abcam

ab119685

Anti-OPA1 antibody [1E81D9]

Key facts

Isotype	IgG1
Host species	Mouse
Storage buffer	pH: 7.5 Preservative: 0.02% Sodium azide Constituents: 99% HEPES buffered saline
Form	Liquid
Clonality	Monoclonal
Immunogen	The exact immunogen used to generate this antibody is proprietary information.
Clone number	1E81D9
Purification technique	Precipitation Ammonium Sulphate
Light chain type	kappa
Concentration	1 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →
Purification notes	Purity is near homogeneity as judged by SDS-PAGE. ab119685 was produced in vitro using hybridomas grown in serum-free medium, and then concentrated by ammonium sulfate precipitation.

Reactivity data

IP

Not recommended

Species	Mouse, Rat, Human
Dilution info	-

Notes	-

Flow Cyt

Tested

Species	Human
Dilution info	1 µg for 10^6 Cells
Notes	ab170190 - Mouse monoclonal IgG1, is suitable for use as an isotype control with this antibody.

Expected

Species	Mouse, Rat
Dilution info	Use at an assay dependent concentration.
Notes	-

ELISA

Not recommended

Species	Mouse, Rat, Human
Dilution info	-
Notes	-

WB

Tested

Species	Human
Dilution info	1 µg/mL
Notes	-

Species	Mouse
Dilution info	1 µg/mL
Notes	-

Species	Rat

Dilution info	1 µg/mL
Notes	-

Target data

See full target information OPA1

Function

Dynamin-related GTPase that is essential for normal mitochondrial morphology by mediating fusion of the mitochondrial inner membranes, regulating cristae morphology and maintaining respiratory chain function (PubMed:16778770, PubMed:17709429, PubMed:20185555, PubMed:24616225, PubMed:28628083, PubMed:28746876, PubMed:31922487, PubMed:32228866, PubMed:32567732, PubMed:33130824, PubMed:33237841, PubMed:37612504, PubMed:37612506). Exists in two forms: the transmembrane, long form (Dynamin-like GTPase OPA1, long form; L-OPA1), which is tethered to the inner mitochondrial membrane, and the short soluble form (Dynamin-like GTPase OPA1, short form; S-OPA1), which results from proteolytic cleavage and localizes in the intermembrane space (PubMed:31922487, PubMed:32228866, PubMed:33237841, PubMed:37612504, PubMed:37612506). Both forms (L-OPA1 and S-OPA1) cooperate to catalyze the fusion of the mitochondrial inner membrane (PubMed:31922487, PubMed:37612504, PubMed:37612506). The equilibrium between L-OPA1 and S-OPA1 is essential: excess levels of S-OPA1, produced by cleavage by OMA1 following loss of mitochondrial membrane potential, lead to an impaired equilibrium between L-OPA1 and S-OPA1, inhibiting mitochondrial fusion (PubMed:20038677, PubMed:31922487). The balance between L-OPA1 and S-OPA1 also influences cristae shape and morphology (By similarity). Involved in remodeling cristae and the release of cytochrome c during apoptosis (By similarity). Proteolytic processing by PARL in response to intrinsic apoptotic signals may lead to disassembly of OPA1 oligomers and release of the caspase activator cytochrome C (CYCS) into the mitochondrial intermembrane space (By similarity). Acts as a regulator of T-helper Th17 cells, which are characterized by cells with fused mitochondria with tight cristae, by mediating mitochondrial membrane remodeling: OPA1 is required for interleukin-17 (IL-17) production (By similarity). Its role in mitochondrial morphology is required for mitochondrial genome maintenance (PubMed:18158317, PubMed:20974897). Dynamin-like GTPase OPA1, long form. Constitutes the transmembrane long form (L-OPA1) that plays a central role in mitochondrial inner membrane fusion and cristae morphology (PubMed:31922487, PubMed:32228866, PubMed:37612504, PubMed:37612506). L-OPA1 and the soluble short form (S-OPA1) form higher-order helical assemblies that coordinate the fusion of mitochondrial inner membranes (PubMed:31922487, PubMed:37612504, PubMed:37612506). Inner membrane-anchored L-OPA1 molecules initiate membrane remodeling by recruiting soluble S-OPA1 to rapidly polymerize into a flexible cylindrical scaffold encaging the mitochondrial inner membrane (PubMed:37612504, PubMed:37612506). Once at the membrane surface, the formation of S-OPA1 helices induce bilayer curvature (PubMed:37612504, PubMed:37612506). OPA1 dimerization through the paddle region, which inserts into cardiolipin-containing membrane, promotes GTP hydrolysis and the helical assembly of a flexible OPA1 lattice on the membrane, which drives membrane curvature and mitochondrial fusion (PubMed:28628083, PubMed:37612504, PubMed:37612506). Plays a role in the maintenance and remodeling of mitochondrial cristae, some invaginations of the mitochondrial

