biosimilar medicines
better access. better health.

Biosimilar medicines

The story of European pioneering success in advancing patient access to lifesaving biologic treatment

Dr Karsten Roth

Senior Director Clinical Research and Development, Polpharma Biologics International, Switzerland

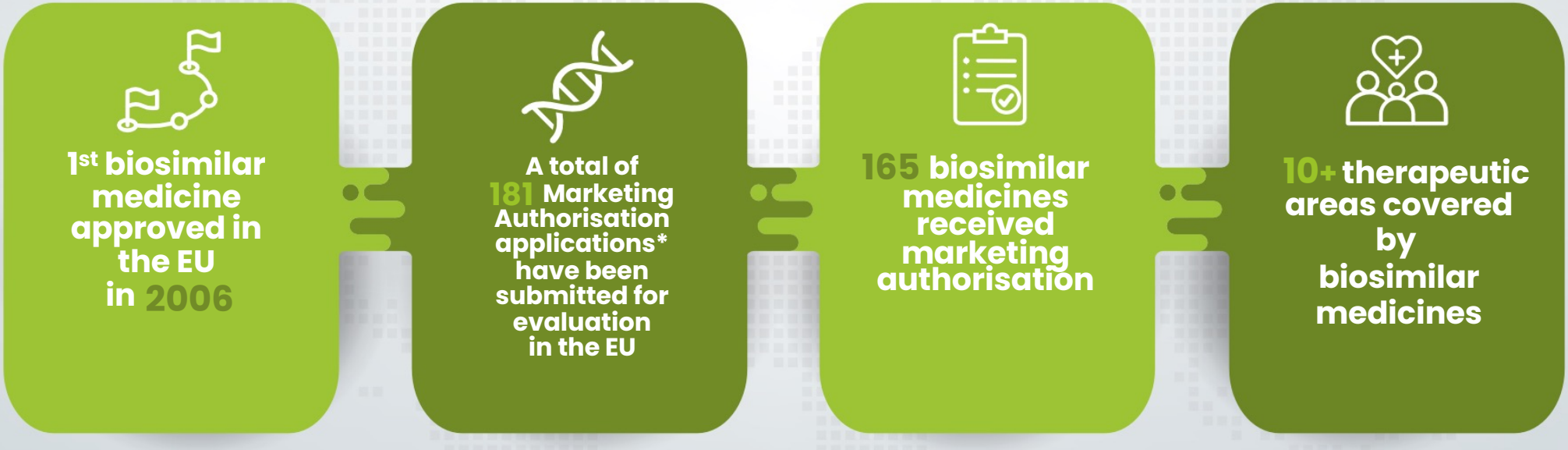
Vice-Chair, Biosimilar medicines sector group, Medicines for Europe, Bruessels

17th Open Scientific EIP Symposium on Immunogenicity of Biopharmaceuticals

patients • quality • value • sustainability • partnership

medicines for europe
better access. better health.

