocytes and is excluded from neurons. ALDH1L1 stains the astrocytes cell body and processes, whereas GFAP labels the intermediate filament cytoskeleton in a subset of astrocytes. Astrocytes stained by both ALDH1L1 and GFAP appear yellow. Clearly the two staining patterns in this developing culture are not identical, suggesting heterogeneity of astrocytes at different stage of differentiation in the culture.

Antibody characteristics: The antibody is an IgG2b class antibody. MCA-4A12 is known to react with ALDH1L1 from human, cow, pig, mouse, rat and other mammals.

Suggestions for use: The antibody solution is affinity purified from tissue culture supernatant and is at concentration of 1mg/mL in phosphate buffered saline. The antibody solution can be used at dilutions of at least 1:2,000-1:5,000 in immunofluorescence experiments. In western blotting using chemiluminescence it can be used at dilutions of 1:10,000-1:20,000 or lower. Antibody preparation contains 10 mM sodium azide preservative (Link to http://www.encorbio.com/MSDS/azide.htm for Material Safety Data Sheet).

Storage Instructions: Shipped on ice. Please store at 4°C for regular uses. For long term storage, please leave frozen at -20°C and avoid freeze/thaw cycles.

Limitations: This product is for research use only and is not approved for use in humans or in clinical diagnosis.

References:

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2. Cahoy JD, Emery B, Kaushal A*, et al*. A transcriptome database for astrocytes, neurons, and oligodendrocytes: a new resource for understanding brain development and function. J Neurosci.28:264-78 (2008).

3. Krupenko SA, Oleinik NV. 10-formyltetrahydrofolate dehydrogenase, one of the major folate enzymes, is down-regulated in tumor tissues and possesses suppressor effects on cancer cells. Cell Growth Differ.13:227-36 (2002).

4. Rodriguez FJ, Giannini C, Asmann YW*, et al*. Gene expression profiling of NF-1-associated and sporadic pilocytic astrocytoma identifies aldehyde dehydrogenase 1 family member L1 (ALDH1L1) as an underexpressed candidate biomarker in aggressive subtypes. J Neuropathol Exp Neurol. 67:1194-204 (2008).

5. Oleinik NV, Krupenko NI, Krupenko SA. Epigenetic Silencing of ALDH1L1, a Metabolic Regulator of Cellular Proliferation, in Cancers. Genes Cancer. 2:130-9 (2011).