



Editorial

Glycobiology

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Glycobiology is that the study of the structure, biosynthesis, and biology of saccharides (sugar chains or glycans) that are cosmopolitan in nature. Sugars or saccharides are essential components of all living things and aspects of the varied roles they play in biology are researched in various medical, biochemical and biotechnological fields.

Protein Glycosylation

The addition of a carbohydrate moiety to a molecule is mentioned as protein glycosylation. It's a standard post translational modification for protein molecules involved in cell wall formation. During this process, the linking of monosaccharide units to the aminoalkanoic acid chains sets up the stage for a series of enzymatic reactions that cause the formation of glycoproteins (n and o linked oligosaccharides that are found to a protein entity). Altogether 16 known enzymes are alleged to mediate this reaction. A typical glycoprotein has a minimum of 41 bonds which involve 8 amino acids and 13 different monosaccharide units and includes the glycosylphosphatidylinositol (GPI) and phosphoglycosyl linkages. Protein glycosylation helps in proper folding of proteins, stability and in cell to cell adhesion commonly needed by cells of the system. The main sites of protein glycosylation within the body are ER, Golgi body, nucleus and therefore the cell fluid.

N-linked glycosylation

It begins with the addition of a 14-sugar precursor to an asparagine aminoalkanoic acid. It contains glucose, mannose and n-acetyl glucosamine molecules. This entity is then transferred to the ER lumen. The oligosaccharyl transferase enzyme attaches the oligosaccharide chain to asparagine that happens within the tripeptide sequence, Asn-X-Ser or Asn-X-Thr. X are often any aminoalkanoic acid aside from Proline. The oligosaccharide attached protein sequence now folds correctly and is now translocated to the Golgi body where the mannose residue is removed.

O-linked glycosylation

Glycosylation begins with an enzyme mediated addition of N-acetyl-galactosamine followed by other carbohydrates to serine or threonine residues. Studies reveal that O linked glycosylation occurs at a later stage in protein processing.

GPI Anchored Glycoproteins

Glycosylphosphatidylinositol (GPI) anchored proteins are identified throughout a broad range of eukaryotic species starting from humans to insects, yeasts, bacteria, and fungi, suggesting they're a really ancient modification. Generally, GPI anchored proteins aren't as prevalent as other post-translationally modified proteins, but as a category of glycoproteins, they demonstrate considerable homology.

Analytics of Complex Glycan and Glycopeptide Structures

One of the important frontiers in glycobiology research is that the quest to decipher the glycome. The glycome refers to the present sugar population pattern within the cell, which may be in free or in conjugated forms like glycoproteins, glycolipids etc. It's not an equivalent when temporally observed, changing continuously from time to time, making it all the tougher.

To put it briefly, the scope of glycobiology research and therefore the expected possibilities are immense. The progress of the research banks much on the technological advances which will be adopted easily and widely across various fields and platforms.