Biosimilar Medicines in the EU:
Approval Overview



biosimilar medicines

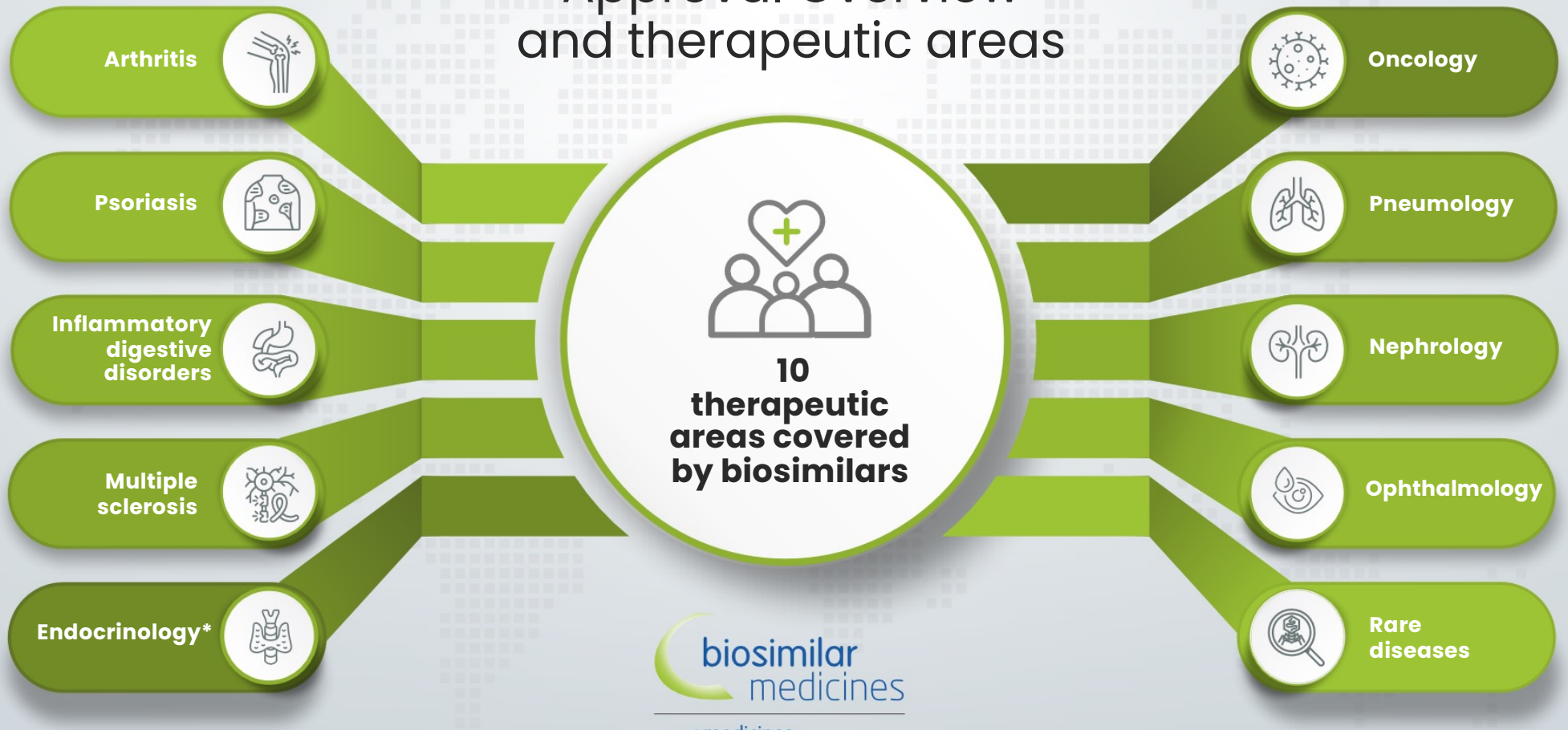
A medicines for europe sector group

*Including duplicates and not yet started.

Source: https://www.ema.europa.eu/en/medicines/download-medicine-data.

Mar 2026

Biosimilars in the EU:
Approval Overview and therapeutic areas



biosimilar medicines

A medicines for europe sector group

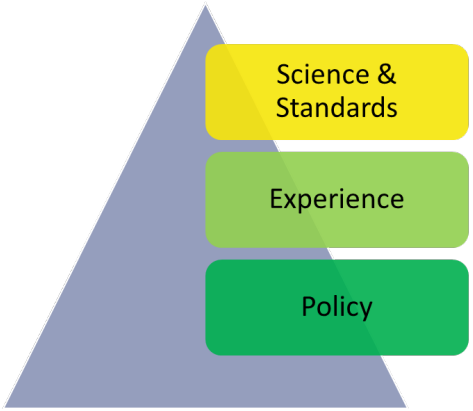
*Including growth hormone, fertility and diabetes.

Source: https://www.ema.europa.eu/en/medicines/download-medicine-data.

Mar 2026

biosimilar medicines
better access. better health.

Biosimilar medicines - The story of a European pioneering success



2006

The first worldwide biosimilar medicine (somatropin) was approved in the EU in 2006[2]

Since 2006, EU-approved biosimilar medicines have generated more than **4.5 billion patient days** of clinical experience[1]

Between 2006 and 2013, patient access rose by 44% following the launch of filgrastim[3]

2013

The first biosimilar monoclonal antibody (infliximab) was approved in the EU in 2013[2]

EU approved biosimilar medicines are **available in over 60 countries** around the world[1]

2023

94%

Europe and U.S. uptake accounts for over 90% of the global biosimilar medicines market[3]

Percentage of global **biosimilar** medicine sales by region[4]

References: 1. IQVIA report Biosimilar competition in Europe (Dec 2022) Accessed Sept 2023. **2.** EMA. European public access reports; **3.** IQVIA, MIDAS MAT Q2 2023; **4.** IQVIA, MIDAS MAT Q2 2023; ATC1, Retail and Hospital; Biocomp, biosimilars only.

biosimilar medicines
better access. better health.

