



Somatotropin

[Targets \(2\)](#)[Biointeractions \(1\)](#)

IDENTIFICATION

Name

Somatotropin

Accession Number

DB00052 (BTD00086, BIOD00086, DB06417)

Type

Biotech

Groups

Approved, Investigational

Biologic Classification

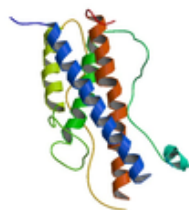
Protein Based Therapies

Hormones

Description

Recombinant human growth hormone (somatotropin) 191 residues, MW 22.1 kD, synthesized in E. coli

Protein structure



Protein chemical formula

$C_{899}H_{1522}N_{242}O_{300}S_7$



Sequences

```
>DB00052 sequence
FPTIPLSRLFDNAMLRAHRLHQLAFDTYQEFEEAYIPKEQKYSFLQNPQTSLCFSESIPT
PSNREETQQKSNELELLRISLLLIQSWLEPVQFLRSVFNANSLVYGASDSNVYDLLKDLEEG
IQTLMGRLEDGSPRTGQIFKQTYSKFDTNSHNDALLKNYGLLYCFRKMDMKVETFLRIV
QCRSVEGSCGF
```

[Download FASTA Format](#)

Synonyms

Growth hormone

Growth hormone (human)

hGH

Human growth hormone

Recombinant human growth hormone

rhGH

Somatotropin (human)

Somatotropin human

Somatotropin human growth hormone

Somatropin

Somatropin (rDNA origin)

Somatropin (recombinant DNA origin)

Somatropin [rDNA origin]

Somatropin recombinant

Somatropin(recombinant DNA origin)

Somatropina

External IDs [i](#)

CB-311 / DA-3002 / LY-137998 / LY137998

Prescription Products

Search



Genotropin	Kit	1.4 mg/0.25mL		Pharmacia & Upjohn Inc	1995-12-20	Not applicable		
Genotropin	Powder, for solution	0.4 mg	Subcutaneous	Pfizer	Not applicable	Not applicable		
Genotropin	Powder, for solution	5.3 mg	Subcutaneous	Pfizer	2013-09-18	Not applicable		
Genotropin	Kit	0.4 mg/0.25mL		Physicians Total Care, Inc.	2006-06-30	2012-06-30		
Genotropin	Powder, for solution	1.4 mg	Subcutaneous	Pfizer	2013-09-18	Not applicable		
Genotropin	Kit	1.8 mg/0.25mL		Pharmacia & Upjohn Inc	1995-12-20	Not applicable		
Genotropin	Powder, for solution	0.6 mg	Subcutaneous	Pfizer	2013-09-18	Not applicable		
Genotropin	Kit	0.8 mg/0.25mL		Physicians Total Care, Inc.	2007-08-16	2012-06-30		
Genotropin	Powder, for solution	1.8 mg	Subcutaneous	Pfizer	2013-09-18	Not applicable		

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Mixture Products

NAME	INGREDIENTS	DOSAGE	ROUTE	LABELLER	MARKETING			
					START	END		
Bio-tropin	Somatotropin (4.8 mg) + Sodium Chloride (10 ml)	Liquid; Powder, for solution	Subcutaneous	Novopharm Limited	Not applicable	Not applicable		

