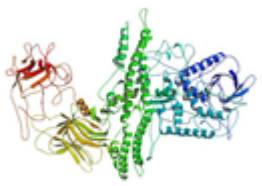
Botulinum toxin type A

Targets (2)

IDENTIFICATION

Name	Botulinum toxin type A
Accession Number	DB00083 (BTD00092, BIOD00092)
Type	Biotech
Groups	Approved, Investigational
Biologic	Protein Based Therapies
Classification	Other protein based therapies
Description	Purified botulinum toxin from Clostridium botulinum, purified from culture via dialysis and acid precipitation.
Protein structure	
Protein chemical formula	$C_{6760}H_{10447}N_{1743}O_{2010}S_{32}$
Protein average weight	149322.7 Da

Sequences

```
>Botulinum Toxin Type A Sequence
MPFVNKQFNYKDPVNGVDIAYIKIPNVGQMQPVKAFKIHNKIWVIPERDTFTNPEEGDLN
PPPEAKQVPVSYYDSTYLSTDNEKDNYLKGVTKLFERIYSTDLGRMLLTSIVRGIPFWGG
STIDTELKVIDTNCINVIQPDGSYRSEELNLVIIGPSADIIQFECKSFGHEVLNLTRNGY
GSTQYIRFSPDFTFGFEESLEVDTNPLLGAGKFATDPAVTLAHELIHAGHRLYGIAINPN
RVFKVNTNAYYEMSGLEVSFEELRTFGGHDAKFIDSLQENEFRLYYYNKFKDIASTLNKA
KSIVGTTASLQYMKNVFKEKYLLSEDTSGKFSVDKLKFDKLYKMLTEIYTEDNFVKFFKV
LNRKTYLNFDKAVFKINIVPKVNYTIYDGFNLRNTNLAANFNGQNTEINNMNFTKLKNFT
GLFEFYKLLCVRGIITSKTKSLDKGYNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEE
ITSDTNIEAAEENISLDLIQQYYLTFNFDNEPENISIENLSSDIIGQLELMPNIERFPNG
KKYELDKYTMFHYLRAQEFEHGKSRIALTNSVNEALLNPSRVYTFFSSDYVKKVNKATEA
AMFLGWVEQLVYDFTDETSEVSTTDKIADITIIIPYIGPALNIGNMLYKDDFVGALIFSG
AVILLEFIPEIAIPVLGTFALVSYIANKVLTVQTIDNALSKRNEKWDEVYKYIVTNWLAK
VNTQIDLIRKKMKEALENQAEATKAIINYQYNQYTEEEKNNINFNIDDLSSKLNESINKA
MININKFLNQCSVSYLMNSMIPYGVKRLEDFDASLKDALLKYIYDNRGTLIGQVDRLKDK
VNNTLSTDIPFQLSKYVDNQRLLSTFTEYIKNIINTSILNLRYESNHLIDLSRYASKINI
GSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVYNSMYENFSTSFWIRIPKYFNSISLNN
EYTIINCMENNSGWKVSLNYGEIIWTLQDTQEIKQRVVFKYSQMINISDYINRWIFVTIT
NNRLNNSKIYINGRLIDQKPISNLGNIHASNNIMFKLDGCRDTHRYIWIKYFNLFDKELN
EKEIKDLYDNQSNSGILKDFWGDYLQYDKPYYMLNLYDPNKYVDVNNVGIRGYMYLKGPR
GSVMTTNIYLNSSLYRGTKFIIKKYASGNKDNIVRNNDRVYINVVVKNKEYRLATNASQA
GVEKILSALEIPDVGNLSQVVVMKSKNDQGITNKCKMNLQDNNGNDIGFIGFHQFNNIAK
LVASNWYNRQIERSSRTLGCSWEFIPVDDGWGERPL
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Download FASTA Format

Botulinum toxin A

Botulinum toxin type A

BTX-A

Evabotulinumtoxina

IncobotulinumtoxinA

OnabotulinumtoxinA

Prabotulinumtoxin A

Toxina botulínica A

Toxine botulinique A

External IDs AGN 191622 / ANT-1207 / ANT-1401 / ANT-1403 / NT 201

Prescription Products

Show 10 entries

Search

NAME	DOSAGE	STRENGTH	ROUTE	LABELLER	MARKETING START	MARKETING END
Botox	Injection, powder, lyophilized, for solution	200 [USP'U]/1	Intradermal; Intramuscular	Allergan, Inc.	2010-01-11	Not applicable