KEY FIGURES ON BIOSIMILAR MEDICINES

9.2 billion
patient treatment days
with EU approved biosimilar medicines since 2011

The number of treatment days with anti-TNF medicines **has doubled** from 2013-2023

€75 billion
cumulative savings
from the impact of biosimilar competition since 2007,
€13 billion
in 2024 alone

A growing opportunity for patients with over **110 new biologic medicines** opening to biosimilar competition by 2032

A considerable opportunity for European healthcare budget: a **€53.5Bn** market will **open to competition** by 2032

By 2030, **1st cell & gene therapies** will open to biosimilar competition

Biosimilar candidates are under development for **1/3 of biologics** losing exclusivity by 2032

Biosimilar medicines represent **5%** of the **total pharmaceutical spending** in Europe (~€12.6 billion)

patients • quality • value • sustainability • partnership

biosimilar medicines
better access. better health.

What has the European biosimilar history taught us so far?

European Biosimilar competition

Affordability

Reduction of **biologic treatment costs**

> 75Bn Euro budget freed-up (since 2006)[1]

Accessibility

9.2 Bn patient treatment days (2025)

+100% prescriptions (anti-TNF) across Europe[1] (between 2013-2023)

Availability

Alternative treatment options

Supply Security

Innovation

Patient Care delivery
Patient pathways

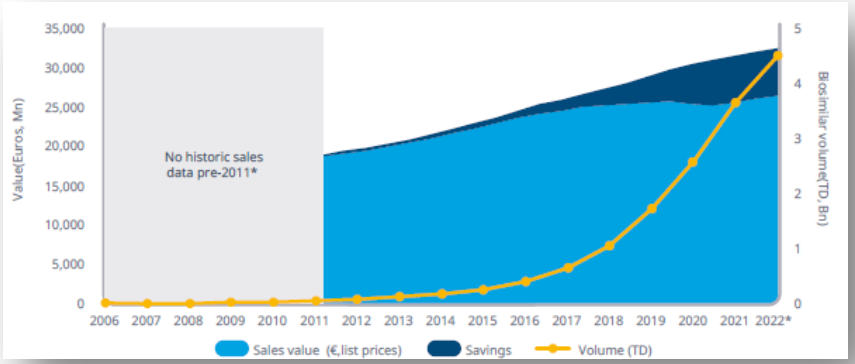
Repositioning
Repurposing

References: 1. IQVIA presentation at EC Event, Biosimilar competition in Europe (04 Dec 2025)

biosimilar medicines
better access. better health.

European Biosimilar competition & Biosimilar Savings, So What ?

European Biosimilar competition → Affordability | Accessibility | Availability | Innovation

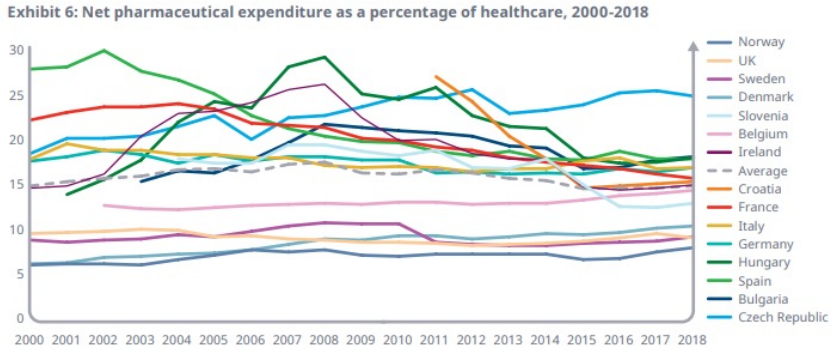


Patient Outcomes / Population Health

More eligible patients, earlier in the progression of the disease

Healthcare systems sustainability

Pharmaceutical expenditure has remained ~15% of healthcare expenditure since 2000

