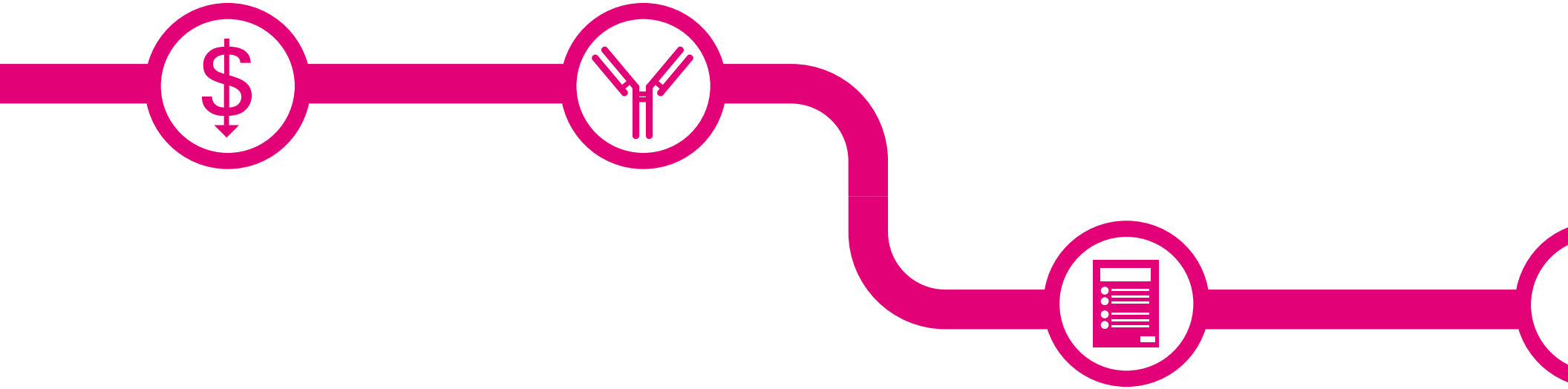
ORGANON®

WELCOME TO

PATHWAYS TO BIOSIMILARS:

DEVELOPMENT AND IMPLEMENTATION | A SELF-DIRECTED LEARNING TOOL



Start learning

Welcome to "Pathways to Biosimilars: Development and Implementation"

Through this self-directed learning tool, you will:

Recognize that biosimilars were introduced to lower costs to the health care system[1,2]

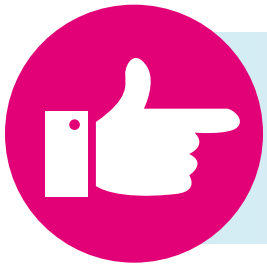
Why Biosimilars Matter >>>

Understand the rigorous development and FDA approval processes for biosimilars[3]

Development and Approval >>>

Gain ideas for adopting biosimilars in your health care system or practice

A Biosimilars Action Plan >>>



Ready to begin?

Get started

FDA, US Food and Drug Administration.

Why Do We Need Biosimilars?

Biologic products have had a profound impact on the treatment of many serious and life-threatening conditions.[1,2]
However, their high cost can place a difficult burden on the health care system.[4]

From 2016 through 2020,
73 biologics
received FDA approval[5]

Drug spending on biologics has risen, reaching $211 billion in 2019. That year, biologics comprised
43% of total medicine spending
in the United States[6]

By 2023, **biologic spending** is projected to increase to over
$300 billion[7]

The goal of biosimilars is to create competitive pricing for biologics, to help reduce health care system costs, and increase access to biologic drugs.[1,2]