inner membrane that provide an increase in the surface area (PubMed:32567732, PubMed:33130824). Probably acts by forming helical filaments at the inside of inner membrane tubes with the shape and dimensions of crista junctions (By similarity). The equilibrium between L-OPA1 and S-OPA1 influences cristae shape and morphology: increased L-OPA1 levels promote cristae stacking and elongated mitochondria, while increased S-OPA1 levels correlated with irregular cristae packing and round mitochondria shape (By similarity). Dynamin-like GTPase OPA1, short form. Constitutes the soluble short form (S-OPA1) generated by cleavage by OMA1, which plays a central role in mitochondrial inner membrane fusion and cristae morphology (PubMed:31922487, PubMed:32228866, PubMed:32245890, PubMed:37612504, PubMed:37612506). The transmembrane long form (L-OPA1) and the S-OPA1 form higher-order helical assemblies that coordinate the fusion of mitochondrial inner membranes (PubMed:31922487, PubMed:32228866, PubMed:37612504, PubMed:37612506). Inner membrane-anchored L-OPA1 molecules initiate membrane remodeling by recruiting soluble S-OPA1 to rapidly polymerize into a flexible cylindrical scaffold encaging the mitochondrial inner membrane (PubMed:32228866, PubMed:37612504, PubMed:37612506). Once at the membrane surface, the formation of S-OPA1 helices induce bilayer curvature (PubMed:37612504, PubMed:37612506). OPA1 dimerization through the paddle region, which inserts into cardiolipin-containing membrane, promotes GTP hydrolysis and the helical assembly of a flexible OPA1 lattice on the membrane, which drives membrane curvature and mitochondrial fusion (PubMed:28628083, PubMed:37612504, PubMed:37612506). Excess levels of S-OPA1 produced by cleavage by OMA1 following stress conditions that induce loss of mitochondrial membrane potential, lead to an impaired equilibrium between L-OPA1 and S-OPA1, thereby inhibiting mitochondrial fusion (PubMed:20038677). Involved in mitochondrial safeguard in response to transient mitochondrial membrane depolarization by mediating flickering: cleavage by OMA1 leads to excess production of S-OPA1, preventing mitochondrial hyperfusion (By similarity). Plays a role in the maintenance and remodeling of mitochondrial cristae, some invaginations of the mitochondrial inner membrane that provide an increase in the surface area (PubMed:32245890). Probably acts by forming helical filaments at the inside of inner membrane tubes with the shape and dimensions of crista junctions (By similarity). The equilibrium between L-OPA1 and S-OPA1 influences cristae shape and morphology: increased L-OPA1 levels promote cristae stacking and elongated mitochondria, while increased S-OPA1 levels correlated with irregular cristae packing and round mitochondria shape (By similarity). Isoform 1. Coexpression of isoform 1 with shorter alternative products is required for optimal activity in promoting mitochondrial fusion. Isoform 4. Isoforms that contain the alternative exon 4b are required for mitochondrial genome maintenance, possibly by anchoring the mitochondrial nucleoids to the inner mitochondrial membrane. Isoform 5. Isoforms that contain the alternative exon 4b are required for mitochondrial genome maintenance, possibly by anchoring the mitochondrial nucleoids to the inner mitochondrial membrane.

Storage

Shipped at conditions	Blue Ice
Appropriate short-term storage conditions	+4°C

Appropriate long-term storage conditions	+4°C
Storage information	Do Not Freeze

Notes

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This antibody clone is manufactured by Abcam. If you require a custom buffer formulation or conjugation for your experiments, please contact orders@abcam.com

Supplementary info

This supplementary information is collated from multiple sources and compiled automatically.