Bio-tropin	Somatotropin (1.8 mg) +	Liquid; Powder, for	Subcutaneous	Novopharm Limited	Not applicable	Not applicable		
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		solution						
Humatrope	Somatotropin (24 mg)	Liquid; Powder, for solution	Intramuscular; Subcutaneous	Eli Lilly & Co. Ltd.	2003-12-08	Not applicable		
Humatrope	Somatotropin (12 mg)	Liquid; Powder, for solution	Intramuscular; Subcutaneous	Eli Lilly & Co. Ltd.	2001-08-28	Not applicable		
Nutropin - Kit Pws(10mg) & Liq(10ml) Im Sc	Somatotropin (10 mg) + Water (10 ml)	Kit; Powder, for solution	Intramuscular; Subcutaneous	Hoffmann La Roche	2002-10-08	2013-12-02		
Nutropin - Kit Pws(5mg) & Liq(10ml) Im Sc	Somatotropin (5 mg) + Water (10 ml)	Kit; Powder, for solution	Intramuscular; Subcutaneous	Hoffmann La Roche	1997-01-20	2011-07-19		
Omnitrope	Somatotropin (5.8 mg) + Water (1.14 ml)	Kit; Powder, for solution	Subcutaneous	Sandoz Canada Incorporated	Not applicable	Not applicable		
Saizen 10iu - Kit	Somatotropin (3.3 mg) + Sodium Chloride (5 ml)	Powder, for solution	Intramuscular; Subcutaneous	Emd Serono, A Division Of Emd Inc., Canada	1996-10-17	Not applicable		
Serostim	Somatotropin (6 mg) + Water (1 ml)	Powder, for solution	Subcutaneous	Emd Serono, A Division Of Emd Inc., Canada	1999-06-30	2013-07-15		

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Unapproved/Other Products ⓘ

Search

MARKETING

MARKETING



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International/Other Brands

BioTropin (Biotech General) / NutropinAQ (Genentech Inc.)

Categories

[Amino Acids, Peptides, and Proteins](#)

[Anterior Pituitary Lobe Hormones and Analogues](#)

[Growth Hormone](#)

[Hormones](#)

[Hormones, Hormone Substitutes, and Hormone Antagonists](#)

[Peptide Hormones](#)

[Peptides](#)

[Pituitary](#)

[Pituitary and Hypothalamic Hormones and Analogues](#)

[Pituitary Hormones](#)

[Pituitary Hormones, Anterior](#)

[Recombinant Human Growth Hormone](#)

[Recombinant Human Growth Hormones](#)

[Somatotropin Agonists](#)

[Somatropin and Somatropin Agonists](#)

[Systemic Hormonal Preparations, Excl. Sex Hormones and Insulins](#)

UNII

[NQX9KB6PCL](#)

CAS number

12629-01-5



For treatment of dwarfism, acromegaly and prevention of HIV-induced weight loss

Associated Conditions

[Adult Onset Growth Hormone Deficiency](#)

[Cachexia](#)

[Childhood-onset Growth Hormone Deficiency](#)

[Growth Failure](#)

[Short Bowel Syndrome \(SBS\)](#)

[Short Stature](#)

Pharmacodynamics

Used in the treatment of dwarfism and growth failure, growth hormone (hGH) stimulates skeletal growth in pediatric patients with growth failure due to a lack of adequate secretion of endogenous GH. Skeletal growth is accomplished at the epiphyseal plates at the ends of a growing bone. Growth and metabolism of epiphyseal plate cells are directly stimulated by GH and one of its mediators, IGF-I (insulin-like growth factor).

Mechanism of action

hGH binds to the human growth hormone receptor (GHR). Upon binding, hGH causes dimerization of GHR, activation of the GHR-associated JAK2 tyrosine kinase, and tyrosyl phosphorylation of both JAK2 and GHR. These events recruit and/or activate a variety of signaling molecules, including MAP kinases, insulin receptor substrates, phosphatidylinositol 3' phosphate kinase, diacylglycerol, protein kinase C, intracellular calcium, and Stat transcription factors. These signaling molecules contribute to the GH-induced changes in enzymatic activity, transport function, and gene expression that ultimately culminate in changes in growth and metabolism.

(A) [Growth hormone receptor](#)

binder

Human

(A) [Prolactin receptor](#)

Not Available

Human

Absorption

Not Available



Protein binding

Not Available

Metabolism

Not Available

Route of elimination

Although calcium excretion in the urine is increased, there is a simultaneous increase in calcium absorption from the intestine. Somatotropin stimulates the synthesis of chondroitin sulfate and collagen, and increases the urinary excretion of hydroxyproline.