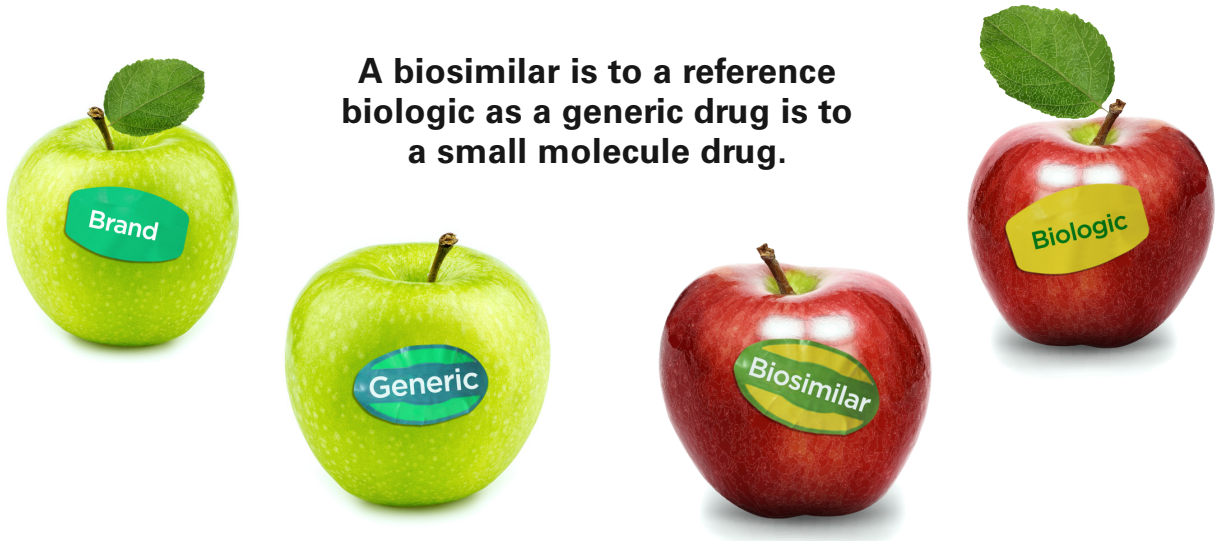
FDA, US Food and Drug Administration.

Watch the "Why Biosimilars Matter" video to dig even deeper into the story.

What, exactly, are biosimilars?

The Blueprint for Biosimilars

To understand how biosimilars may achieve their goal of reducing health care system costs, consider this analogy:



In comparison with generics, which are often molecular copies of a small molecule drug, biologics and biosimilars are derived from a living source—making them highly complex molecules.[3,8]

A biosimilar is a biologic product that is **highly similar to, and has no clinically meaningful differences in terms of safety, purity, and potency** from, an existing FDA-approved reference biologic.[8]

FDA, US Food and Drug Administration.

Watch the "Why Biosimilars Matter" video to dig even deeper into the story.

How can generics act as a blueprint for biosimilar success?

Savings Snapshot: Generics and Biosimilars

Generics-based competition helps facilitate savings that may go back into the health care system.[9]

Generics:

$313 billion in savings
from generic drugs in the United States in 2019[10]

Biosimilars:

$104 billion in expected potential savings over the next 5 years
(projected savings from biosimilars to the health care system from 2020–2024)[6]

Biosimilars and generics were introduced with the same goal: to increase access to medicines and reduce health care system costs.[1]

As more biosimilars are approved and utilized, the potential for savings and access across the health care system can grow.[2]

Watch the "Why Biosimilars Matter" video to dig even deeper into the story.

How are biosimilars created?

Learning Objectives | Why Biosimilars Matter | Development and Approval | A Biosimilars Action Plan | Summary & References

The Rigorous Phases of Biosimilar Development and Approval

To demonstrate that a **biosimilar is highly similar to its reference biologic**, the biosimilar must go through a rigorous development and approval process[3]:

ANALYSIS: Critical Quality Attributes (CQAs) are defined through a multifactorial analysis of the reference biologic. They serve as a blueprint for developing the biosimilar.[3,11]

TESTING: Extensive in vitro and in vivo assessments of the biosimilar's CQAs are performed to support biosimilarity through structural, functional, and clinical evidence.[3]

DEVELOPMENT: From a pool of thousands of living cell lines, the living cell line that reliably generates a biosimilar molecule with the established CQAs is identified.[12,13]

FDA APPROVAL: The FDA bases its approval on a **comprehensive analysis of all structural, functional, and clinical data.[3]**

Approval of a biosimilar indicates that there are no clinically meaningful differences between the biosimilar and its reference biologic in terms of safety, purity, and potency.[3]

FDA, US Food and Drug Administration.