Botox	Injection, powder, lyophilized, for solution	100 [USP'U]/1	Intradermal; Intramuscular	Allergan, Inc.	1989-12-15	Not applicable
Botox	Powder, for solution	100 unit	Intramuscular	Allergan	1992-12-31	Not applicable
BOTOX Cosmetic	Powder, for solution	100 unit	Intramuscular	Allergan	2001-05-07	Not applicable
BOTOX Cosmetic	Injection, powder, lyophilized, for solution	100 [USP'U]/1	Intramuscular	Allergan, Inc.	2008-05-20	Not applicable
BOTOX Cosmetic	Injection, powder, lyophilized, for solution	50 [USP'U]/1	Intramuscular	Allergan, Inc.	2008-07-15	Not applicable
Dysport	Injection, powder, lyophilized, for solution	300 [USP'U]/1	Intramuscular	Medicis Pharmaceutical Corporation	2009-05-25	2015-03-31
Dysport	Injection, powder, lyophilized, for solution	500 U/1	Intramuscular	Ipsen Biopharmaceuticals, Inc.	2009-11-02	Not applicable
Dysport	Injection, powder, lyophilized, for solution	300 U/1	Intramuscular	Galderma Laboratories, L.P.	2009-11-02	Not applicable
Dysport	Injection, powder, lyophilized, for solution	300 U/1	Intramuscular	Ipsen Biopharmaceuticals, Inc.	2009-11-02	Not applicable

ADDITIONAL DATA AVAILABLE

Showing 1 to 10 of 25 entries

‹ 1 2 3 ›

Categories

Acetylcholine Release Inhibitors

Agents that produce neuromuscular block (indirect)

Amino Acids, Peptides, and Proteins

Biological Factors
Botulinum Toxins
Botulinum Toxins, Type A
Botulinum Toxins, Type A, antagonists & inhibitors
Central Nervous System Depressants
Cholinergic Agents
Endopeptidases
Ganglion Blockers
Hydrolases
Membrane Transport Modulators
Metalloendopeptidases
Metalloproteases
Muscle Relaxants
Muscle Relaxants, Peripherally Acting Agents
Musculo-Skeletal System
Neurotransmitter Agents
Noxae
Other Miscellaneous Therapeutic Agents
Peptide Hydrolases
Peripheral Nervous System Agents
Proteins
Toxic Actions
Toxins, Biological

UNII E211KPY694

CAS number 93384-43-1

PHARMACOLOGY

Indication

For the treatment of cervical dystonia in adults to decrease the severity of abnormal head position and neck pain associated with cervical dystonia. Also for the treatment of severe primary axillary hyperhidrosis that is inadequately managed with topical agents and for the treatment of strabismus and blepharospasm associated with dystonia, including benign essential blepharospasm or VII nerve disorders in patients 12 years of age and above. Also used cosmetically to temporarily improve the appearance of moderate-to-severe frown lines between the eyebrows (glabellar lines) as well as for the treatment of excessive underarm sweating.