Half life

Not Available

Clearance

- 2.3 +/- 1.8 mL/min/kg [GHD patients (IV 33 ng/kg/min)]

Toxicity

Not Available

Affected organisms

Humans and other mammals

Pathways

Not Available

Pharmacogenomic Effects/ADRs [i](#)

Not Available

INTERACTIONS

Drug Interactions [i](#)

ALL DRUGS

APPROVED

VET APPROVED

NUTRACEUTICAL

ILLICIT

WITHDRAWN





DRUG	INTERACTION
Acipimox	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Acipimox.
Alendronic acid	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Alendronic acid.
Aluminium clofibrate	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Aluminium clofibrate.
Amiodarone	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Amiodarone.
Amphotericin B	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Amphotericin B.
Atorvastatin	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Atorvastatin.
Baclofen	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Baclofen.
Betamethasone	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Betamethasone.
Bezafibrate	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Bezafibrate.
Bumetanide	The risk or severity of myopathy, rhabdomyolysis, and myoglobinuria can be increased when Somatotropin is combined with Bumetanide.

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Food Interactions

Not Available

REFERENCES

Synthesis Reference

Mandayam J. Narasimhan, John A. Anderson, "Process for the large scale production of human growth hormone by serial secondary suspension culture." U.S. Patent US4124448, issued January, 1963.

[US4124448](#)



2. Alba-Roth J, Muller OA, Schopohl J, von Werder K: Arginine stimulates growth hormone secretion by suppressing endogenous somatostatin secretion. *J Clin Endocrinol Metab.* 1988 Dec;67(6):1186-9. [[PubMed:2903866](#)]
3. Scarth JP: Modulation of the growth hormone-insulin-like growth factor (GH-IGF) axis by pharmaceutical, nutraceutical and environmental xenobiotics: an emerging role for xenobiotic-metabolizing enzymes and the transcription factors regulating their expression. A review. *Xenobiotica.* 2006 Feb-Mar;36(2-3):119-218. [[PubMed:16702112](#)]
4. Takahashi Y, Kipnis DM, Daughaday WH: Growth hormone secretion during sleep. *J Clin Invest.* 1968 Sep;47(9):2079-90. [[PubMed:5675428](#)]

External Links

UniProt

[P58756](#)

Genbank

[AF374232](#)

PubChem Substance

[46506010](#)

ChEMBL

[CHEMBL1201621](#)

Therapeutic Targets Database

[DAP001054](#)

PharmGKB

[PA451446](#)

RxList

[RxList Drug Page](#)

Drugs.com

[Drugs.com Drug Page](#)

Wikipedia

[Somatotropin_recombinant](#)

ATC Codes

[H01AC01 – Somatotropin](#)

- [H01AC – Somatotropin and somatotropin agonists](#)
- [H01A – ANTERIOR PITUITARY LOBE HORMONES AND ANALOGUES](#)



68:28.00 – Pituitary

68:30.04 – Somatotropin Agonists*

FDA label[Download](#) (241 KB)

CLINICAL TRIALS

Clinical Trials ⓘ

Search

PHASE	STATUS	PURPOSE	CONDITIONS	COUNT
0	Active Not Recruiting	Treatment	Aging / Immune System and Related Disorders	1
0	Completed	Treatment	Human Growth Hormone Deficiency	1
0	Recruiting	Treatment	Infertility, Female	1
0	Recruiting	Treatment	NAFLD	1
1	Completed	Basic Science	Cardiovascular Disease (CVD)	1
1	Completed	Basic Science	Growth Failure / Human Growth Hormone Deficiency	1
1	Completed	Diagnostic	Traumatic Brain Injury (TBI)	1
1	Completed	Treatment	Adult Onset Growth Hormone Deficiency / Growth Hormone Disorders	1
1	Completed	Treatment	Adult Onset Growth Hormone Deficiency / Growth Hormone Disorders / Healthy Volunteers	1
1	Completed	Treatment	Chronic Kidney Disease (CKD) / End-Stage Renal Disease (ESRD) / Healthy Volunteers	1

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PHARMACOECONOMICS

Manufacturers

Genentech inc



Pharmacia and upjohn co

Eli Lilly and Co

Novo Nordisk Inc

Sandoz Inc

EMD Serono Inc

Ligand Life Sciences Ltd

Packagers

Bio Technology General Ltd.