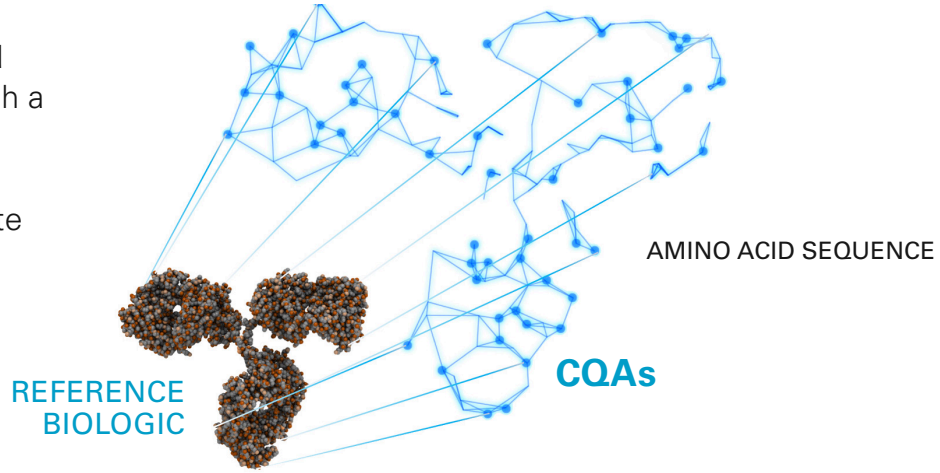
Watch the "Rigorous Approval" video to dig even deeper into the story.

Dive deeper into analysis and development

Analysis and Development of Biosimilars

Biosimilar development begins with analyzing the reference biologic to build a "fingerprint" that helps define the structure and function of the reference biologic, which the biosimilar will match.[3]

1. **IDENTIFY** critical quality attributes (CQAs), such as amino acid sequence, binding activity, protein structure, and MOA, through a multifactorial analysis of the reference biologic.[3,11]
2. **DEVELOP** a pool of thousands of living cell lines that generate a comparable molecule to the reference biologic.[12,13]
3. **SELECT** the optimal cell line for biosimilar production.[12,13]



The biosimilar is continuously validated against the reference biologic's CQAs throughout development and during manufacturing post-approval.[3]

MOA, mechanism of action.

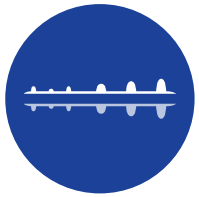
Watch the "Rigorous Approval" video to dig even deeper into the story.

Continue to testing and approval

Testing and Approval of Biosimilars

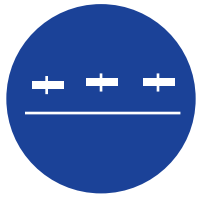
Testing includes extensive in vitro and in vivo assessments of CQAs and other attributes of the proposed biosimilar against the reference biologic.[3]

To support that there are no clinically meaningful differences between a biosimilar and its reference biologic, 3 types of tests are performed[3]:



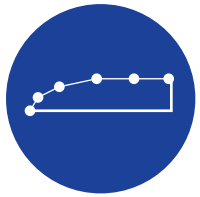
STRUCTURAL

- Amino acid sequence
- Protein structure



FUNCTIONAL

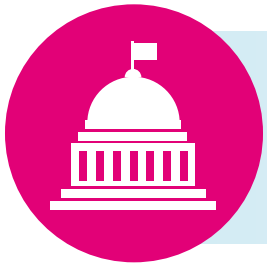
- Target binding activity
- Mechanism of action



CLINICAL

- PK/PD
- Immunogenicity
- If residual uncertainty remains, additional comparative safety and efficacy clinical studies are performed

The FDA bases its approval on a stepwise analysis of all structural, functional, and clinical data collected by a biosimilar manufacturer. They may request additional comparative clinical studies be performed to demonstrate equivalent efficacy, safety, and immunogenicity to the reference biologic.[3]



FDA approval of a biosimilar indicates that there are no clinically meaningful differences in safety, purity, and potency between the biosimilar and its reference biologic.[3]

CQA, critical quality attribute; FDA, US Food and Drug Administration; PD, pharmacodynamics; PK, pharmacokinetics.

Watch the "Structural Testing," "Functional Testing," and "Clinical Testing" videos to dig even deeper into the story.

What is your role in the biosimilars story?

How Can You Successfully Adopt Biosimilars Into Your Health Care Practice or Organization?