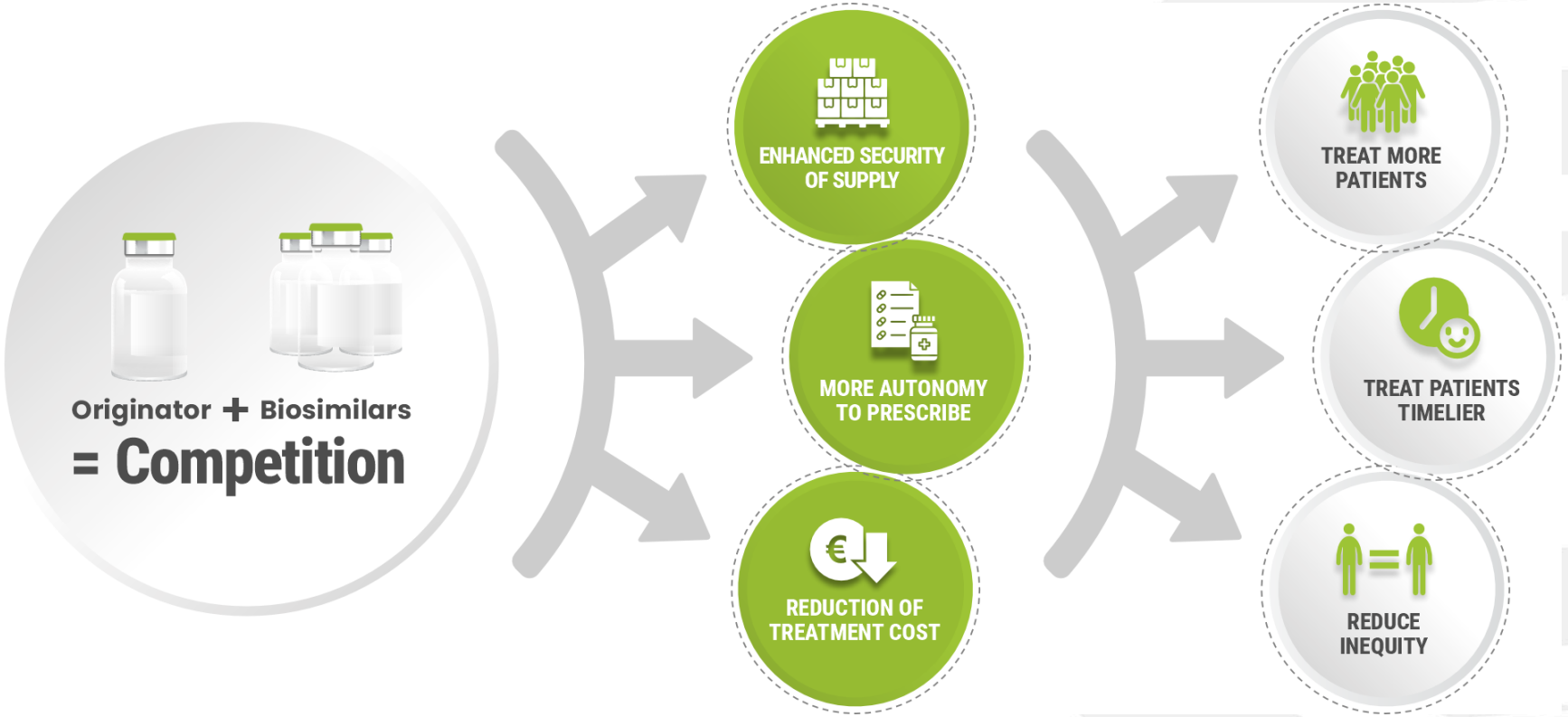


References: 1. IQVIA report Biosimilar competition in Europe (Dec 2022) Accessed Sept 2023; **2.** IQVIA Understanding Net Pharmaceutical Expenditure Dynamics in Europe (Apr 2022) https://www.iqvia.com/-/media/iqvia/pdfs/library/white-papers/iqvia-understanding-net-pharmaceutical-expenditure-dynamics-in-europe.pdf, Accessed Oct 2023).

biosimilar medicines
better access. better health.

