جامعة الفرات الاوسط التقنية /المعهد التقني سماوة

قسم تقنيات صحة مجتمع

المحاضرة الاولى والثانية

اسم المادة / وظائف اعضاء 1.

المرحلة الدراسية / الاولى

العام الدراسي / 2022 - 2023

استاذ المادة. م .م شيماء جبار حسين

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Lab Safety

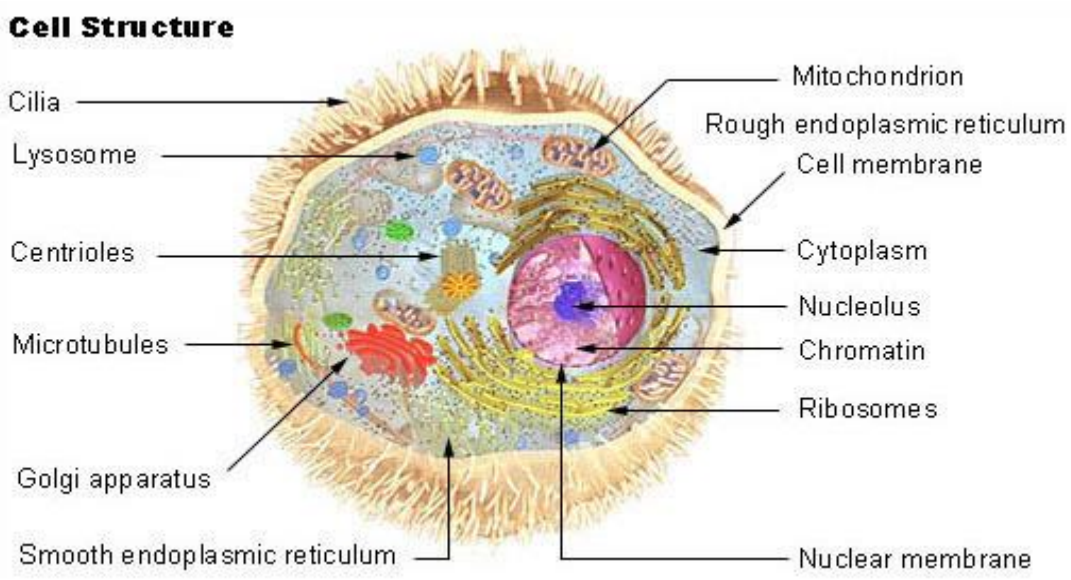
- General Safety Rules:

- Do not utilize fume hoods for evaporations and disposal of volatile solvents.
- Perform work with hazardous chemicals in a properly working fume hood to reduce potential exposures.
- Avoid working along in a building. Do not work alone in a laboratory if the procedures being conducted are hazardous.
- Laboratory employees should have access to a chemical inventory list, applicable safety data sheets (SDS), departmental laboratory safety manual, and relevant standard operating procedures.
- Access to laboratories and support areas such as stockrooms or specialized laboratories should be limited to approved personnel only.
- All equipment should be regularly inspected for wear or deterioration.
- Equipment should be maintained according to the manufacturer's requirements and records of certification, maintenance, or repairs should be maintained for the life of the equipment.
- Designated and well-marked waste storage locations are necessary.
- No cell phone or ear bud usage is allowed in the active portion of the laboratories or during experimental operations.
- Clothing made of synthetic fibers should not be worn while working with flammable liquids or when a hazard is present as these materials tend to melt and stick to exposed skin.
- Laboratory coats should not be stored in offices or break rooms as this spreads contaminates to other areas.
- Computers and instrumentation should be labeled to indicate whether gloves should be worn or not. Inconsistent glove use around keyboards is a source of potential contamination.

- Avoid wearing jewelry in the lab as this can post multiple safety hazards.

Cell Physiology

The cell it is the basic living unit of the body is the cell .