Associated Conditions

Blepharospasm
Cervical Dystonia
Chronic Migraine
Equinus deformity of foot, acquired
Lower Limb Spasticity
Sialorrhea
Strabismus
Upper Limb Spasticity
Urinary Bladder, Overactive
Urinary Incontinence (UI)

Detrusor overactivity, neurologic conditions
Hypertonicity disorders of the 7th nerve
Severe axillary hyperhidrosis

Associated Therapies

Temporary improvement in the appearance of moderate to severe lateral canthal lines associated with orbicularis oculi activity
Temporary improvement in the appearance of moderate to severe glabellar lines associated with procerus and corrugator muscle activity

Pharmacodynamics

A 150 kDa neurotoxic protein produced from fermentation of Hall strain Clostridium botulinum type A grown in a medium containing casein hydrolysate, glucose and yeast extract. It is purified from the culture solution by dialysis and a series of acid precipitations to a complex consisting of the neurotoxin, and several accessory proteins. Botulinum Toxin Type A is not expected to be present in the peripheral blood at measurable levels following IM or intradermal injection at the

in patients without other neuromuscular dysfunction. However, sub-clinical systemic effects have been shown by single-fiber electromyography after IM doses of botulinum toxins appropriate to produce clinically observable local muscle weakness.

Mechanism of action

Botulinum Toxin Type A blocks neuromuscular transmission by binding to acceptor sites on motor or sympathetic nerve terminals, entering the nerve terminals, and inhibiting the release of acetylcholine. This inhibition occurs as the neurotoxin cleaves SNAP-25, a protein integral to the successful docking and release of acetylcholine from vesicles situated within nerve endings.

TARGET	ACTIONS	ORGANISM
(A) Synaptosomal-associated protein 25	inhibitor	Humans
(U) Rho-related GTP-binding protein RhoB	Not Available	Humans

Absorption

The chemical complexity of Botulinum Toxin Type A combined with its extreme potency limits the opportunity to study its pharmacokinetic profile in humans. Therefore, no human pharmacokinetic studies have been performed. Botulinum Toxin Type A is injected directly into the target organ, a skeletal muscle. Thus, bioavailability of the intravenous or oral route is not of clinical relevance.

Volume of distribution

Not Available

Protein binding

Not Available

Metabolism

Not Available

Route of elimination

Not Available

Half life

Not Available

Clearance

Not Available

Toxicity

Based on toxicological studies, it has been estimated that the human LD50 by injection is approximately 2800 Units, equivalent to 28 individual vials of BOTOX (Botulinum Toxin Type A) Purified Neurotoxin Complex (100 Units) for a 70 kg adult. When injected intramuscularly, Botulinum Toxin Type A has been shown to be teratogenic or to have embryocidal effects in some animal species.

Humans and other mammals

Pathways Not Available

Pharmacogenomic Effects/ADRs Not Available

INTERACTIONS

Drug Interactions

ALL DRUGS | APPROVED | VET APPROVED | NUTRACEUTICAL | ILLICIT | WITHDRAWN | INVESTIGATIONAL | EXPERIMENTAL

Show 10 entries Search

DRUG	INTERACTION
2,5-Dimethoxy-4-ethylthioamphetamine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 2,5-Dimethoxy-4-ethylthioamphetamine.
4-Bromo-2,5-dimethoxyamphetamine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 4-Bromo-2,5-dimethoxyamphetamine.
4-Bromo-2,5-dimethoxyphenethylamine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 4-Bromo-2,5-dimethoxyphenethylamine.
4-Methoxyamphetamine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 4-Methoxyamphetamine.
5-methoxy-N,N-dimethyltryptamine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 5-methoxy-N,N-dimethyltryptamine.
7-Nitroindazole	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 7-Nitroindazole.
7,8-Dichloro-1,2,3,4-tetrahydroisoquinoline	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with 7,8-Dichloro-1,2,3,4-tetrahydroisoquinoline.
Acepromazine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with Acepromazine.
Aceprometazine	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with Aceprometazine.
Acetazolamide	The risk or severity of adverse effects can be increased when Botulinum toxin type A is combined with Acetazolamide.