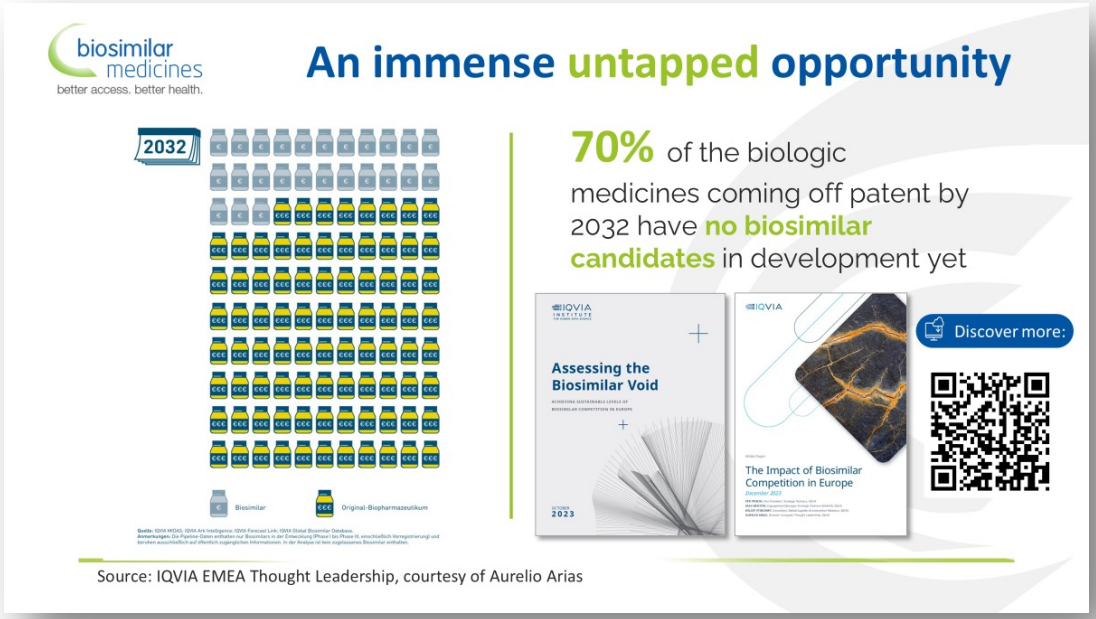
Primary Opportunity

Improving Patient Outcomes and Patient Care



patients • quality • value • sustainability • partnership

Closing the Biosimilar Void: Converting Potential into Uptake and Access



Healthcare systems could carry a **sustained ~€15Bn investment in indefinite monopolies**, approximately 25% of the total LoE opportunity by 2032

biosimilar medicines
better access. better health.

Current Challenges of Biosimilar Development

Main challenges for a **sustainable biosimilar model:**

High Development Costs → high upfront investments

- Lead principally by the high **reference product costs** and the **cost of conducting the Comparable Efficacy Trial (Phase III) ; ~ 1/3rd of overall development costs**

High Operating costs → Biotech, injectable

High concentration of biosimilar assets (blockbusters, high sales, therapy areas)

Fierce competition & Steep Price Erosion → slower ROI

- Dictated by market dynamics, and regulatory frameworks

Higher market volatility in the market with fast product hopping to newer clinical/therapeutic option

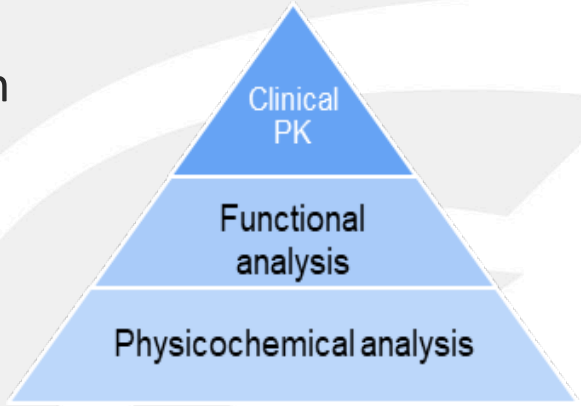
- **Immuno-oncology focus** of originator pipelines

Existing regulatory requirements can pose as an absolute barrier to biosimilar development

biosimilar medicines
better access. better health.