Bristol-Myers Squibb Co.

BTG Pharmaceuticals Corp.

Ebewe Pharma

Eli Lilly & Co.

EMD Canada Inc.

F Hoffmann-La Roche Ltd.

First KJM Corporation

Gate Pharmaceuticals

Genentech Inc.

Hospira Inc.

Merck KGaA

Merck Serono SPA

Novartis AG

Novo Nordisk Inc.

Pfizer Inc.

Pharmacia Inc.

Physicians Total Care Inc.

Sandoz

Serono SA

Vetter Pharma Fertigung GmbH and Co. KG

Wasserburger Arzneimittelwerk GmbH

Dosage forms



Liquid; powder, for solution	Subcutaneous	
Kit		0.2 mg/0.25mL
Kit		0.4 mg/0.25mL
Kit		0.6 mg/0.25mL
Kit		0.8 mg/0.25mL
Kit		1 mg/0.25mL
Kit		1.2 mg/0.25mL
Kit		1.4 mg/0.25mL
Kit		1.6 mg/0.25mL
Kit		1.8 mg/0.25mL

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Prices

Search

UNIT DESCRIPTION	↕ COST	↕ UNIT
Humatrope 24 mg cartridge	1822.9USD	cartridge
Norditropin flexpro 15 mg/1.5	1179.54USD	ml
Norditropin 15 mg/1.5ml Solution 1.5ml Cartridge	1168.32USD	cartridge
Norditropin NordiFlex Pen 15 mg/1.5ml Solution 1 Syringe = 1.5ml	1168.32USD	pen
Norditropin 15 mg/1.5 ml cartridge	1123.38USD	ml
Norditropin nordiflx 15 mg/1.5	1123.38USD	ml
Genotropin 12 mg Solution	928.36USD	each
Humatrope 12 mg cartridge	911.45USD	cartridge
Nutropin 10 mg vial	784.7USD	vial
Nutropin aq 20 mg/2ml pen cart	759.55USD	ml

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PATENT NUMBER	↑↓	PEDIATRIC EXTENSION	↑↓	APPROVED	↑↓	EXPIRES (ESTIMATED)	↑↓	↑↓
US5288703		<input type="radio"/> No		1994-02-22		2011-10-07		
CA2252535		<input type="radio"/> No		2009-06-23		2017-04-24		
CA1326439		<input type="radio"/> No		1994-01-25		2011-01-25		
US6152897		<input type="radio"/> No		2000-11-28		2018-11-20		
US5898030		<input type="radio"/> No		1999-04-27		2016-04-27		
US8672898		<input type="radio"/> No		2014-03-18		2022-01-02		
US8684969		<input type="radio"/> No		2014-04-01		2025-10-20		
US9132239		<input type="radio"/> No		2015-09-15		2032-02-01		
US8920383		<input type="radio"/> No		2014-12-30		2026-07-17		
US7686786		<input type="radio"/> No		2010-03-30		2026-08-03		

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PROPERTIES

State

Liquid

Experimental Properties

PROPERTY	VALUE	SOURCE
melting point (°C)	76 °C at pH 3.5	Gomez-Orellana, I. et al., Protein Sci. 7:1352-1358 (1998)
hydrophobicity	-0.411	Not Available
isoelectric point	5.27	Not Available

TAXONOMY

Description

Not Available

Kingdom

Organic Compounds



Class

Carboxylic Acids and Derivatives

Sub Class

Amino Acids, Peptides, and Analogues

Direct Parent

Peptides

Alternative Parents

Not Available

Substituents

Not Available

Molecular Framework

Not Available

External Descriptors

Not Available

TARGETS

1. Growth hormone receptor

Kind

Protein

Organism

Human

Pharmacological action

Yes

Actions

**Specific Function**

Receptor for pituitary gland growth hormone involved in regulating postnatal body growth. On ligand binding, couples to the JAK2/STAT5 pathway (By similarity).The soluble form (GHBP) acts as a rese...

