Protein

Proteins are large biological molecules, or macromolecules, consisting of one or more long chains of amino acid residues. Proteins perform a vast array of functions within living organisms, including catalyzing metabolic reactions, replicating DNA, responding to stimuli, and transporting molecules from one location to another. Proteins differ from one another primarily in their sequence of amino acids, which is dictated by the nucleotide sequence of their genes, and which usually results in folding of the protein into a specific three-dimensional structure that determines its activity.

Extracellular vesicles secreted by human glioma cells contain a wealth of tumor-specific proteins and nucleic acids that can be isolated from patients with these neoplasms. Thus, EV contribute to the development of biomarkers, and additionally have certain therapeutic potential for possible use in neurooncology and neurosurgery [1)].

Biosynthesis

Protein biosynthesis.

Proteomics

Proteomics.

Families

Protein families are groups of proteins that share a common evolutionary ancestry and exhibit similar structural, functional, and/or sequence characteristics. Proteins within a family typically have similar three-dimensional structures, which are determined by the amino acid sequence of the protein.

There are many different types of protein families, ranging from families with only a few members to those with thousands of members. Some examples of protein families include:

Enzymes: Enzymes are proteins that catalyze chemical reactions within cells. Examples of enzyme families include the serine proteases, which are involved in digestion and blood clotting, and the kinases, which are involved in cell signaling and regulation.

Receptors: Receptors are proteins that bind to specific ligands, such as hormones or neurotransmitters, and initiate a signaling cascade within cells. Examples of receptor families include the G protein-coupled receptors (GPCRs), which are involved in a wide range of physiological processes, and the ligand-gated ion channels, which mediate the flow of ions across cell membranes.

Structural proteins: Structural proteins provide support and shape to cells and tissues. Examples of structural protein families include the keratins, which make up hair and nails, and the collagens, which provide strength to connective tissues such as skin, bones, and tendons.

Transport proteins: Transport proteins are involved in the movement of molecules across cell membranes or within cells. Examples of transport protein families include the ATP-binding cassette (ABC) transporters, which pump a wide range of molecules out of cells, and the solute carrier (SLC) transporters, which transport nutrients and other molecules into cells.

The study of protein families is important for understanding the structure, function, and evolution of proteins, as well as for the development of new drugs and therapies for various diseases.

Types

Binding protein

Cytokines

G protein

Glycoprotein

RNA-binding protein

S protein

Cerebrospinal Fluid Protein

Cerebrospinal Fluid Protein

1)
Santiago-Dieppa DR, Gonda DD, Cheung VJ, Steinberg JA, Carter BS, Chen CC. Extracellular Vesicles as a Platform for Glioma Therapeutic Development. Prog Neurol Surg. 2018;32:172-179. doi: 10.1159/000469689. Epub 2018 Jul 10. PubMed PMID: 29990983.