

Drugs



## Darbepoetin alfa

Targets (1)

## IDENTIFICATION

**Name** Darbepoetin alfa**Accession Number** DB00012 (BTD00032, BIOD00032)**Type** Biotech**Groups** Approved, Investigational**Biologic Classification** Protein Based Therapies  
Haematopoietic growth factors**Description** Human erythropoietin with 2 aa substitutions to enhance glycosylation (5 N-linked chains), 165 residues (MW=37 kD). Produced in Chinese hamster ovary (CHO) cells by recombinant DNA technology.**Protein structure****Protein chemical formula**  $C_{815}H_{1317}N_{233}O_{241}S_5$ **Protein average weight** 18396.1 Da**Sequences**

>DB00012 sequence  
APPRLICDSRVLERYLLLEAKEAENITTGCAEHCSLNENITVPDTKVNFYAWKRMEVGQQA  
VEVWQGLALLSEAVLRGQALLVNSSQPWEPLQLHVDKAVSGLRSLTLLRALGAQKEAIS  
PPDAASAAPLRTITADTFRKLFrvvysnflrgkllklytgeactgdr

[Download FASTA Format](#)**Synonyms**

Darbepoetin  
Darbepoetin alfa, recombinant  
Darbepoetina alfa

**Prescription Products**Show  entries

NAME	DOSAGE	STRENGTH	ROUTE	LABELLER	MARKETING START	MARKETING END			
Aranesp	Injection, solution	10 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable			
Aranesp	Injection, solution	10 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable			

NAME	DOSAGE	STRENGTH	ROUTE	LABELLER	MARKETING START	MARKETING END		
Aranesp	solution	20 µg	Subcutaneous	Europe B.V.				
Aranesp	Injection, solution	20 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable	EU	
Aranesp	Injection, solution	30 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable	EU	
Aranesp	Injection, solution	30 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable	EU	
Aranesp	Injection, solution	40 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable	EU	
Aranesp	Injection, solution	40 µg	Intravenous; Subcutaneous	Amgen Europe B.V.	2001-06-08	Not applicable	EU	

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**Categories**

- [Amino Acids, Peptides, and Proteins](#)
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- [Biological Factors](#)
- [Blood and Blood Forming Organs](#)
- [Carbohydrates](#)
- [Colony-Stimulating Factors](#)
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- [Erythropoiesis-Stimulating Agents](#)
- [Erythropoietin](#)
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- [Glycoproteins](#)
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- [Increased Erythroid Cell Production](#)
- [Intercellular Signaling Peptides and Proteins](#)
- [Peptides](#)
- [Proteins](#)

**UNII**

[15UQ94PT4P](#)

**CAS number**

209810-58-2

PHARMACOLOGY

**Indication**

For the treatment of anemia (from renal transplants or certain HIV treatment)

**Associated Conditions**

[Anemias](#)

**Pharmacodynamics**

Darbepoetin alfa is used in the treatment of anemia. It is involved in the regulation of erythrocyte differentiation and the maintenance of a physiological level of circulating erythrocyte mass.

**Mechanism of action**

Darbepoetin alfa stimulates erythropoiesis by the same mechanism as endogenous erythropoietin. Erythropoietin interacts with progenitor stem cells to increase red cell production. Binding of erythropoietin to the erythropoietin receptor leads to receptor dimerization, which facilitates activation of JAK-STAT signaling pathways within the cytosol. Activated STAT (signal transducers and activators of transcription) proteins are then translocated to the nucleus where they serve as transcription factors which regulate the activation of specific genes involved in cell division or differentiation.