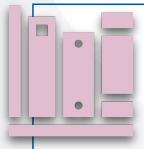
Streamlining Biosimilar development

- Streamlined Biosimilar Development is the development and regulatory approval of biosimilar medicines based on analytical and clinical pharmacokinetic data.
- **Today's regulatory science suggests that robust analytical and clinical PK data is sufficient to assess biosimilarity in most cases**
  - **no need for trade-off in quality, safety, & efficacy.**
- Streamlined biosimilar development is ready to become the new default in biosimilar regulation.



Science-Based

2 decades of experience with marketed **biosimilar medicines** in the EU



Over 4 decades of experience with regulation of **biotech process manufacturing changes**

biosimilar medicines
better access. better health.

Opportunities of Streamlined Biosimilar Development

Increased access of biological therapies to patients

Higher feasibility of developments for a broader range of biologics, including where facing absolute development barriers, e.g.:

- excessive originator reference comparator medicines acquisition costs,
- limited patient recruitment (orphan, complex biologics)…

Opportunity to provide critical savings to health care systems by increasing the number of biosimilar medicines on the market

- in synergy with appropriate market access and reimbursement policies

International convergence efforts

- possibly opening new markets

N.B.!

Development may be less costly for some, but not for all biosimilar candidates.

Still biotech development!

biosimilar medicines
better access. better health.

EU & Global Regulators' Activities on Streamlining Biosimilar development

EMA

- Published September workshop report[1]: "*..The science-driven tailored approach is supported as the next step in the evolution of the biosimilar regulatory pathway.*"

FDA

- Published a recommendation[2] that enables streamlined approach for developers (Oct 2025)

ICH

- Start of the guideline development process (topic M18)[3]

UK MHRA and WHO

- Already revised guidelines to accept streamlining (2021, 2022)

Considering adoption via guideline revision:

- Argentina, Canada, India, Mexico, Turkey, Brazil…

References: 1. EMA BMWP Workshop Report, 2. FDA recommendation for implementing streamlining 3. ICH M18 Concept paper;

biosimilar medicines

Advancements in regulatory science support **streamlined biosimilar development already today.**[2]

Streamlining development can **reduce treatment costs**, relieve pharmaceutical budgets, allowing **reinvestment** in other health products and services.[4]

Current mandate for comparative efficacy studies acts as a **barrier to greater patient access.**[3]

Convergence of regulatory requirements can accelerate streamlined biosimilar development adoption.[5]

1 https://biosimilarscouncil.org/resource/streamlining-the-development-of-biosimilar-medicines/
2 Schiestl et al. BioDrugs 2020 https://doi.org/10.1007/s40259-020-00422-1
3 IQVIA Report Biosimilar Void (2023)
4 Biosimilars Report Bolsters IGBA's Calls To Streamline Development Process
5 Comparative efficacy studies of biosimilars: data versus theoretical risks, beliefs, and comfort

medicines for europe
better access. better health.

biosimilar medicines
better access. better health.

Maximizing the impact of Biosimilar policies and measures

- **Regulatory Approval does not automatically guarantee access, or availability** of biosimilar medicines.
  - Governments must **implement policy frameworks (multi-measures)** to ensure biosimilar medicines are adopted by the system, available to the patient, and foster competition in the market.
- **Efficient post-authorization processes**, including through **procurement, pricing & reimbursement**, and information/education of stakeholders, are **critical** to ensuring that **quality-assured biosimilar medicines are available** in the market.
- There is a **continuous interplay** of policies and measures put in place, and this must be kept in mind - **avoiding acting in silos**.
- To **unveil the full value of biosimilar competition** for patients and healthcare systems, **4 main areas of policy** should be attended to as a matter of priority:
  - greater regulatory **convergence** and **reliance**,
  - efficient, timely and sustainable market **competition**,
  - affordable patient **co-payment** and **reimbursement policies** and
  - **continuously growing stakeholder trust and confidence**.

COMPANIES

ASSOCIATIONS

biosimilar medicines
better access. better health.

