Boehringer Ingelheim

Boehringer Ingelheim Biosimilars

Biosimilars - Contributing to the Quality and Economic Sustainability of Healthcare

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Since their introduction in the 1980s, the advent of biological medicines (biologics) has helped reduce disease morbidity and mortality while improving patient quality of life across many different diseases – from rheumatoid arthritis and psoriasis to various forms of cancer. In the past decade, over 80 biologic molecules have been launched globally.[1] Biologics currently account for more than 20% percent of global pharmaceutical sales.[2] This share is predicted to increase to almost 30% by 2020.[1]

Patents for a number of high-cost biologics are expected to expire by 2020.[3] The regulatory authorities in the European Union (EU)[4] and the United States (U.S.)[5] have created a regulatory pathway that enables the introduction of biosimilar medicines. Boosting competition among biologics, biosimilars are expected to increase the availability of safe, effective, high-quality therapeutic options to patients and to contribute to the economic sustainability of healthcare systems. These factors make biosimilars a key to meeting the increased demand for biologic therapies.[6]

The Molecule is Similar, The Experience is the Same

A biosimilar is a highly similar version of an approved biologic (referred to as a reference product) with no clinically meaningful differences in terms of quality, safety and efficacy (according to the European Medicines Agency; EMA)[4]/quality, safety, purity and potency (according to the U.S. Food and Drug Administration; FDA)[5].

Made from living organisms, biologics are proteins or antibodies that interact with the body to produce a therapeutic outcome. Unlike small molecule drugs that are chemically synthesized and can be copied exactly in the form of a generic, biologics and biosimilars consist of large, complex molecules (e.g., monoclonal antibodies) that are manufactured in living cells and then extracted and purified. Because biologics are grown from living organisms, it is impossible to develop an identical copy of the reference product.

Thus, there is a significant difference between the development of a generic drug and of a biosimilar: On average, a generic drug takes 3-5 years to develop at a cost of USD 1-5 million; a biosimilar, on the other hand, takes on average 7-8 years to develop at a cost of USD 100-250 million.[7]

The first biosimilar was introduced in the EU in 2006, with the regulatory approval of Omnitrope® (somatropin). Currently, there are more than 20 biosimilars on the market in the EU.[8] In the U.S., Zarxio® (filgrastim-sndz) became the first biosimilar to receive regulatory approval in 2015.[9] The first monoclonal antibody biosimilar to receive FDA approval was Inflectra® (infliximab-dyyb) in 2016[10].

The Path to Approval for Biosimilars in the European Union

In the EU, a legal framework for approving biosimilars was established in 2003, determining that biosimilar medicines must be approved centrally by the EMA. Since then, the EMA has developed various general and specific guidelines for biosimilars.[11] The Overarching Guideline "on similar biological medicinal products" came into effect on 30 April 2015 and determines that the developers of biosimilars have to establish similarity to the reference product "by the best possible means, ensuring that the previously proven safety and efficacy of the reference medicinal product also applies to the biosimilar".[12] In order to accomplish this, the EMA recommends a stepwise approach throughout the development program, including non-clinical in vivo studies and clinical studies. However, the study design depends on the nature of the biosimilar.[12]

The Path to Approval for Biosimilars in the United States

In the U.S., the 2010 Patient Protection and Affordable Care Act (ACA) established the biosimilars approval pathway to accelerate the availability of biosimilars. To utilize this approval pathway, the manufacturer of a biosimilar must demonstrate that its product is "highly similar to the reference product" and provide data from analytical, animal and clinical studies.[5] The approval pathway is designed to be more streamlined than the U.S. FDA's Biologics License Application (BLA) pathway, but provides the analytics to prove biosimilars are as safe and efficacious as the reference product based on the "totality of evidence" included in the application.[5]

[1] IMS Institute for Healthcare Informatics, 2016: Delivering on the Potential of Biosimilar Medicines – The Role of Functioning Competitive Markets; https://www.imshealth.com/files/web/IMSH%20Institute/Healthcare%20Briefs/Documents/IMS_Institute_Biosimilar_Brief_March_2016.pdf; p. 3. Accessed November 09, 2016.
[2] Evaluate Pharma World Preview, 2015: World Preview 2015, Outlook to 2020; http://info.evaluategroup.com/rs/607-YGS-364/images/wp15.pdf; p. 21. Accessed November 09, 2016.
[3] GaBi Online, 2014: US$67 billion worth of biosimilar patents expiring before 2020; http://www.gabionline.net/Biosimilars/General/US-67-billion-worth-of-biosimilar-patents-expiring-before-2020 Accessed November 09 2016.
[4] EMA, 2016: Biosimilars; http://www.ema.europa.eu/ema/index.jsp?curl=pages/special_topics/document_listing/document_listing_000318.jsp Accessed November 09, 2016.
[5] FDA, 2015: Scientific Considerations in Demonstrating Biosimilarity to a Reference Product. Guidance for Industry; http://www.fda.gov/downloads/DrugsGuidanceComplianceRegulatoryInformation/Guidances/UCM291128.pdf. Accessed November 09, 2016.
[6] Forbes, 2014: Biosimilars can save lives and cost less. http://www.forbes.com/sites/realspin/2014/08/08/biosimilars-can-save-lives-and-cost-less/#1a6e59233b2f. Accessed November 09, 2016.
[7] Erwin A. Blackstone., P. Fuhr Joseph, Jr., The Economics of Biosimilars. *Am Health Drug Benefits*. 2013 SepOct;6(8): 469–478.
[8] EMA Europe. European Public Assessment reports. Available at: http://www.ema.europa.eu/ema/index.jsp?curl=pages%2Fmedicines%2Flanding%2Fepar_search.jsp&mid=WC0b01ac058001d124&searchTab=searchByAuthType&alreadyLoaded=true&isNewQuery=true&status=Authorised&keyword=Enter+keywords&searchType=name&taxonomyPath=&treeNumber=&searchGenericType=biosimilars&genericsKeywordSearch=Submit. Accessed November 09, 2016.
[9] FDA, 2015: FDA approves first biosimilar product Zarxio. http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm436648.htm. Accessed November 09, 2016.
[10] FDA approves Inflectra, a biosimilar to Remicade. http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm494227.htm. Accessed November 11, 2016
[11] GaBi Online, 2016: Overview – Biosimilars approved in Europe. http://www.gabionline.net/Biosimilars/General/Biosimilars-approved-in-Europe. Accessed November 09, 2016.
[12] EMA, 2014: Guideline on similar biological medicinal products. http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2014/10/WC500176768.pdf. Accessed November 09, 2016.