abcam

ab59715

Anti-Clostridium botulinum Toxin B antibody [GR-3G7]

Key facts

Isotype	IgG1
Host species	Mouse
Storage buffer	pH: 7.2 Constituents: PBS
Form	Liquid
Clonality	Monoclonal
Carrier free	Yes
Clone number	GR-3G7
Purification technique	Affinity purification Protein G
Specificity	This antibody reacts with Clostridium botulinum Toxin B.
Concentration	2 mg/mL The concentration of this product may be batch-dependent Batch concentration finder →

Reactivity data

cELISA

Expected

Species	Clostridium botulinum
Dilution info	1/200 - 1/400
Notes	-

Not recommended

Species	Transfected cell line - Clostridium botulinum
Dilution info	-
Notes	-

Flow Cyt

Tested

Species	Transfected cell line - Clostridium botulinum
Dilution info	1.2 µg for 10^6 Cells
Notes	ab170190 - Mouse monoclonal IgG1, is suitable for use as an isotype control with this antibody.

Predicted

Species	Clostridium botulinum
Dilution info	-
Notes	-

Target data

See full target information botB

Function

Botulinum neurotoxin type B. Botulinum toxin causes flaccid paralysis by inhibiting neurotransmitter (acetylcholine) release from the presynaptic membranes of nerve terminals of the eukaryotic host skeletal and autonomic nervous system, with frequent heart or respiratory failure. Precursor of botulinum neurotoxin B which has 2 coreceptors; complex polysialylated gangliosides found on neural tissue and specific membrane-anchored proteins found in synaptic vesicles (PubMed:17167418, PubMed:17167421, PubMed:17185412, PubMed:23807078). Receptor proteins are exposed on host presynaptic cell membrane during neurotransmitter release, when the toxin heavy chain (HC) binds to them (PubMed:14504267). Upon synaptic vesicle recycling the toxin is taken up via the endocytic pathway (PubMed:14504267). When the pH of the toxin-containing endosome drops a structural rearrangement occurs so that the N-terminus of the HC forms pores that allows the light chain (LC) to translocate into the cytosol (PubMed:3856850). Once in the cytosol the disulfide bond linking the 2 subunits is reduced and LC cleaves its target protein on synaptic vesicles, preventing their fusion with the cytoplasmic membrane and thus neurotransmitter release. Binds to host peripheral neuronal presynaptic membranes via synaptotagmins 1 and 2 (SYT1 and SYT2) (PubMed:14504267, PubMed:8144634). Toxin binds to the

membrane proximal extra-cytoplasmic region of host SYT1 and SYT2 that is transiently exposed outside of cells during exocytosis; exogenous gangliosides enhance binding and subsequent uptake of toxin into host cells (PubMed:14504267, PubMed:15123599). Toxin uptake into neural cells requires stimulation (incubation with K(+) to stimulate SYT protein receptor exposure); subsequently the toxin colocalizes with its receptor in host cells with a concomitant decrease in target protein (synaptobrevin-2/VAMP2) immunoreactivity (PubMed:14504267). Toxin uptake can be blocked by the appropriate synaptotagmin protein fragments and gangliosides in cell culture and in mice (PubMed:14504267, PubMed:15123599). BoNT/B is a 'coincidence detector'; it requires simultaneous binding to coreceptor GT1b and low pH to transform into a membrane-bound, oligomeric channel (PubMed:21925111, PubMed:22720883). Whole toxin only has protease activity after reduction which releases LC (PubMed:1331807, PubMed:7803399). Botulinum neurotoxin B light chain. Has proteolytic activity (PubMed:1331807). After translocation into the eukaryotic host cytosol, inhibits neurotransmitter release by acting as a zinc endopeptidase that cleaves the '76-Gln-|-Phe-77' bond of synaptobrevin-2/VAMP2, blocking neurotransmitter release (PubMed:1331807, PubMed:7803399). In vitro the LC only has protease activity after reduction (PubMed:1331807, PubMed:7803399). Botulinum neurotoxin B heavy chain. Responsible for host epithelial cell transcytosis, host nerve cell targeting and translocation of light chain (LC) into host cytosol. Composed of 3 subdomains; the translocation domain (TD), and N-terminus and C-terminus of the receptor-binding domain (RBD). The N-terminus of the TD wraps an extended belt around the perimeter of the LC; it does not seem to protect the active site, but might prevent premature LC dissociation from the translocation channel and protect toxin prior to translocation (PubMed:10932256, PubMed:17167418). Has 2 coreceptors; complex gangliosides found primarily on neural tissue and host synaptotagmin-1 and -2 (SYT1 and SYT2) which bind simultaneously to adjacent but separate sites at the tip of the HC (PubMed:17167418, PubMed:17167421, PubMed:17185412, PubMed:23807078, PubMed:8144634). HC alone partially prevents uptake of whole toxin by neural cells, and delays paralysis onset by 160% (PubMed:10413679). Binding probably positions the TD for integration into the synaptic vesicle membrane (PubMed:17167418, PubMed:23807078). The HC forms channels at low pH that mediate transport of the light chain (LC) from the endocytic vesicle to the cytosol (PubMed:3856850). Binds gangliosides GD1b and GT1b (PubMed:10413679, PubMed:14731268). Gangliosides are not only a coreceptor, but also required for uptake into nerve cells (PubMed:17167418, PubMed:21925111). HC alone binds to host receptor proteins SYT1 and SYT2 (PubMed:14504267, PubMed:15123599, PubMed:17185412, PubMed:19650874). Interaction with SYT1 protein does not require SYT1 glycosylation (PubMed:19476346). The HC C-terminus (approximately residues 1079-1291) interacts with host SYT2 (PubMed:15123599, PubMed:17167418, PubMed:17167421, PubMed:23807078). Has higher affinity for SYT2 than SYT1 (PubMed:17167421, PubMed:17185412). Significantly decreases uptake and toxicity of whole BoNT/B and BoNT/G (PubMed:19650874).