TARGET	ACTIONS	ORGANISM
<a href="#">Erythropoietin receptor</a>	agonist	Humans

**Absorption**

Not Available

**Volume of distribution**

Not Available

**Protein binding** Not Available

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**Route of elimination** Not Available

**Half life** Not Available

**Clearance** Not Available

**Toxicity** Not Available

**Affected organisms** Humans and other mammals

**Pathways** Not Available

**Pharmacogenomic Effects/ADRs**

INTERACTIONS

**Drug Interactions**

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

Show  entries

DRUG <input type="button" value="↑↓"/>	INTERACTION <input type="button" value="↑↓"/>
<a href="#">Cyclophosphamide</a>	The risk or severity of pulmonary toxicity can be increased when Darbepoetin alfa is combined with Cyclophosphamide.
<a href="#">Lenalidomide</a>	The risk or severity of Thrombosis can be increased when Darbepoetin alfa is combined with Lenalidomide.
<a href="#">Nandrolone</a>	The therapeutic efficacy of Darbepoetin alfa can be increased when used in combination with Nandrolone.
<a href="#">Nandrolone decanoate</a>	The therapeutic efficacy of Darbepoetin alfa can be increased when used in combination with Nandrolone decanoate.
<a href="#">Nandrolone phenpropionate</a>	The therapeutic efficacy of Darbepoetin alfa can be increased when used in combination with Nandrolone phenpropionate.
<a href="#">Pomalidomide</a>	The risk or severity of Thrombosis can be increased when Darbepoetin alfa is combined with Pomalidomide.
<a href="#">Thalidomide</a>	The risk or severity of Thrombosis can be increased when Darbepoetin alfa is combined with Thalidomide.
<a href="#">Vinblastine</a>	The risk or severity of peripheral neuropathy can be increased when Darbepoetin alfa is combined with Vinblastine.
<a href="#">Vincamine</a>	The risk or severity of peripheral neuropathy can be increased when Darbepoetin alfa is combined with Vincamine.
<a href="#">Vincristine</a>	The risk or severity of peripheral neuropathy can be increased when Darbepoetin alfa is combined with Vincristine.

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**Food Interactions** Not Available

REFERENCES

**General References** Not Available

External Links

UniProt [P01588](#) [Darbepoetin alfa DrugBank](#)  
 Genbank [X02158](#)

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ChEMBL [CHEMBL1201566](#)  
 Therapeutic Targets Database [DAP000800](#)  
 PharmGKB [PA164743138](#)  
 RxList [RxList Drug Page](#)  
 Drugs.com [Drugs.com Drug Page](#)  
 Wikipedia [Darbepoetin\\_alfa](#)

ATC Codes

- [B03XA02 — Darbepoetin alfa](#)
- [B03XA — Other antianemic preparations](#)
  - [B03X — OTHER ANTIANEMIC PREPARATIONS](#)
  - [B03 — ANTIANEMIC PREPARATIONS](#)
  - [B — BLOOD AND BLOOD FORMING ORGANS](#)

AHFS Codes

20:16.00 — Hematopoietic Agents

CLINICAL TRIALS

Clinical Trials ⓘ

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PHASE	STATUS	PURPOSE	CONDITIONS	COUNT
1	Completed	Other	<a href="#">Hemoglobin Level</a>	1
1	Completed	Other	<a href="#">Reticulocyte Count</a>	1
1	Completed	Treatment	<a href="#">Healthy Volunteers</a>	2
1	Unknown Status	Treatment	<a href="#">Symptomatic Anemia</a>	1
1	Withdrawn	Treatment	<a href="#">Anemias / Chronic Kidney Disease (CKD)</a>	1
1, 2	Completed	Treatment	<a href="#">Anemias / Congestive Heart Failure (CHF)</a>	1
1, 2	Completed	Treatment	<a href="#">Blood Cancers / Myelodysplastic Syndromes / Myelodysplastic Syndromes (MDS)</a>	1
1, 2	Completed	Treatment	<a href="#">Hypoxic Ischemic Encephalopathy (HIE)</a>	1
2	Active Not Recruiting	Supportive Care	<a href="#">Lymphoma, Large B-Cell, Diffuse (DLBCL)</a>	1
2	Active Not Recruiting	Treatment	<a href="#">Malignant Lymphomas</a>	1

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PHARMACOECONOMICS

Manufacturers

Amgen Inc.

