University of Mosul
Lecture No.: 1
College of Veterinary Medicine
Date: second term/2025
Unit of Scientific Affairs
Website: https://uomosul.edu.iq/veterinarymedicine/

Lecture title: **Cell cycle:**

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Summary:

Cell cycle

G1 phase. Metabolic changes prepare the cell for division. At a certain point the cell is committed to division and moves into the S phase.

S phase. DNA synthesis replicates the genetic material. Each chromosome now consists of two sister chromatids.

G2 phase. Metabolic changes assemble the cytoplasmic materials necessary for mitosis and cytokinesis: (is the part of the cell division process, Means the cytoplasm of a single eukaryotic cell divides into two daughter cells)

M phase. A nuclear division (mitosis) followed by a cell division (cytokinesis).

The period between mitotic divisions - that is, G1, S and G2 - is known as interphase.

Cell cycle conclusion: The active cell cycle phases are interphase and the M phase. Interphase consists of G1, S, and G2. In G1, the cell grows and prepares for cell division; in the S phase, DNA synthesis takes place; in G2, other biochemical events necessary for cell division take place. Some cells enter a dormant phase called G0. The M phase includes mitosis, which is divided into prophase, prometaphase, metaphase, anaphase, and telophase, and cytokinesis.

The duration of the cell growth cycle: -

The duration of the cell growth cycle varies from one cell to another, and it may take a minimum of twelve hours, and the cell does not move after its growth cycle to the preliminary stage except when the chemical compounds that it needs to divide have become ready, such as amino acids, fats, and sugars. Cell division, it depends mainly on the percentage of nutrients, and this is what helps children who are properly and desired nutrition to improve their structure and speed of growth.

Causes of cell division

1-The growth of new organisms, such as the process of developing the bones and muscles of children.

2- Compensation for cells that are damaged and dead.

3- Creation of gametes, which is the first step that occurs during sexual reproduction.

4-Reproduction, increasing the number of single-celled cells.

Mitosis

Mitosis is a form of eukaryotic cell division that produces two daughter cells with the same genetic component as the parent cell. Chromosomes replicated during the S phase are divided in such a way as to ensure that each daughter cell receives a copy of every chromosome. The whole process takes about one hour. The whole process takes about one hour. The replicated chromosomes are attached to a 'mitotic apparatus' that aligns them and then separates the sister chromatids to produce equal parts of the genetic material. This separation of the genetic material in a mitotic nuclear division (or karyokinesis) is followed by a separation of the cell cytoplasm in a cellular division (or cytokinesis) to produce two daughter cells.

In some single-celled organisms mitosis forms the basis of asexual reproduction. In diploid multicellular organisms sexual reproduction involves the fusion of two haploid gametes to produce a diploid zygote. Mitotic divisions of the zygote and daughter cells are then responsible for the subsequent growth and development of the organism. In the adult organism, mitosis plays a role in cell replacement, wound healing.

Mitosis, although a continuous process, is conventionally divided into five stages: prophase, prometaphase, metaphase, anaphase and telophase.