Gene Name

GHR

Uniprot ID

[P10912](#)

Uniprot Name

Growth hormone receptor

Molecular Weight

71498.885 Da

References

1. Walenkamp MJ, Wit JM: Genetic disorders in the growth hormone - insulin-like growth factor-I axis. *Horm Res.* 2006;66(5):221-30. [[PubMed:16917171](#)]
2. Wu XY, Xu Z, Chen C, Liu FK, Li JS: [Correlation of growth hormone receptor expression to preoperative radiosensitivity of rectal cancer patients]. *Ai Zheng.* 2006 Sep;25(9):1162-7. [[PubMed:16965663](#)]
3. Adriani M, Garbi C, Amodio G, Russo I, Giovannini M, Amorosi S, Matrecano E, Cosentini E, Candotti F, Pignata C: Functional interaction of common gamma-chain and growth hormone receptor signaling apparatus. *J Immunol.* 2006 Nov 15;177(10):6889-95. [[PubMed:17082603](#)]
4. Choi JH, Kim HS, Kim SH, Yang YR, Bae YS, Chang JS, Kwon HM, Ryu SH, Suh PG: Phospholipase Cgamma1 negatively regulates growth hormone signalling by forming a ternary complex with Jak2 and protein tyrosine phosphatase-1B. *Nat Cell Biol.* 2006 Dec;8(12):1389-97. Epub 2006 Nov 26. [[PubMed:17128263](#)]
5. Bernstein RM, Leigh SR, Donovan SM, Monaco MH: Hormones and body size evolution in papionin primates. *Am J Phys Anthropol.* 2007 Feb;132(2):247-60. [[PubMed:17133434](#)]
6. Chen X, Ji ZL, Chen YZ: TTD: Therapeutic Target Database. *Nucleic Acids Res.* 2002 Jan 1;30(1):412-5. [[PubMed:11752352](#)]

2. Prolactin receptor**Kind**

Protein

Organism

Human



Specific Function

This is a receptor for the anterior pituitary hormone prolactin (PRL). Acts as a prosurvival factor for spermatozoa by inhibiting sperm capacitation through suppression of SRC kinase activation and...

Gene Name

PRLR

Uniprot ID

[P16471](#)

Uniprot Name

Prolactin receptor

Molecular Weight

69505.045 Da

References

1. Keeler C, Jablonski EM, Albert YB, Taylor BD, Myszka DG, Clevenger CV, Hodsdon ME: The kinetics of binding human prolactin, but not growth hormone, to the prolactin receptor vary over a physiologic pH range. *Biochemistry*. 2007 Mar 6;46(9):2398-410. Epub 2007 Feb 6. [[PubMed:17279774](#)]
2. Ahmed TA, Buzzelli MD, Lang CH, Capen JB, Shumate ML, Navaratnarajah M, Nagarajan M, Cooney RN: Interleukin-6 inhibits growth hormone-mediated gene expression in hepatocytes. *Am J Physiol Gastrointest Liver Physiol*. 2007 Jun;292(6):G1793-803. Epub 2007 Mar 29. [[PubMed:17395896](#)]
3. Modersheim TA, Gorba T, Pathipati P, Kokay IC, Grattan DR, Williams CE, Scheepens A: Prolactin is involved in glial responses following a focal injury to the juvenile rat brain. *Neuroscience*. 2007 Mar 30;145(3):963-73. Epub 2007 Feb 20. [[PubMed:17317019](#)]
4. Cunningham BC, Bass S, Fuh G, Wells JA: Zinc mediation of the binding of human growth hormone to the human prolactin receptor. *Science*. 1990 Dec 21;250(4988):1709-12. [[PubMed:2270485](#)]

Drug created on June 13, 2005 07:24 / Updated on December 07, 2018 15:21

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