Activity summary	OPA1 also known as optic atrophy 1 is a dynamin-related GTPase protein important for mitochondrial fusion. OPA1 has a molecular weight of about 120 kDa and is present mostly in the inner mitochondrial membrane. It promotes the maintenance of mitochondrial DNA cristae structures and the modulation of mitochondrial dynamics. Expression of OPA1 occurs in tissues with high energy demands including the retina brain and muscles. Detection of the OPA1 protein can be done using techniques such as Western blot and it reveals different isoforms generated through alternative splicing.
Biological function summary	Mitochondrial dynamics involving OPA1 ensure energy production efficiency and cell health. OPA1 plays a role in mitochondrial fusion by forming a complex with mitofusins MFN1 and MFN2. This complex maintains the integrity of mitochondrial networks facilitates proper respiratory function and prevents apoptosis by regulating cristae junctions. It also participates in the stress response particularly in the preservation of the mitochondrial structure and function under challenging conditions.
Pathways	OPA1 integrates into the mitochondrial fusion and fission pathways important for cellular energy metabolism. It works alongside proteins like DRP1 in balancing these processes. The involvement in these pathways is essential for cellular adaptation to metabolic needs and stress. OPA1 also has a relationship with the PINK1/Parkin pathway where its regulation affects mitophagy a process of clearing damaged mitochondria. These interactions highlight the importance of OPA1 in maintaining cellular and mitochondrial homeostasis.
Associated diseases and disorders	Mutations in OPA1 have been linked to autosomal dominant optic atrophy and a range of neurodegenerative conditions. The protein's dysfunction leads to the degeneration of the retinal ganglion cells and their axons resulting in vision loss. OPA1 also shows connections to disorders like Charcot-Marie-Tooth disease where its interaction with other proteins like MFN2 plays a role. Deficiency or dysfunction of OPA1 disrupts mitochondrial dynamics leading to cellular energy deficits and contributing to disease pathophysiology.

Product promise

Tested

We have tested this species and application combination and it works. It is covered by our product promise.

Expected

We have not tested this specific species and application combination in-house, but expect it will work. It is covered by our product promise.

Predicted

This species and application combination has not been tested, but we predict it will work based on strong homology. However, this combination is not covered by our product promise.

Not recommended

We do not recommend this combination. It is not covered by our product promise.

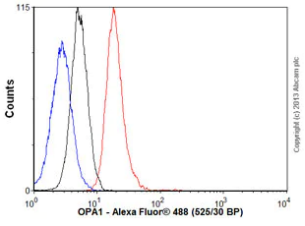
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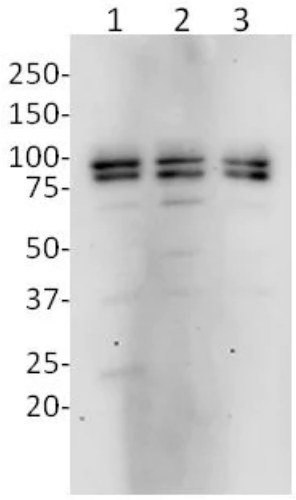
2 product images



Flow Cytometry - Anti-OPA1 antibody [1E81D9] (ab119685)

OPA1 Flow Cytometry staining using mouse Anti-OPA1 antibody

Overlay histogram showing SH-SY5Y cells stained with ab119685 (red line). The cells were fixed with 80% methanol (5 min) and then permeabilized with 0.1% PBS-Tween for 20 min. The cells were then incubated in 1x PBS / 10% normal goat serum / 0.3M glycine to block non-specific protein-protein interactions followed by the antibody (ab119685, 1µg/1x10^6 cells) for 30 min at 22°C. The secondary antibody used was Alexa Fluor® 488 goat anti-mouse IgG (H&L) (ab150113) at 1/2000 dilution for 30 min at 22°C. Isotype control antibody (black line) was mouse IgG1 [ICIGG1] (ab91353, 1µg/1x10^6 cells) used under the same conditions. Unlabelled sample (blue line) was also used as a control. Acquisition of >5,000 events were collected using a 20mW Argon ion laser (488nm) and 525/30 bandpass filter.



Western blot - Anti-OPA1 antibody [1E81D9] (ab119685)

All lanes:
Western blot - Anti-OPA1 antibody [1E81D9] (ab119685) at 1 µg/mL

Lane 1:
whole cell lysates from HeLa cells(human) at 30 µg

Lane 2:
whole cell lysates from H4IIE cells(rat) at 30 µg

Lane 3:
whole cell lysates from MEF cells(mouse) at 30 µg

Secondary

All lanes:
HRP goat anti-mouse at 1/5000 dilution

Developed using the ECL technique.

Performed under reducing conditions.

Predicted band size: 111 kDa

Please note: All products are 'FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC OR THERAPEUTIC PROCEDURES'.