



جامعة الأنبار  
كلية العلوم  
قسم التقنيات الاحيائية



المادة : علم الحيوان  
المادة باللغة الإنكليزية : Zoology

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المحاضرة الثامنة

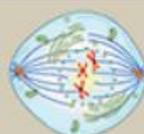
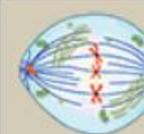
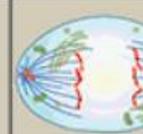
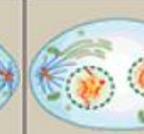
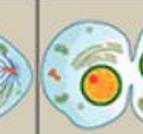
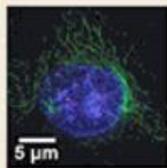
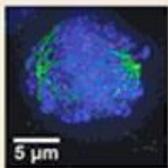
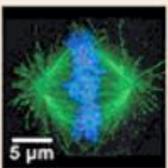
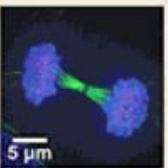
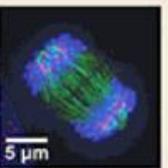
Cell Division

Cell Division

**The Mitosis Cell Cycle**

Before a cell starts dividing, it is in the "Interphase." It seems that cells must be constantly dividing, but each cell actually spends most of its time in the interphase. Interphase is the period when a cell is getting ready to divide and start the cell cycle. During this time, cells are gathering nutrients and energy. The parent cell is also making a copy of its DNA to share equally between the two daughter cells.

The mitosis division process has several steps or phases of the cell cycle—interphase, prophase, prometaphase, metaphase, anaphase, telophase, and cytokinesis—to successfully make the new diploid cells.

Prophase	Prometaphase	Metaphase	Anaphase	Telophase	Cytokinesis
					
<ul style="list-style-type: none"> <li>Chromosomes condense and become visible</li> <li>Spindle fibers emerge from the centrosomes</li> <li>Nuclear envelope breaks down</li> <li>Centrosomes move toward opposite poles</li> </ul>	<ul style="list-style-type: none"> <li>Chromosomes continue to condense</li> <li>Kinetochores appear at the centromeres</li> <li>Mitotic spindle microtubules attach to kinetochores</li> </ul>	<ul style="list-style-type: none"> <li>Chromosomes are lined up at the metaphase plate</li> <li>Each sister chromatid is attached to a spindle fiber originating from opposite poles</li> </ul>	<ul style="list-style-type: none"> <li>Centromeres split in two</li> <li>Sister chromatids (now called chromosomes) are pulled toward opposite poles</li> <li>Certain spindle fibers begin to elongate the cell</li> </ul>	<ul style="list-style-type: none"> <li>Chromosomes arrive at opposite poles and begin to decondense</li> <li>Nuclear envelope material surrounds each set of chromosomes</li> <li>The mitotic spindle breaks down</li> <li>Spindle fibers continue to push poles apart</li> </ul>	<ul style="list-style-type: none"> <li>Animal cells: a cleavage furrow separates the daughter cells</li> <li>Plant cells: a cell plate, the precursor to a new cell wall, separates the daughter cells</li> </ul>
					
5 μm	5 μm	5 μm	5 μm	5 μm	5 μm
					

When a cell divides during mitosis, some organelles are divided between the two daughter cells. For example, mitochondria are capable of growing and dividing during the interphase, so the daughter cells each have enough mitochondria.

### Meiosis Cell Division

Meiosis is cell division that creates sex cells, like female egg cells or male sperm cells. In meiosis, each new cell contains a unique set of genetic information. After meiosis, the sperm and egg cells can join to create a new organism.

Meiosis is why we have genetic diversity in all sexually reproducing organisms. During meiosis, a small portion of each chromosome breaks off and reattaches to another chromosome. This process is called "**crossing over**" or "**genetic recombination.**" Genetic recombination is the reason full siblings made from egg and sperm cells from the same two parents can look very different from one another.

### The Meiosis Cell Cycle

Meiosis has two cycles of cell division, conveniently called Meiosis I and Meiosis II. Meiosis I halves the number of chromosomes and is also when crossing over happens. Meiosis II halves the amount of genetic information in each chromosome of each cell. The end result is four daughter cells called haploid cells. Haploid cells only have one set of chromosomes - half the number of chromosomes as the parent cell.

**So remember, Mitosis is what helps us grow and Meiosis is why we are all unique!**

Mitosis and meiosis, the two types of cell division.

