

BACKGROUND

Aldehyde dehydrogenase (ALDH) is an enzyme involved in intracellular retinoic acid production. ALDH1A is an important member of the ALDH family that includes 17 genes encoding different substrate specificities. ALDH1A1 is an intracellular enzyme that oxidizes aldehydes, serving a detoxifying role, and converts retinol to retinoic acid. Retinoic acid signaling is linked to cellular differentiation during development and has important function in stem cell (SC) self-protection throughout an organism's lifespan. The ALDH1A1 population defines normal hematopoietic stem cells, being used to isolate cells for stem cell transplants in patients. Using the ALDEFLUOR assay, a functional flow cytometric assay that identifies cells with active ALDH1A1, tumor-initiating cell-enriched populations have been identified in multiple malignancies, including breast, colon, pancreas, lung, prostate, ovary, and liver cancers as well as multiple myeloma and acute myeloid leukemia.¹ It was shown that ALDH1A1 was a marker of normal and malignant human mammary SCs and a predictor of poor clinical outcome of breast cancer patients. Moreover, studies demonstrated that the ALDH1A1⁺ lung cancer cells could generate tumors that resembled the heterogeneity of the parental cancer cells. Furthermore, elevated ALDH1A1 expression was correlated with the stage and grade of lung tumors and associated with a poor prognosis for the lung cancer patients. In addition, high ALDH activity was recently proven to be a novel functional marker of murine prostate SCs. Furthermore, ALDH1A1 could be a prostate cancer SC-related marker. Measuring its expression might provide a potential approach to study tumorigenesis of PCa and predict outcome of the disease.²

Among several markers that have been used to identify cancer stem cells, aldehyde dehydrogenase-1A1 (ALDH1A1) has been a valid marker among several malignant and nonmalignant tissues. It holds the attractive distinction of not only being a potential marker of stemness but potentially playing a role in the biology of tumor-initiating cells as well. More importantly, ALDH1A1 is implicated in chemoresistance pathways, targeting ALDH1A1 can sensitize resistant cells to chemotherapy and therefore represent a potential target for cancer stem cell-directed therapy.³ In addition, ALDH1A1 is also of interest in Parkinson's Disease (PD) and expressed in the the A9 dopaminergic (DA) neuronal group projecting to the dorsal striatum; this is the most vulnerable site in PD. ALDH1A1 protein is a known mesencephalic dopaminergic marker.

References

1. Li, T. et al: Lab. Invest. 90:234:44, 2010
2. Sladek, N.E. et al: Cancer Chemother. Pharmacol. 49:309-21, 2002
3. Landen, C.A. Jr. et al: Mol. Cancer Therapeut. 9:3186-99, 2010

TECHNICAL INFORMATION

Source:

ALDH1A1 Antibody is a mouse monoclonal antibody raised against purified recombinant human ALDH1A1 fragments expressed in *E. coli*.

Specificity and Sensitivity:

This antibody detects endogenous ALDH1A1 proteins without cross-reactivity with other related proteins.

Storage Buffer: PBS and 30% glycerol

Storage:

Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

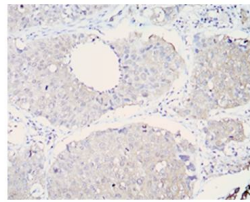
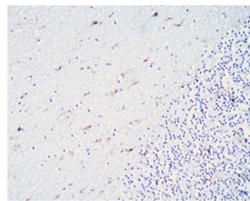
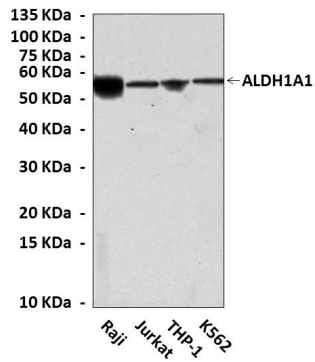
APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	1:50
IHC	1:50-200
ICC	n/d
FACS	n/d

*Optimal dilutions must be determined by end user.



QUALITY CONTROL DATA



Western Blot detection of ALDH1A1 proteins in various cell lysates using ALDH1A1 Antibody (**Top**). This antibody stains paraffin-embedded human cerebellum tissue (**Middle**) and lung cancer (**Bottom**) tissue in immunohistochemical analysis.