Biosimilar Medicines Group Membership

accord
alvotech
Biocon Biologics™
Transforming Healthcare. Transforming Lives.
CELLTRION
Dr.Reddy's
formycon
FRESENIUS KABI
GEDEON RICHTER
mAbxience
From lab to life
polpharma biologics
SAMSUNG
SAMSUNG BIOEPIS
SANDOZ
STADA
teva

apogen
BOGIN
BRITISH BIOSIMILARS ASSOCIATION
Medaxes
Association for accessible medicines
FARMA NORGE
Forening for Generiske og Biotilsvarende Medisiner
igL
Industriforeningen for Generiske og Biosimilære Lægemidler
GENAS
asociácia generických výrobcov
VGA
VAISTŲ GAMINTOJŲ ASOCIACIJA
FGL
FÖRENINGEN FÖR GENERISKA LÄKEMEDEL
GEMME
Biosimilaires
IEIS
intergenerika
bewährtes immer besser
iBG
Italian Biosimilars Group
medicines for ireland
Eine Arbeitsgemeinschaft von Pro Generika
probiosimilars

biosimilar medicines
better access. better health.

Join us in Amsterdam for the latest discussions on biosimilar medicines!

Event webpage: https://www.medicinesforeurope.com/events/bios26/

patients • quality • value • sustainability • partnership

biosimilar medicines
better access. better health.

medicines for europe
better access. better health.

Thank you for your attention!

patients • quality • value • sustainability • partnership

biosimilar medicines
better access. better health.

medicines for europe
better access. better health.

Back up slides

Single-dose PK studies suffice

- There are concerns that a single-dose study may not be as sensitive for assessing immunogenic response as a multiple-dose study
- Ji et al 2025:
  - *"This concern regarding low sensitivity after single-dose administration likely originated from vaccination practices, where multiple doses are often required to enhance the immune response and achieve long-lasting protective immunity."*
  - *"However, unlike vaccinations, which typically have a very short half-life, the half-life of monoclonal antibodies and fusion proteins is generally long, ranging from weeks to months. As a result, these products tend to remain in the body long enough to generate ADA, suggesting that an assessment following single-dose administration may be sufficient to evaluate the product's immunogenicity."*
- Experience in biosimilar development confirm high sensitivity of single-dose studies
  - Schiestl et al: Ustekinumab case study: all PK studies were single-dose studies
  - Kurki et al, Li et al: Single-dose PK studies delivered sensitive immunogenicity response, which were replicated in the CES studies

Conclusion

- Single-dose PK studies suffice to provide sensitive supportive immunogenicity data in a tailored development
- A multi-dose PK study would not be more definitive for regulatory decision making

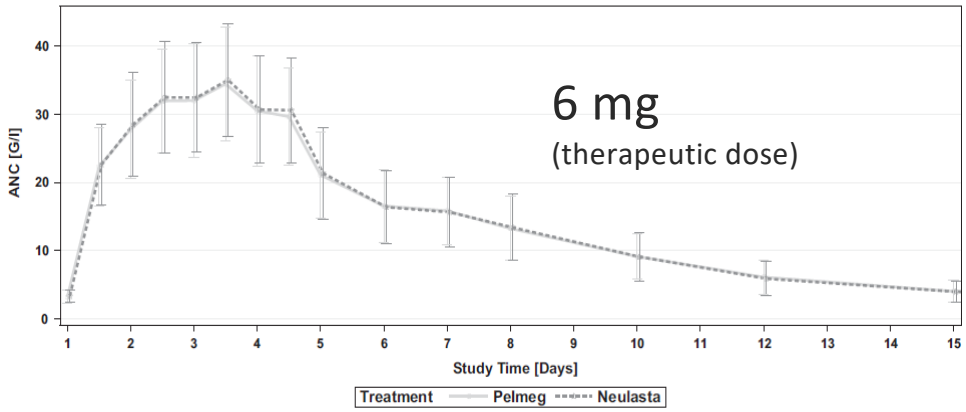
Case-Study evaluating knowledge gain of larger and longer safety study

