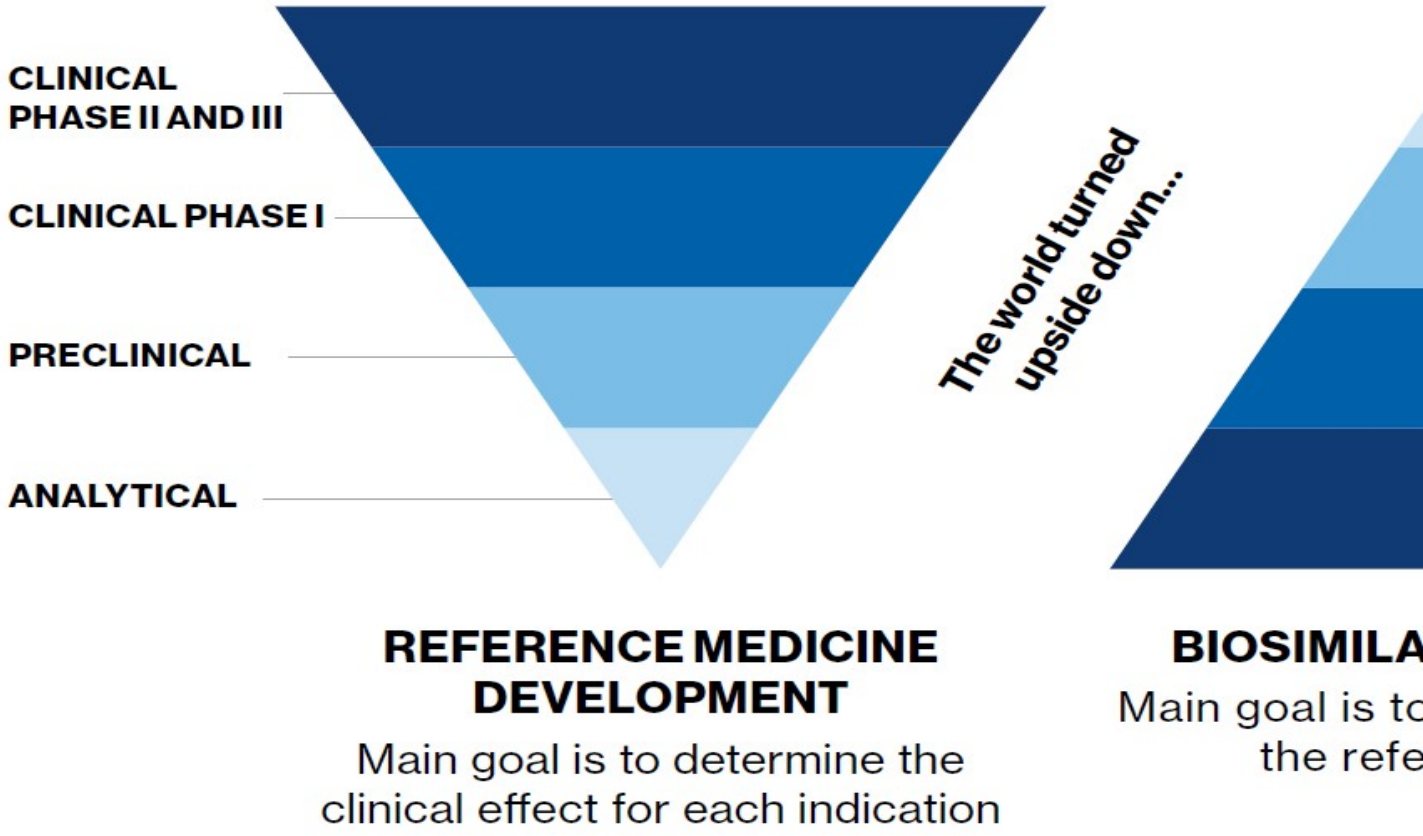
Development of Biosimilars [1]

The main goal of biosimilar development is to establish a ‘scientific bridge’ to the clinical experience of the reference product. This is done through analytical, pre-clinical and pharmacokinetic/pharmacodynamic studies, which confirm the active ingredient in the biosimilar matches the reference product. The clinical safety and efficacy studies that follow confirm biosimilarity.

This is different to development of reference products whose focus is on proving clinical effect. Both approaches provide the same level of confidence with regard to safety and efficacy of the biological medicine.

The four stages of the biosimilar development program are:

1. **Analytical** - Extensive laboratory analyses to establish comparability of the biosimilar to the reference product in terms of molecular structure and functionality
2. **Pre-clinical** - Laboratory studies to confirm that any differences between the reference product and biosimilar have no impact on safety or efficacy
3. **PK/PD** - Pharmacokinetic and pharmacodynamic studies in humans to determine bioequivalence, i.e. to determine if the proposed biosimilar and reference product will work in the same way within the body
4. **Clinical** - Clinical trial conducted in the patient population to confirm the safety and efficacy of the biosimilar is highly similar to the reference product



The totality of evidence is the data package generated from the biosimilar development program to show that the biosimilar matches the reference product in terms of structure, function, pharmacokinetic/pharmacodynamic profile, safety and efficacy.

Understanding biosimilar approval

Biosimilars are approved via stringent regulatory pathways by the same regulatory authorities that approve reference products. Regulatory bodies such as the European Medicines Agency (EMA) and the US Food and Drug Administration (FDA) will only approve a biosimilar if it is highly similar to the reference product and demonstrates no clinically meaningful difference, so that it can be expected to have the same safety and beneficial effects in patients. This is done using advanced analytical, pre-clinical and clinical trials.

A biosimilar molecule will behave the same way as the reference product in all indications and patient populations.

Sandoz is the pioneer and global leader in biosimilars and has approved biosimilars in the highly-regulated markets of the US, Canada, EU, Japan and Australia.

Links
[1] https://www.sandoz.com.au/our-work/biopharmaceuticals/development-biosimilars