Showing 1 to 10 of 821 entries ‹ 1 2 3 4 5 ... 83 ›

ADDITIONAL DATA AVAILABLE

Food Interactions Not Available

REFERENCES

General References

1. Montecucco C, Molgo J: Botulinal neurotoxins: revival of an old killer. Curr Opin Pharmacol. 2005 Jun;5(3):274-9. [PubMed:15907915]
2. Brin MF, Lew MF, Adler CH, Comella CL, Factor SA, Jankovic J, O'Brien C, Murray JJ, Wallace JD, Willmer-Hulme A, Koller M: Safety and efficacy of NeuroBloc (botulinum toxin type B) in type A-resistant cervical dystonia. Neurology. 1999 Oct 22;53(7):1431-8. [PubMed:10534247]
3. Shukla HD, Sharma SK: Clostridium botulinum: a bug with beauty and weapon. Crit Rev Microbiol. 2005;31(1):11-8. [PubMed:15839401]
4. Eisenach JH, Atkinson JL, Fealey RD: Hyperhidrosis: evolving therapies for a well-established phenomenon. Mayo Clin Proc. 2005 May;80(5):657-66. [PubMed:15887434]
5. Schurch B, Corcos J: Botulinum toxin injections for paediatric incontinence. Curr Opin Urol. 2005 Jul;15(4):264-7. [PubMed:15928517]

External Links

UniProt	P10845
Genbank	X52066
KEGG Drug	D00783
KEGG Compound	C07946

KEGG Compound	C07946

Therapeutic Targets Database	DAP001298
PharmGKB	PA164754825
Wikipedia	Botox

ATC Codes

- M03AX01 — Botulinum toxin
  - M03AX — Other muscle relaxants, peripherally acting agents
  - M03A — MUSCLE RELAXANTS, PERIPHERALLY ACTING AGENTS
  - M03 — MUSCLE RELAXANTS
  - M — MUSCULO-SKELETAL SYSTEM

AHFS Codes

92:92.00 — Other Miscellaneous Therapeutic Agents

FDA label

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CLINICAL TRIALS

Clinical Trials

Show 10 entries Search

PHASE	STATUS	PURPOSE	CONDITIONS	COUNT
0	Completed	Treatment	Bladder Pain Syndrome	1
0	Completed	Treatment	Strokes	1
0	Not Yet Recruiting	Treatment	Gummy Smile Due to Hypermobile Upper Lip	1
0	Recruiting	Treatment	Complex Regional Pain Syndrome (CRPS)	1
0	Recruiting	Treatment	Secondary Headache Disorder	1
0	Terminated	Treatment	Neurocostal neuralgia	1
0	Withdrawn	Diagnostic	Benign Prostatic Hyperplasia (BPH) / Enlarged Prostate With Lower Urinary Tract Symptoms (LUTS) / Prostate Cancer	1
1	Active Not Recruiting	Treatment	Parkinson's Disease (PD)	1
1	Active Not Recruiting	Treatment	Pruritus	1
1	Completed	Basic Science	Healthy Volunteers	2

Showing 1 to 10 of 505 entries ‹ 1 2 3 4 5 … 51 ›

PHARMACOECONOMICS

Manufacturers

Not Available

Packagers

Allergan Inc. Tercica Inc.