The potential for savings to the health care system may depend on how biosimilars are utilized moving forward. As competition increases from biosimilar adoptions, the potential for significant savings to the health care system can increase as well.[2]

DECIDING TO ADOPT A BIOSIMILAR:

- Building knowledge about the product
- Assessing the payer landscape
- Building a consensus among key stakeholders in your organization

IMPLEMENTING A BIOSIMILAR:

- Updating systems
- Addressing payer landscape and reimbursement
- Educating and communicating key information
- Becoming available to patients and stakeholders

MONITORING BIOSIMILAR USE AND EXPERIENCE:

- Measuring and confirming success

For biosimilars to fulfill their potential to increase access and reduce costs across the health care system, it will take the collective efforts of all stakeholders throughout the biosimilars adoption process.[1,2]

Download a comprehensive roadmap for adopting biosimilars here.

Based on the experience at a major health care institution. The adoption process and roles may vary by institution. Organon does not guarantee that your use of this information will help you achieve your biosimilars goals. This information was prepared in consultation with, and with the permission of, a health care administrator at a major health care institution who had successfully implemented a biosimilars switch within their organization.

Review and wrap-up

Key Takeaways

The 3 key points to remember are:

Biosimilars are projected to have the potential to **save the health care system $104 billion** from 2020 to 2024[6]

Biosimilars are FDA approved as having **no clinically meaningful differences in safety, purity, and potency** from their reference biologic, as demonstrated by a **rigorous development process**[3]

Adopting biosimilars requires the **collective efforts of all stakeholders** in your organization. A guide is available to help you get started here

As the health care landscape continues to change, consider whether adopting biosimilars presents an opportunity for your organization.

FDA, US Food and Drug Administration.

See references

References: 1. Biosimilars Action Plan. Balancing Innovation and Competition. FDA website. July 2018. Accessed April 23, 2021. https://www.fda.gov/media/114574/download **2.** Mulcahy AW, Hlávka JP, Case SR. Biosimilar cost savings in the United States: initial experience and future potential. Accessed June 23, 2021. https://www.rand.org/content/dam/rand/pubs/ perspectives/PE200/PE264/RAND_PE264.pdf **3.** Scientific considerations in demonstrating biosimilarity to a reference product. Guidance for industry. FDA website. April 2015. Updated April 24, 2020. Accessed May 28, 2021. https://www.fda.gov/media/82647/download **4.** Atzinger CB, Guo JJ. Biologic disease-modifying antirheumatic drugs in a national, privately insured population: utilization, expenditures, and price trends. *Am Health Drug Benefits*. 2017;10(1):27–36. **5.** Purple Book database of licensed biological products. FDA website. October 2020. Accessed June 23, 2021. https://purplebooksearch.fda.gov/downloads **6.** Aitken M, Kleinrock M, Muñoz E. Biosimilars in the United States 2020–2024: competition, savings, and sustainability. IQVIA Institute for Human Data Science report. September 29, 2020. Accessed June 23, 2021. https://www.iqvia.com/insights/the-iqvia-institute/reports/biosimilars-in-the-united-states-2020-2024 **7.** Aitken M, Kleinrock M, Simorellis A, et al. The global use of medicine in 2019 and outlook to 2023: forecasts and areas to watch. IQVIA Institute for Human Data Science report. January 29, 2019. Accessed June 23, 2021. www.iqvia.com/insights/the-iqvia-institute/reports/the-global-use-of-medicine-in-2019-and-outlook-to-2023 **8.** Purple Book database of licensed biological products. FDA website. October 2020. Updated August 20, 2021. Accessed June 23, 2021. https://www.fda.gov/files/drugs/published/Biological-Product-Definitions.pdf **9.** Association for Accessible Medicines 2020 Report: Generic Drug and Biosimilars Access and Savings in the U.S. using data from IQVIA, found online. Published December 2020, Accessed April 23, 2021. https://accessiblemeds.org/sites/default/files/2020-09/AAM-2020-Generics-Biosimilars-Access-Savings-Report-US-Web.pdf **10.** Lim S. Overview of the regulatory framework and FDA's guidance for the development and approval of biosimilar and interchangeable products in the US. Accessed June 23, 2021. https://www.fda.gov/media/113820/download **11.** Guidance for industry: Q8(R2) pharmaceutical development. FDA website. Accessed June 23, 2021. www.fda.gov/media/71535/download **12.** Monoclonal antibody production. NCBI website. Accessed June 23, 2021. www.ncbi.nlm.nih.gov/books/n/nap9450/pdf/ **13.** Dranitsaris G, Amir E, Dorward K. Biosimilars of biological drug therapies: regulatory, clinical and commercial considerations. *Drugs*. 2011;71(12):1527-1536. doi:10.2165/11593730-000000000-00000.