Cheatography

AP Biology Cheat Sheet

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AP BIO

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Eukaryotic cells

Eukaryotic cells have internal membranes that compartmentalize their functions
Comparing prokaryotic and eukaryotic cells
Since prokaryotic cells lack a membrane--bound nucleus, eukaryotic cells are the main difference between these two types of creatures. Eukaryotes store their genetic material in their nuclei.
Prokaryotic cells
Lack nuclei and other membrane-enclosed organelles
Only organism is of the domains
Bacteria and Archaea consist of No Nucleus
No membrane-bound organelles
Nucleoid-DNA in an unbound region
Cytoplasm-Bound by the plasma membrane.
Eukaryotic cells
have internal membranes that compartme-ntalize cellular functions
Protists, fungi, animals, and plants all consist
-DNA in a nucleus that is bounded by a membranous nuclear envelope
membrane-bound organelles
cytoplasm in the region between the plasma membrane
are generally much larger than prokaryotic cells
A panoramic view of eukaryotic cell
has internal membranes that partition the cell into organelles
plant and animal cells have most of the same organelles

Catalysts

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Alpha carbon
The link between the amino group and the acid carboxyl group is what gives amino acids their name. Additionally, 19 out of the 20 amino acids employed in protein synthesis have their side chains attached to the alpha carbon. Only glycine has no side chains among the amino acids.
Animation: protein functions
The body uses protein for a variety of purposes. It promotes metabolic reactions, supports tissue growth and repair, and synchronizes biological processes.
The 20 amino acids of protein
Histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine are the necessary amino acids. Alanine, asparagine, aspartic acid, glutamic acid, and serine are the non-essential amino acids.

Bulk transport

Bulk transport (cont)

Catalysts
Proteins provide the primary function of enzymes, which are catalysts that quicken practically all chemical events within cells. Although some biological reactions can be catalyzed by RNAs, proteins are responsible for the majority of them.
Amino acid monomers
Definition: The monomers that make up proteins are amino acids. A protein is made up of one or more polypeptides, which are individual linear chains of amino acids.

Exocytosis
a procedure wherein the vacuole membrane and cell membrane combine to discharge the contents of a cell's vacuole to the outside.
Endocytosis
the process by which a live cell takes in material by allowing a vacuole to develop inside its membrane.
The plasma membrane plays a key role in most cell signaling
The condition of the plasma membrane modulates the bidirectional transmission of signals, and the context of the cell's past influences how it responds to signals.
Local and long-distance signaling
Long-distance endocrine signaling involves the production of signals by specialized cells and the release of those signals into the bloodstream, where they are transported to target cells in far-flung regions of the body. Hormones are signals that are created in one area of the body and move through the bloodstream to distant locations.
The three stages of cell signaling

Reception: An outside signaling molecule is picked up by a cell. A signal is recognized when a ligand, a chemical signal, interacts to a receptor protein either within or on the surface of a cell.
2. Transduction: The receptor protein is altered in some way when the signaling molecule attaches to it. The transduction process is started by this modification. Usually, there are numerous phases in the process of signal transduction. The following molecule in the signal transduction cascade is altered by each relay molecule.
Response: The signal finally causes a particular biological reaction.
Intracellular receptors
Proteins known as intracellular receptors can be located inside cells, usually in the cytoplasm or nucleus.
Transduction by cascades of molecular interactions
Signal transduction is the method through which cells interact with their surroundings and react to them. Signaling cascades, which act as intracellular transmitters and have the ability to transport biochemical information between the cell membrane and the nucleus, are in charge of controlling this mechanism.
Protein phosphorylation and dephosphorylation
In addition to activating or inhibiting signaling through conformational changes, protein phosphorylation and dephosphorylation can create binding sites for proteins with particular domains and govern cellular localisation.
Small molecules and Ions as second messengers
Second messengers are small molecules and ions that relay signals received by cell-surface receptors to effector proteins.
Regulation of transcription or cytoplasmic activities
A crucial biological mechanism known as transcriptional regulation enables a cell or an organism to respond to a variety of intra- and extracellular inputs, to determine a cell's identity throughout development, to maintain it over the course of its existence, and to coordinate cellular activity.

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Bulk transport (cont)

The majority of cellular functions, including several metabolic pathways, including glycolysis, and procedures like cell division, take place within the cytoplasm. The concentrated inner region is known as endoplasm, and the cell cortex or ectoplasm is the name of the outside layer.

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Four levels of protein structure

The primary structure of a protein

The most fundamental level of protein structure is called primary structure. The shape, structure, and ultimately the function of the protein are determined by the amino acid sequence.

secondary structure

Secondary structure is another way to categorize protein structures. The term "-secondary structure" describes the regular, local structure of the protein backbone that is stabilized by amide group hydrogen bonds that occur both within and outside of individual molecules.

Helix

a typical structural pattern found in proteins. An amide hydrogen located one amino acid away from a carbonyl oxygen located four amino acids away form hydrogen bonds to maintain the helix.

Pleated sheet

A secondary structure seen in many proteins that is made up of two or more contiguous parallel polypeptide chains that are organized so that hydrogen bonds can form between them.

tertiary structure

For a protein to work effectively, it must take on a final, stable, three-dimensional structure. The organization of the secondary structures into this final, three-dimensional shape is known as the tertiary structure of a protein. The -helices, for instance, could be arranged at a straight angle or parallel to one another.

Hydrophobic interaction

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The interactions between hydrophobes and water are referred to as hydrophobic interactions. Nonpolar hydrophobic compounds, which often have a lengthy carbon chain and do not interact with water molecules, are known as hydrophobes.

Disulfide bridges

Disulfide bonds or S-S bonds are other names for disulfide bridges. The establishment of these covalent bonds between the sulfur atoms of two cysteine amino acids stabilizes the protein's tertiary and higher order structure.

Quaternary structure

Proteins made up of two or more polypeptide chains, whether they are the same or distinct, have quaternary structure.

Because they include two or more subunits, these proteins are known as oligomers. The native protein's subunit arrangement is described by the quaternary structure.

Collagen

Glycine, proline, and hydroxyproline are the three amino acids that make up the majority of collagen. The triple-helix structure of collagen is made up of these amino acids, which are organized into three strands. Connective tissue, skin, tendons, bones, and cartilage all contain the protein collagen. It supports tissues structurally and participates in vital body functions like tissue repair and cell-to-cell communication.

Sickle cell disease

Sickle cell disease is caused by inheriting the sickle cell gene.

Denaturation

method that alters a protein's molecular structure. In order to achieve denaturation, many of the weak connections or links that give a protein its highly organized structure in its normal condition must be broken.

Protein folding in the cell

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The endoplasmic reticulum is a biological region where protein folding takes place. Because proteins must be accurately folded into precise, three-dimensional forms in order to function correctly, this is an essential biological process. Proteins that are misfolded or are unfolded improperly contribute to the pathophysiology of many diseases.

X-ray crystallography

The experimental science known as X-ray crystallography employs incident X-ray beams to diffract into numerous distinct directions in order to identify the atomic and molecular structure of crystals.

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