

Biologics and Biosimilars

What is a biologic?

Biologics are therapeutics derived from living sources such as proteins, animal cells, bacteria, and yeast. This broad category of biopharmaceuticals includes **vaccines** (e.g., influenza vaccine), **blood products and tissues** (e.g., plasma and skin grafts), **antibodies** (e.g., disease-modifying antirheumatics), **gene therapies** (e.g., bioengineered stem cells), and **long amino acid chain proteins** (e.g., human growth factors).

How are biologics different than small molecule drugs?

Biologics consist of larger molecules which can be more expensive and complex to manufacture. Therefore, biologic manufacturing and approval is governed by a distinct regulatory process dubbed a **“Biologic License Application” (BLA)**, distinguished from the New Drug Application (NDA) seen with traditional small molecule drug approval submissions. A biologic submitted for review under a BLA will have its manufacturing process, chemical make-up and clinical pharmacology assessed to ensure it is safe and effective for human use.

What is a biosimilar?

A **biosimilar** is a close match to an existing FDA-approved biologic (referred to as the “reference/innovator product”), defined as having no clinically meaningful differences in purity, quality, and pharmacokinetic parameters. These products may be brought to market through an abbreviated (quicker and less costly) process, as their approval is contingent on showing similarity to the already approved reference biologic.

Are biologics interchangeable with their biosimilar products?

To be deemed **“interchangeable,”** a manufacturer must submit additional clinical trial data demonstrating no safety or efficacy concerns when switching between a reference biologic and the proposed interchangeable biosimilar. If approved, an interchangeable biosimilar may be substituted for the original product without consulting the prescriber (similar to conventional brand-to-generic substitution). This is commonly called [pharmacy-level substitution](#) and is subject to state pharmacy laws. The [FDA’s Purple Book](#) remains the best reference source for reference/innovator biologics, biosimilars, and interchangeable biosimilars.



What are examples of commonly encountered biologics?

Biologic	Biosimilar	Interchangeable?	Example Indication
Avastin (bevacizumab)	Alymsys (bevacizumab-maly)	✗	Metastatic Colorectal Cancer
Enbrel (etanercept)	Eticovo (etanercept-ykro)	✓	Plaque Psoriasis
Herceptin (trastuzumab)	Herzuma (trastuzumab-pkrb)	✗	Breast Cancer
Humira (adalimumab)	Amjevita (adalimumab-atto)	✓	Rheumatoid Arthritis
Lantus (insulin glargine)	Semglee (insulin glargine-yfgn)	✓	Diabetes Mellitus
Lucentis (ranibizumab)	Byooviz (ranibizumab-nuna)	✓	Macular Edema
Neulasta (pegfilgrastim)	Ziextenzo (pegfilgrastim-bmez)	✗	Febrile Neutropenia
Prolia (denosumab)	Jubbonti (denosumab-bbdz)	✓	Osteoporosis
Remicade (infliximab)	Inflectra (infliximab-dyyb)	✗	Crohn's Disease
Rituxan (rituximab)	Riabni (rituximab-arrx)	✗	Non-Hodgkin's Lymphoma

For more information on individual biologic products (storage/handling, dosing, adverse effects, etc.), utilize the [NIH's DailyMed search engine](#) to access respective package inserts with full prescribing information!

Additional Resources

1. [Biosimilars: Overview for Health Care Professionals](#)
2. [Biosimilars: What Patients Need to Know](#)