Packagers

Amgen Inc. Physicians Total Care Inc.

Dosage forms

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FORM	ROUTE	STRENGTH
Injection, solution	Intravenous; Subcutaneous	10 µg
Injection, solution	Intravenous; Subcutaneous	10 ug/0.4mL
Injection, solution	Intravenous; Subcutaneous	100 µg
Injection, solution	Intravenous; Subcutaneous	100 ug/0.5mL

FORM	ROUTE	STRENGTH
Injection, solution	Intravenous; Subcutaneous	150 ug
Injection, solution	Intravenous; Subcutaneous	20 µg
Injection, solution	Intravenous; Subcutaneous	200 µg

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## Prices

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UNIT DESCRIPTION	COST	UNIT
Aranesp (Albumin Free) 150 mcg/0.75ml Solution (1 Box = Four 0.75ml Vials)	3902.75USD	box
Aranesp (Albumin Free) 100 mcg/0.5ml Solution (1 Box = Four 0.5ml Syringes)	2601.83USD	box
Aranesp (Albumin Free) 100 mcg/ml Solution Four 1ml Vials Per Box	2601.83USD	box
Aranesp (Albumin Free) 300 mcg/ml vial	1951.37USD	vial
Aranesp 300 mcg/ml vial	1876.32USD	ml
Aranesp 200 mcg/ml vial	1250.88USD	ml
Aranesp 100 mcg/ml vial	625.44USD	ml
Aranesp (Albumin Free) 60 mcg/ml vial	390.31USD	vial
Aranesp 60 mcg/ml vial	375.3USD	ml
Aranesp 40 mcg/ml vial	250.2USD	ml

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## Patents

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PATENT NUMBER	PEDIATRIC EXTENSION	APPROVED	EXPIRES (ESTIMATED)	
<a href="#">CA2165694</a>	No	2003-03-18	2010-10-15	
<a href="#">CA2147124</a>	No	2002-11-05	2014-08-16	

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## PROPERTIES

State Liquid

## Experimental Properties

PROPERTY	VALUE	SOURCE
melting point (°C)	53 °C	Arakawa, T. et al., Biosci. Biotechnol. Biochem. 65:1321-1327 (2001)
hydrophobicity	-0.188	Not Available
isoelectric point	8.75	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

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Substituents Not Available



Molecular Framework Not Available

External Descriptors Not Available

TARGETS

**1. Erythropoietin receptor** Details

Kind	Protein
Organism	Humans
Pharmacological action	Yes
Actions	Agonist
General Function	Identical protein binding
Specific Function	Receptor for erythropoietin. Mediates erythropoietin-induced erythroblast proliferation and differentiation. Upon EPO stimulation, EPOR dimerizes triggering the JAK2/STAT5 signaling cascade. In som...
Gene Name	EPOR
Uniprot ID	<a href="#">P19235</a>
Uniprot Name	Erythropoietin receptor
Molecular Weight	55064.725 Da

References

- LaMontagne KR, Butler J, Marshall DJ, Tullai J, Gechtman Z, Hall C, Meshaw A, Farrell FX: Recombinant epoetins do not stimulate tumor growth in erythropoietin receptor-positive breast carcinoma models. Mol Cancer Ther. 2006 Feb;5(2):347-55. [\[PubMed:16505108\]](#)
- Kokhaei P, Abdalla AO, Hansson L, Mikaelsson E, Kubbies M, Haselbeck A, Jernberg-Wiklund H, Mellstedt H, Osterborg A: Expression of erythropoietin receptor and in vitro functional effects of epoetins in B-cell malignancies. Clin Cancer Res. 2007 Jun 15;13(12):3536-44. [\[PubMed:17575216\]](#)
- Chen X, Ji ZL, Chen YZ: TTD: Therapeutic Target Database. Nucleic Acids Res. 2002 Jan 1;30(1):412-5. [\[PubMed:11752352\]](#)

Drug created on June 13, 2005 07:24 / Updated on April 18, 2019 08:41

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