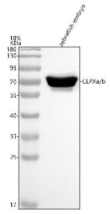
Zebrafish Clpx Antibody / Isoforms a & b (RZ1040)

Catalog No.	Formulation	Size
RZ1040	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	A0A8M9QBU1
Applications	Western Blot : 0.5-1 ug/ml
Limitations	This Zebrafish Clpx antibody is available for research use only.



Western blot analysis of Clpxa/b protein using Zebrafish Clpx antibody and zebrafish embryo tissue lysate. The predicted molecular weight of Clpxa/b is ~68 kDa.

Description

Zebrafish (Danio rerio) Clpx antibody recognizes ATP-dependent clpX-like chaperone, mitochondrial, encoded by the zebrafish clpx gene and expressed as isoforms a and b. Clpx is a highly conserved AAA+ ATPase that forms the regulatory, unfolding, and substrate-recognition component of the mitochondrial ClpXP protease complex. Located in the mitochondrial matrix, Clpx binds, unfolds, and translocates misfolded or regulatory protein substrates into the ClpP peptidase for degradation. In Danio rerio, Clpx is expressed strongly during early embryogenesis, with pronounced enrichment in metabolically active tissues including developing heart, brain, somites, notochord, and endoderm-derived organs such as liver and pancreas. Subcellular localization is strictly mitochondrial, where Clpx supports proteostasis,

mitochondrial remodeling, and metabolic adaptation.

ATP-dependent clpX-like chaperone, mitochondrial, is essential for maintaining protein quality control within the mitochondrial compartment. Zebrafish embryos rely heavily on mitochondrial metabolic transitions during early development, including increased oxidative phosphorylation capacity and mitochondrial biogenesis. Clpx participates in the selective removal of misfolded proteins, regulatory enzymes, and metabolic intermediates, ensuring proper assembly of mitochondrial respiratory complexes and preventing accumulation of damaged proteins that could impair membrane potential or electron transport chain function. Isoforms a and b likely provide tissue-specific or developmental tuning of Clpx activity.

Clpx influences mitochondrial metabolism by regulating the stability of enzymes involved in fatty acid oxidation, amino acid metabolism, and TCA cycle flux. In zebrafish cardiac and skeletal muscle tissues, Clpx supports the maturation of mitochondrial networks required for contractile and locomotive function. Neural tissues also depend on Clpx-mediated proteostasis to support axonal outgrowth, synapse formation, and neurotransmission-related metabolic demands. Disrupted clpx activity can lead to deficits in ATP production, increased reactive oxygen species, and impaired mitochondrial morphology, resulting in developmental abnormalities across multiple organ systems.

Beyond its role in proteolysis, Clpx participates in mitochondrial stress responses. Under metabolic or environmental stress, Clpx helps refold partially damaged proteins, supports degradation of irreversibly misfolded substrates, and contributes to the mitochondrial unfolded protein response. Zebrafish embryos, which undergo rapid cellular proliferation and metabolic flux, depend on Clpx for resilience to oxidative, thermal, and metabolic challenge. Clpx function also intersects with pathways involving AMPK, PGC-1-related regulators, and redox signaling, aligning mitochondrial proteostasis with broader developmental programs.

Developmentally, Clpx contributes to organ specification by regulating mitochondrial quality control within differentiating tissues. In heart development, Clpx supports maturation of mitochondrial cristae and contractile energy supply. In the central nervous system, Clpx influences neuronal differentiation through its effects on mitochondrial remodeling and metabolic homeostasis. Because mitochondrial function shapes cell fate decisions, Clpx helps coordinate the integration of metabolic state with transcriptional programs during organogenesis. Isoform-specific expression of clpxa and clpxb may reflect tailored requirements for protein quality control in different tissues or developmental phases.

This Zebrafish Clpx antibody is suitable for detecting both isoforms a and b in research focused on mitochondrial proteostasis, metabolism, oxidative phosphorylation, cardiac and skeletal muscle development, neural maturation, and stress-response pathways in zebrafish. It supports studies examining mitochondrial protein quality control, ClpXP complex function, and developmental phenotypes arising from disrupted mitochondrial homeostasis. NSJ Bioreagents provides this reagent within its zebrafish and mitochondrial biology antibody collection.

Application Notes

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

Immunogen

An E.coli-derived zebrafish Clpxa/b recombinant protein (amino acids A327-L564) was used as the immunogen for the Zebrafish Clpx antibody. This antibody will detect the a and b isoforms.

Storage

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