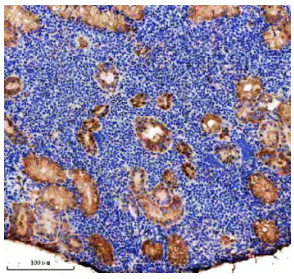
Zebrafish Aldh18a1 Antibody / Glutamate 5-kinase / P5cs (RZ1101)

Catalog No.	Formulation	Size
RZ1101	0.5mg/ml if reconstituted with 0.2ml sterile DI water	100 ug

Bulk quote request

Availability	2-3 weeks
Species Reactivity	Zebrafish
Format	Antigen affinity purified
Host	Rabbit
Clonality	Polyclonal (rabbit origin)
Isotype	Rabbit Ig
Purity	Antigen affinity chromatography
Buffer	Lyophilized from 1X PBS with 2% Trehalose
UniProt	A4IGC8
Applications	Immunohistochemistry (FFPE) : 2-5 ug/ml
Limitations	This Zebrafish Aldh18a1 antibody is available for research use only.



Zebrafish Aldh18a1 Antibody Kidney IHC. Immunohistochemical analysis of P5CS/ALDH18A1 protein using Zebrafish Aldh18a1 antibody and paraffin-embedded zebrafish kidney tissue. HIER: boil tissue sections in pH8 EDTA for 20 min and allow to cool before testing.

Description

Zebrafish (Danio rerio) Aldh18a1 antibody detects Aldh18a1, a multifunctional mitochondrial enzyme also known as Glutamate 5-kinase and P5cs, which catalyzes early steps in proline and ornithine biosynthesis. In zebrafish, the aldh18a1 gene encodes a bifunctional enzyme that contains both a glutamate 5-kinase domain and a gamma-glutamyl phosphate reductase domain. These domains act sequentially in the conversion of glutamate into pyrroline-5-carboxylate, a precursor for proline, ornithine, and ultimately arginine. Because these metabolic pathways support cell growth, collagen formation, redox regulation, and early tissue differentiation, Glutamate 5-kinase antibody and P5cs antibody reagents are widely used in studies of metabolic development and mitochondrial biology.

Aldh18a1 plays an essential role in maintaining cellular redox balance and energy metabolism by supplying proline, an amino acid important for protein synthesis, extracellular matrix integrity, and antioxidant buffering. Proline metabolism links mitochondrial activity with stress adaptation, influencing apoptosis, reactive oxygen species handling, and metabolic shifting during rapid developmental transitions. In zebrafish embryos, aldh18a1 is broadly expressed in tissues with high metabolic demand, including somites, the developing brain, heart, and craniofacial structures. Loss of aldh18a1 function disrupts metabolic flux, impairs connective tissue formation, and produces developmental abnormalities.

In addition to its metabolic role, Aldh18a1 contributes to cell signaling processes tied to proliferation and differentiation. Through its influence on ornithine and arginine production, Aldh18a1 indirectly supports nitric oxide synthesis, polyamine metabolism, and pathways involved in muscle and neural development. Zebrafish studies have shown that altered proline metabolism can impact morphogen gradients, extracellular matrix deposition, and the mechanical properties of developing tissues. These downstream effects underscore why Aldh18a1 activity is tightly regulated during embryogenesis.

At the molecular level, Aldh18a1 localizes predominantly to mitochondria, where it interacts with enzymes in the proline cycle, tricarboxylic acid cycle, and redox balancing pathways. Its bifunctional catalytic structure allows efficient channeling of substrates between enzymatic steps, minimizing loss of intermediates and enhancing metabolic throughput. Known co localization partners include pyrroline-5-carboxylate reductase, ornithine aminotransferase, and mitochondrial chaperones involved in protein folding and enzyme stabilization.

Disruptions in Aldh18a1 function in vertebrate models have been associated with defects in connective tissue formation, impaired collagen production, and developmental syndromes linked to proline deficiency. In zebrafish, metabolic perturbations caused by aldh18a1 deficiency can affect notochord morphology, muscle fiber organization, craniofacial cartilage development, and neural differentiation. These phenotypes reflect the enzyme's role in supplying metabolites necessary for structural integrity and cellular stress tolerance during early growth.

A Zebrafish Aldh18a1 antibody is suitable for research applications such as western blotting, immunohistochemistry, and assays examining mitochondrial metabolism, amino acid biosynthesis, and oxidative stress pathways. This reagent detects endogenous Aldh18a1 without implying epitope mapping or literature validated specificity. NSJ Bioreagents provides the Zebrafish Aldh18a1 antibody to support studies in metabolic development, redox biology, mitochondrial enzymatic pathways, and tissue differentiation.

This Zebrafish antibody is part of a broader Zebrafish / Danio rerio antibody panel offered by NSJ Bioreagents.

Application Notes

Optimal dilution of the Zebrafish Aldh18a1 antibody should be determined by the researcher.

Immunogen

An E.coli-derived zebrafish P5CS/ALDH18A1 recombinant protein (amino acids R35-A204) was used as the immunogen for the Zebrafish Aldh18a1 antibody.

Storage

After reconstitution, the Zebrafish Aldh18a1 antibody can be stored for up to one month at 4oC. For long-term, aliquot and store at -20oC. Avoid repeated freezing and thawing.