Dosage forms

Show 10 entries Search

FORM	ROUTE	STRENGTH
Injection, powder, lyophilized, for solution	Intradermal; Intramuscular	100 [USP'U]/1
Injection, powder, lyophilized, for solution	Intradermal; Intramuscular	200 [USP'U]/1
Powder, for solution	Intramuscular	100 unit
Injection, powder, lyophilized, for solution	Intramuscular	300 [USP'U]/1
Injection, powder, lyophilized, for solution	Intramuscular	300 U/1
Injection, powder, lyophilized, for solution	Intramuscular	500 U/1
Powder, for solution	Intramuscular	300 unit
Powder, for solution	Intramuscular	500 unit

Injection, powder, lyophilized, for solution	Intramuscular	100 [USP'U]/1

Showing 1 to 10 of 13 entries ‹ 1 2 ›

Prices

Show 10 entries Search

UNIT DESCRIPTION	COST	UNIT
Botox 200 unit vial	1260.0USD	vial
Dysport 500 unit vial	852.0USD	vial
Botox 100 unit	655.2USD	vial
Botox 100 unit vial	630.0USD	vial
Botox cosmetic 100 unit vial	630.0USD	vial
Botox cosmetic 50 unit vial	346.8USD	vial
Botox (100 - 200 unit/Vial)	3.74USD	vial

Showing 1 to 7 of 7 entries ‹ 1 ›

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Patents

Show 10 entries Search

PATENT NUMBER	PEDIATRIC EXTENSION	APPROVED	EXPIRES (ESTIMATED)	
CA2280565	No	2005-11-15	2019-08-20	
CA2310845	No	2001-05-15	2014-06-07	

Showing 1 to 2 of 2 entries ‹ 1 ›

PROPERTIES

State Solid

Experimental Properties

PROPERTY	VALUE	SOURCE
water solubility	Soluble	Not Available
hydrophobicity	-0.368	Not Available
isoelectric point	6.06	Not Available

TAXONOMY

Description Not Available

Kingdom Organic Compounds

Super Class Organic Acids

Class Carboxylic Acids and Derivatives

Sub Class Amino Acids, Peptides, and Analogues

Direct Parent Peptides

Alternative Parents Not Available

Substituents Not Available

Molecular Not Available

Framework

Drugs

External Descriptors	Not Available

TARGETS

1. Synaptosomal-associated protein 25

Details

Kind	Protein
Organism	Humans
Pharmacological action	Yes
Actions	Inhibitor
General Function	Syntaxin-1 binding
Specific Function	t-SNARE involved in the molecular regulation of neurotransmitter release. May play an important role in the synaptic function of specific neuronal systems. Associates with proteins involved in vesi...
Gene Name	SNAP25
Uniprot ID	P60880
Uniprot Name	Synaptosomal-associated protein 25
Molecular Weight	23314.905 Da

References

1. Zhou JY, Wang ZF, Ren XM, Tang MZ, Shi YL: Antagonism of botulinum toxin type A-induced cleavage of SNAP-25 in rat cerebral synaptosome by toosendanin. FEBS Lett. 2003 Dec 4;555(2):375-9. [PubMed:14644446]
2. Flynn TC: Myobloc. Dermatol Clin. 2004 Apr;22(2):207-11, vii. [PubMed:15222581]
3. Okada M, Yoshida S, Zhu G, Kaneko S: [Methodological consideration in studying the exocytosis mechanisms using microdialysis]. Nihon Shinkei Seishin Yakurigaku Zasshi. 2004 Aug;24(4):165-70. [PubMed:15484814]
4. Frassoni C, Inverardi F, Coco S, Ortino B, Grumelli C, Pozzi D, Verderio C, Matteoli M: Analysis of SNAP-25 immunoreactivity in hippocampal inhibitory neurons during development in culture and in situ. Neuroscience. 2005;131(4):813-23. [PubMed:15749336]
5. Straughan D: Progress in applying the Three Rs to the potency testing of Botulinum toxin type A. Altern Lab Anim. 2006 Jun;34(3):305-13. [PubMed:16831062]
6. Chen X, Ji ZL, Chen YZ: TTD: Therapeutic Target Database. Nucleic Acids Res. 2002 Jan 1;30(1):412-5. [PubMed:11752352]

2. Rho-related GTP-binding protein RhoB

Details

Kind	Protein
Organism	Humans
Pharmacological action	Unknown
General Function	Gtpase activity
Specific Function	Mediates apoptosis in neoplastically transformed cells after DNA damage. Not essential for development but affects cell adhesion and growth factor signaling in transformed cells. Plays a negative r...
Gene Name	RHOB
Uniprot ID	P62745
Uniprot Name	Rho-related GTP-binding protein RhoB
Molecular Weight	22123.185 Da

References

Drug created on June 13, 2005 07:24 / Updated on July 24, 2019 05:39

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