Lecture Number 5: **Cell Division, Mitosis and Meiosis**

Topic:

* Main objective of cells is to become two cells! **(7:157)**

* Cell Division **(Chapter 7)**

* Cell division in bacteria **(7:158).**

* Cell cycle in Eukaryotes **(7:159-160)**

* Mitosis (the words) and how if works. **(7:161-166)**

* Meiosis: production of gametes for sex. **(7:167-171)**

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Recommended Reading: All citations are from: Knox, Ladiges, Evans & Saint "*Biology*" 3rd Edition (McGraw-Hill, 2005); citations are for Chap., page number, thus: **(7:167-171)**.

Theme/Objective: To understand cell division in prokaryotes and eukaryotes, including the words of cell division. To understand eukaryotic cell cycle and the process of mitosis . To understand the mechanism of meiosis and the production of gametes (eggs and sperm) for sex.

Keywords/concepts: Cell division, mitosis, meiosis, centromere, centrosome, centriole, kinetochore, chromatin, chromatid, chromosome, spindle microtubules.

Summary of Lecture:

1. Students should read and comprehend all of **Chapter 7**. There are some aspects of the regulation of cell division that we won't deal with in the lectures, but you should read through this material and know it for the exam. As we saw when we discussed cell theory, all cells come from other cells through the processes of cell division.

2. Cell division - required for growth, replacement for aged cells, and for reproduction.

3. Cell division includes DNA replication and division (mitosis) and division of the actual cell (cytokinesis).

4. Prokaryotic division is simple, and involves a single circular strand of DNA (see Fig. 7.2 in your text) followed by simple binary fission. Some bacteria can divide every 10 mins.

5. Eukaryotic cell division is relatively complex, and involves mitosis and cytokinesis. The cell cycle in eukaryotes is discussed in detail in your text.

6. Mitosis: DNA replication and nuclear division occurs prior to the division of the cell and all its contents (called cytokinesis), and you need to understand the vocabulary of these events. Mitosis differs slightly between plant and animal cells. Plant cells lack centrioles, and form a phragmoplast prior to forming a cell plate that develops into a wall (as plant cells have a wall, they cannot simply pinch in two like animal cells).

7. Sexual reproduction in eukaryotic organisms involves the fusion of genetic material from two cells (e.g., egg and sperm). As this would double the chromosome number, normally a halving of the genetic material occurs first – this is the process of meiosis that leads to the production of gametes for sex.

8. Meiosis involves DNA replication and the halving of the chromosome number, together meiosis I and meiosis II. During prophase of meiosis I, crossing over of chromatids may occur causing the interchange of parts of chromatids – results in the great diversity of off-spring!