

Glycoproteins in biopharma

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Biopharmaceuticals are therapeutic drugs derived from biological sources, such as yeast, bacteria and mammalian cells. They include vital glycoprotein molecules, such as antibodies and hormones that have numerous clinical applications. Glycoproteins are conjugated macromolecules that contain a carbohydrate chain covalently attached to amino acid chains. The attachment of sugar molecules to proteins is a common modification that occurs after protein synthesis, called glycosylation. Glycosylated proteins regulate fundamental cell processes, such as cell adhesion, immune functions and have structural roles in cell membrane formation. More than 60% of commercialised biopharmaceuticals consist of recombinant proteins that are produced by genetic engineering. In the case of recombinant biopharmaceuticals, glycosylation significantly enhances their yield, folding efficiency and biological activity. Some of the qualities that make glycoproteins valuable as biopharmaceutical products are: (a) their expression in both mammalian and vegetable cells, (b) long shelf-life with good stability profile, (c) no immune response elicitation, (d) easy recovery by purification techniques, and (e) development of target-specific antibodies to improve the efficiency of therapy. Glycoproteins have been successfully employed in the diagnosis, prevention and treatment of a wide range of diseases, such as autoimmune diseases, cancer and metabolism-related disorders. Therefore, further investigation and development of glycoprotein molecules would be highly beneficial in the biopharmaceutical industry.

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