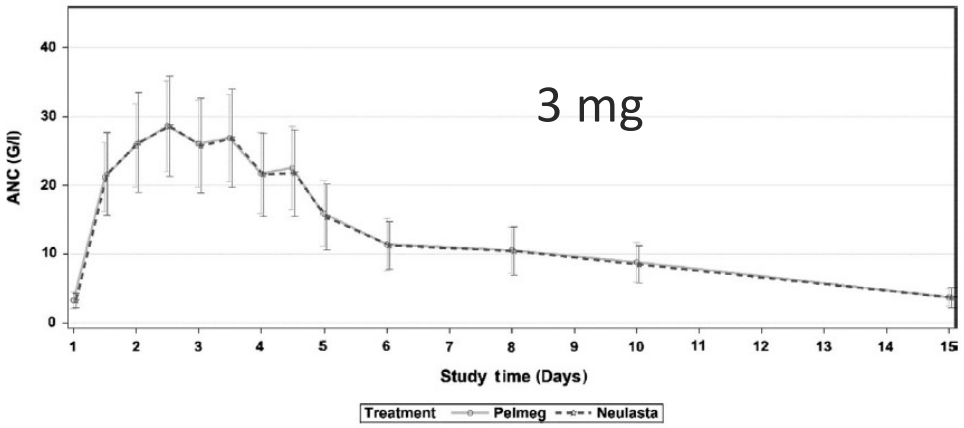
- Probabilities of detecting AEs
  - Probability of detecting at least one AE in one arm
  - Probability of detecting an AE only in one arm
- Case study CES of biosimilar GP2017 (adalimumab)
  - Dependence of comparative descriptive AE data from study duration
- Outcome:
  - The information gain of a longer or larger safety study provides only incremental additional information

Use of PD biomarker for biosimilar pegfilgrastim demonstrates insensitivity for differences

- Example: limited dose sensitivity of neutrophil count, a widely accepted PD endpoint for pegfilgrastim biosimilarity studies
- Reduction of dose by 50 % results in only 13 % lower PD response
  - Source: two consecutive PD studies for pegfilgrastim in healthy volunteers
  - Comparing both doses in a controlled parallel design study could potentially meet predefined 80-125 % equivalence margin
  - Same study sites, study population inclusion criteria, and analytical labs used for both studies
  - Biosimilar product approved in EU 2018

Study [1,2]	Dose	$AUEC_{0\text{-last}}$ Reference product
B12019-101	6 mg	7110.5
B12019-102	3 mg	6170.8
Difference	**50 %**	**13 %**





1. Roth et al. Pharmacol Res Perspect. 2019;e00503. https://doi.org/10.1002/prp2.503
2. Wessels et al. Pharmacol Res Perspect. 2019;e00507. https://doi.org/10.1002/prp2.507

AUEC: Area under the effect curve; PD biomarker: Pharmacodynamic biomarker

biosimilar medicines
better access. better health.

Summary on PD biomarker

A failed hope to make biosimilar development more efficient

- FDA sponsored PD pilot studies revealed detailed insights in potential and limitations of using PD biomarker in biosimilar development
- Replacing conventional clinical endpoints by PD biomarker means replacing one blunt tool with another
  - Sensitivity of PD biomarker for differences is typically low
  - Functional characterization using binding and functional bioassays can measure functional differences with much higher sensitivity
  - PD biomarker do not add decisive evidence for biosimilar evaluation on what analytical, including functional testing and clinical PK can provide
- Practical limitations on top of limited sensitivity of PD biomarkers for differences
  - Dose sensitive biomarkers are known for few biologicals only
  - Finding and qualifying a novel biomarker may be more resource intensive than conducting a comparative efficacy study using a conventional clinical endpoint

biosimilar medicines
better access. better health.

Conclusion

- A pharmacokinetic (PK) study, powered for PK endpoints suffice in a tailored biosimilar development program
  - Comparative analytical studies provide the pivotal data to ensure comparable safety and immunogenicity of a biosimilar
    - This claim is also supported by over 4 decades of regulation of process manufacturing changes
  - Recent studies show that PK studies powered for PK endpoints provide useful supportive descriptive safety and immunogenicity data, and CES do not appear to be more definitive:
    - EMA Authors: Kurki et al, Drugs 2021;81:1881–96. https://doi.org/10.1007/s40265-021-01601-2
    - FDA authors: Ji et al 2025, J. Clin. Pharmacol. 2025;65(4) 499–507. https://doi.org/10.1002/jcph.6165
    - Industry: Schiestl et al, BioDrugs 2025;39;769-776. https://doi.org/10.1007/s40259-025-00733-1
  - A case study demonstrates that the information gain of a longer or larger safety study provides only incremental information

Conclusion: Ensuring comparative safety and immunogenicity in a tailored development typically does neither require a longer PK study nor an additional safety and immunogenicity study