Glossary

Aggregation the process in which misfolded proteins accumulate and clump together, reducing efficacy, and potentially increasing toxicity

Antisera human or animal sera containing antibodies against a specific antigen

Bioassay a laboratory procedure used to determine biological activity of a substance by comparing its effect on tissue or other living material with that of a standard preparation

Biobetters an improved version of an existing biologic, with a change in structure or formulation that leads to improved safety, efficacy and/or improved administration characteristics

Biopharming using genetically engineered crops or animals to produce proteins

Biosimilars officially approved versions of innovator biologic products that are highly similar to the innovator, with no clinically meaningful differences in safety and efficacy

Bovine derived from a cow or related animal

Chelating agent a compound that complexes metal ions

Chimeric antibody a recombinant antibody with reduced immunogenicity, containing domains from different species (most commonly mouse and human)

Denaturation the disruption of noncovalent bonds in a protein, resulting in the unfolding of the peptide chain, and a loss of some or all of the protein's specific characteristics

DNA ligase an enzyme that joins two separate DNA molecules together

DNA polymerase an enzyme that helps catalyze the polymerization of nucleotides into a DNA strand

Extrapolation regulatory principle that allows for the approval of a biosimilar for use in an indication held by the reference product but not directly studied in a comparative clinical trial with the biosimilar.

Follow-on biologics lower cost copies of innovator biologic products. May have been approved through FDA 505(b)(2) pathway, or as a biosimilar via the PHS 351(k) pathway.

K. M. Nagel, *Introduction to Biologic and Biosimilar Product Development and Analysis*, AAPS Introductions in the Pharmaceutical Sciences,
https://doi.org/10.1007/978-3-319-98428-5

Fusion proteins proteins created following the fusion of two or more genes that originally coded for separate proteins

Glycosylation the process of adding sugar units to proteins

Human antibody a recombinant antibody in which the mouse sequence has been completely removed and 100% human sequencing remains

Human anti-mouse antibodies (HAMA) antibodies that form a complex that is eliminated from the body, limiting the antibody from reaching its target receptor; an immune response, including fever, rash and potentially more serious side effects, typically accompanies HAMA

Humanized antibody a recombinant antibody, containing mostly human sequences with a small amount of mouse sequences; they have less affinity for the target than murine or chimeric antibodies but are less immunogenic

Hybridoma a hybrid cell used to produce monoclonal antibodies; formed by the fusion of a myeloma cell and an antibody-producing cell

Immunogenicity the ability of a substance to provoke an immune response

Immunoglobulin any of five classes of glycoprotein secreted by plasma cells that function as antibodies in the immune response

Immunomodulator a drug that affects the body's normal immune response in either a positive or negative fashion

Immunosuppressant a drug that lowers the body's normal immune response

Intended copies copies of innovator biologics that have not undergone comparative evaluations to the innovator, but which are being commercialized in some countries, and which may have clinically significant differences in formulation, dosages, efficacy or safety.

Interchangeable biosimilar a biosimilar deemed appropriate by a regulatory authority for substitution for the reference biologic under local laws and pharmacy practices

Lyoprotectants substances added to a formulation in order to protect the ingredients from the conditions involved in the freeze-drying process

Myeloma a tumor originating in the bone marrow; usually malignant

Monoclonal antibody one produced from a single cell line consisting of identical antibody molecules

Murine antibody an antibody derived from mouse proteins

Neutralizing antibody an antibody that reduces or abolishes the biological activity of an antigen, a microorganism, or a recombinant drug

Neutropenia abnormally low level of neutrophils, a particular type of white blood cell, in the blood

PEGylation the process of adding polyethylene glycol units to proteins or other macromolecules

Peptide moderately sized molecules consisting of up to 40 amino acid residues without higher order structure

Pharmacogenomics the study of how genetic variations affect response to drugs

Plasmid small, circular DNA molecules found inside bacterial cells

Polyclonal antibodies antibodies derived from different B-cell lines

Polymerase chain reaction (PCR) a technique used to quickly amplify DNA sequences *in vitro*

Porcine derived from a pig

Protein large molecules consisting of greater than amino acid 40 amino acid residues folded into secondary, tertiary or quaternary structures held together by peptide bonds

Quaternary structure protein structure characterized by the assembly of two or more monomeric macromolecules held together by noncovalent interactions

Recombinant DNA DNA genetically engineered to combine genetic material from two or more sources

Restriction endonuclease an enzyme that cuts DNA at a specific recognition sequence

Secondary structure protein structure characterized by the folding of a peptide chain into α helices, β sheets, or random coils

Serum therapy administration of serum obtained from an immunized animal in order to treat disease

Site-directed mutagenesis a genetic engineering technique that creates a mutation at a defined site in a DNA molecule in order to change the properties of the resultant proteins

Tertiary structure protein structure characterized by the folding of α helices and β sheets into a three-dimensional structure held in place by hydrophobic and hydrophilic interactions

Thrombocytopenia a deficiency of platelets in the blood

Transgenic containing genetic material from another species

Totality of evidence the approach used to demonstrate similarity between biosimilar and innovator biologic, which relies most heavily on analytical studies. No one study is pivotal, and an orthogonal approach is needed, whereby each quality attribute is measured by multiple analytical methods.

Index

K. M. Nagel, *Introduction to Biologic and Biosimilar Product Development and Analysis*, AAPS Introductions in the Pharmaceutical Sciences,
https://doi.org/10.1007/978-3-319-98428-5