

CHAPTER 6. THE TYPES OF MEMBRANE CARBOHYDRATES

Carbohydrate groups are present only on the outer surface of the plasma membrane and are attached to proteins, forming glycoproteins, or lipids, forming glycolipids.

Most of the membrane carbohydrates are found linked to proteins.

In the glycoproteins, the majority of the molecule consist of proteins; they have one or more oligosaccharides attached to a protein, and they usually are branched and do not have serial repeats, so they are rich in information, forming highly specific sites for recognition and high-affinity binding by other proteins.

Membrane-bound glycoproteins participate in a wide range of cellular phenomena, including cell recognition, cell surface antigenicity, etc.

Glycolipids are membrane lipids in which the hydrophilic head groups are oligosaccharides.

Three types of glycolipids are found in membranes: glycosphingolipids, which are the most abundant in the animal cells, glycoglycerolipids, and glycoposphatidylinositol.

Glycoglycerolipids are more frequent in the plasma membrane of plant cells.

Blood groups are determined by cell surface carbohydrates of erythrocytes, and they also have the ability to trigger immunological responses.

Glycocalyx

The glycocalyx also has important functions in humans. Glycocalyx is composed of glycosaminoglycans, proteoglycans and other glycoproteins bearing acidic oligosaccharides and terminal sialic acids. Most glycocalyx associated proteins are transmembrane that can be linked to the cytoskeleton.

This layer functions as a barrier between a cell and its surrounding. Glycocalyx also serves as a mediator for cell-cell interactions and protects a cell membrane from the direct action of physical forces and stresses allowing the membrane to maintain its integrity.