There are many different types, sizes, and shapes of cells in the body. For descriptive purposes, the concept of a "generalized cell" is introduced. It includes features from all cell types. A cell consists of three parts: the cell membrane, the nucleus, and, between the two, the cytoplasm. Within the cytoplasm lie intricate arrangements of fine fibers and hundreds or even thousands of miniscule but distinct structures called organelles.

Cell membrane

Every cell in the body is enclosed by a cell (Plasma) membrane. The cell membrane separates the material outside the cell, extracellular, from the material inside the cell, intracellular. It maintains the integrity of a cell and controls passage of materials into and out of the cell. All materials within a cell must have access to the cell membrane (the cell's boundary) for the needed exchange.

The cell membrane is a double layer of phospholipid molecules. Proteins in the cell membrane provide structural support, form channels for passage of materials, act as receptor sites, function as carrier molecules, and provide identification markers.

Nucleus and Nucleolus

The nucleus, formed by a nuclear membrane around a fluid nucleoplasm, is the control center of the cell. Threads of chromatin in the nucleus contain deoxyribonucleic acid (DNA), the genetic material of the cell. The nucleolus is a dense region of ribonucleic acid (RNA) in the nucleus and is the site of ribosome formation. The nucleus determines how the cell will function, as well as the basic structure of that cell.

Cytoplasm

The cytoplasm is the gel-like fluid inside the cell. It is the medium for chemical reaction. It provides a platform upon which other organelles can operate within the cell. All of the functions for cell expansion, growth and replication are carried out in the cytoplasm of a cell. Within the cytoplasm, materials move by diffusion, a physical process that can work only for short distances.

Cytoplasmic organelles

Cytoplasmic organelles are "little organs" that are suspended in the cytoplasm of the cell. Each type of organelle has a definite structure and a specific role in the function of the cell. Examples of cytoplasmic organelles are mitochondrion, ribosomes, endoplasmic reticulum, golgi apparatus, and lysosomes.

Cell Function

The structural and functional characteristics of different types of cells are determined by the nature of the proteins present. Cells of various types have different functions because cell structure and function are closely related. It is apparent that a cell that is very thin is not well suited for a protective function. Bone cells do not have an appropriate structure for nerve impulse conduction. Just as there are many cell types, there are varied cell functions. The generalized cell functions include movement of substances across the cell membrane, cell division to make new cells, and protein synthesis.

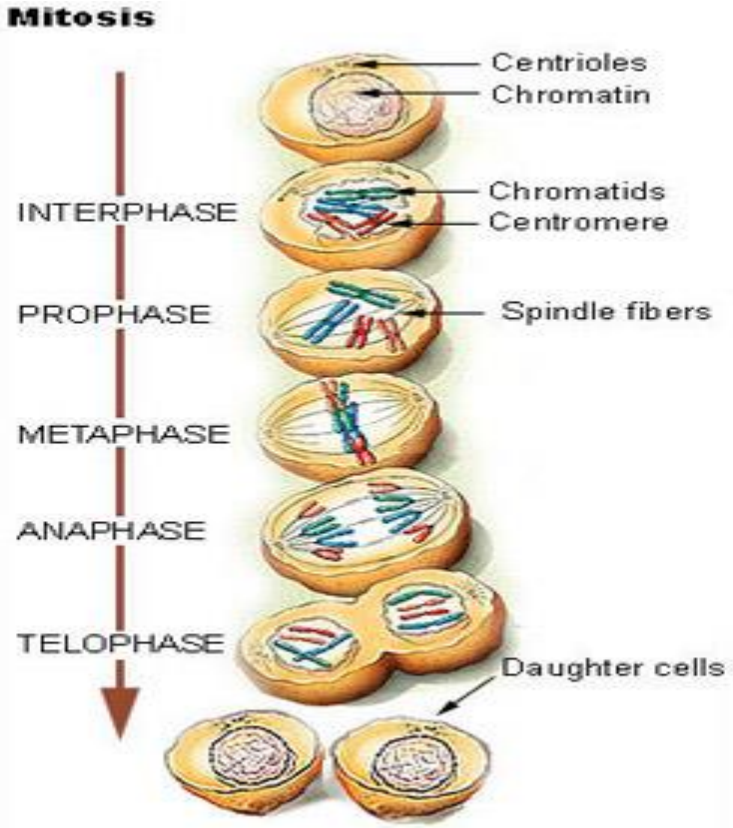
Movement of substances across the cell membrane