Storage

Shipped at conditions	Blue Ice
Appropriate short-term storage duration	1-2 weeks

Appropriate short-term storage conditions	+4°C
Appropriate long-term storage conditions	-20°C
Aliquoting information	Upon delivery aliquot
Storage information	Avoid freeze / thaw cycle

Supplementary info

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

Activity summary	Clostridium botulinum toxin B often called "botulinum toxin B" or "botox B" is a neurotoxic protein produced by the bacterium Clostridium botulinum. This protein has a molecular mass of approximately 150 kDa. It is expressed during the bacterial life cycle and released into environments that promote anaerobic conditions. Mechanically botulinum toxin B interferes with acetylcholine release at the neuromuscular junction. The toxin binds to peripheral neurons enters the cells and cleaves specific proteins required for neurotransmitter exocytosis which results in muscle paralysis.
Biological function summary	The interruption of neurotransmitter release caused by Clostridium botulinum toxin B is essential for its paralytic effect. This action makes it part of a family of botulinum neurotoxins which all inhibit synaptic vesicle fusion through enzymatic cleavage of SNARE proteins. Though it generally acts independently it shares a similar mechanism with botulinum toxin type A another well-known neurotoxin. Through this action botulinum toxin B disrupts normal nervous system communication which can be significant in both clinical and research contexts.
Pathways	Botulinum toxin B is part of the cholinergic signaling pathway where it plays an important role in modulating neurotransmission. Its ability to cleave VAMP (vesicle-associated membrane protein) is important for its inhibitory action on synaptic vesicle fusion. This places it in a similar functional space as botulinum toxin A which targets SNAP-25 another SNARE protein. Both toxins effectively decrease acetylcholine release disrupting normal synaptic activity and muscle contraction processes.
Associated diseases and disorders	Botulinum toxin B is associated primarily with botulism a serious illness characterized by muscle paralysis that can lead to respiratory failure. However in controlled medical settings it serves as a therapeutic agent in the treatment of dystonia a movement disorder causing muscle contractions and spasms. The therapeutic use relies heavily on its ability to reduce excessive muscle activity by targeting nerves similar to those affected in botulism which involves SNARE proteins like VAMP. This makes botulinum toxins including type A and B integral to understanding both the detrimental and beneficial effects of neuromodulation.

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

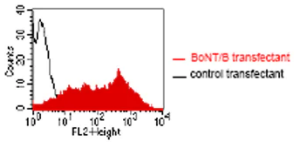
We do not recommend this combination. It is not covered by our product promise.

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Flow Cytometry - Anti-Clostridium botulinum Toxin B antibody [GR-3G7] (ab59715)

BOSC23 cells were transiently trans-fected with an expression vector encoding either Clostridium botulinum Toxin B (red curve) or an irrelevant protein (control transfectant). Binding of ab59715 was detected with a PE conjugated secondary antibody. A positive signal was obtained only with Clostridium botulinum Toxin B transfected cells.

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