The survival of the cell depends on maintaining the difference between extracellular and intracellular material. Mechanisms of movement across the cell membrane include simple diffusion, osmosis, filtration, active transport, endocytosis, and exocytosis.

Simple diffusion is the movement of particles (solutes) from a region of higher solute concentration to a region of lower solute concentration. Osmosis is the diffusion of solvent or water molecules through a selectively permeable membrane. Filtration utilizes pressure to push substances through a membrane. Active transport moves substances against a concentration gradient from a region of lower

concentration to a region of higher concentration. It requires a carrier molecule and uses energy. Endocytosis refers to the formation of vesicles to transfer particles and droplets from outside to inside the cell. Secretory vesicles are moved from the inside to the outside of the cell by exocytosis.

Cell division



Cell division is the process by which new cells are formed for growth, repair, and replacement in the body. This process includes division of the nuclear material and division of the cytoplasm. All cells in the body (somatic cells), except those that give rise to the eggs and sperm (gametes), reproduce by mitosis. Egg and sperm cells are produced by a special type of nuclear division called meiosis in which the number of chromosomes is halved. Division of the cytoplasm is called cytokinesis.

Somatic cells reproduce by mitosis, which results in two cells identical to the one parent cell. Interphase is the period between successive cell divisions. It is the longest part of the cell cycle. The successive stages of mitosis are prophase, metaphase, anaphase, and telophase. Cytokinesis, division of the cytoplasm, occurs during telophase.

Meiosis is a special type of cell division that occurs in the production of the gametes, or eggs and sperm. These cells have only 23 chromosomes, one-half the number found in somatic cells, so that when fertilization takes place the resulting cell will again have 46 chromosomes, 23 from the egg and 23 from the sperm.

Body Tissues

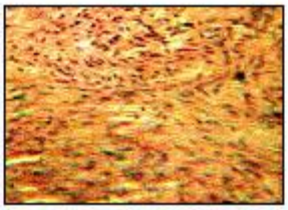
Tissue is a group of cells that have similar structure and that function together as a unit. A nonliving material, called the intercellular matrix, fills the spaces between the cells. This may be abundant in some tissues and minimal in others. The intercellular matrix may contain special substances such as salts and fibers that are unique to a specific tissue and gives that tissue distinctive characteristics. There are four main tissue types in the body: epithelial, connective, muscle, and nervous. Each is designed for specific functions.

Muscle Tissue

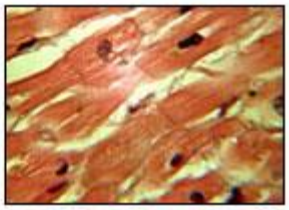
Muscle tissue is composed of cells that have the special ability to shorten or contract in order to produce movement of the body parts. The tissue is highly cellular and is well supplied with blood vessels. The cells are long and slender so they are sometimes called muscle fibers, and these are usually arranged in bundles or layers that are surrounded by connective tissue. Actin and myosin are contractile proteins in muscle tissue.

Muscle tissue can be categorized into skeletal muscle tissue, smooth muscle tissue, and cardiac muscle tissue.

Skeletal muscle



Smooth muscle



Cardiac muscle

Skeletal muscle fibers are cylindrical, multinucleated, striated, and under voluntary control. Smooth muscle cells are spindle shaped, have a single, centrally located nucleus, and lack striations. They are called involuntary muscles. Cardiac muscle has branching fibers, one nucleus per cell, striations, and intercalated disks. Its contraction is not under voluntary control.