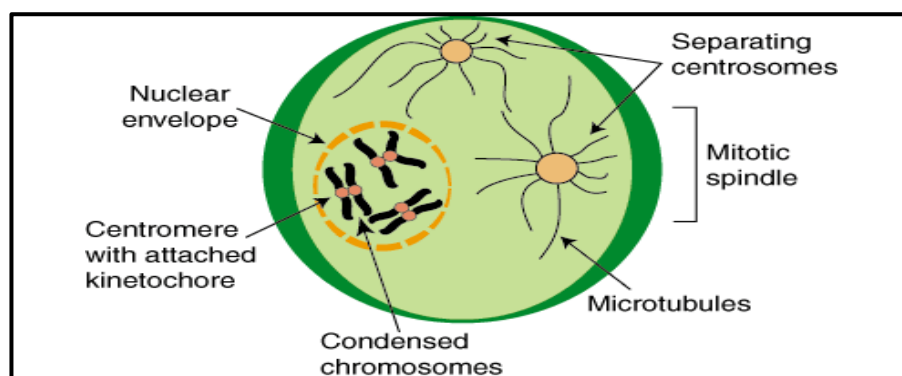


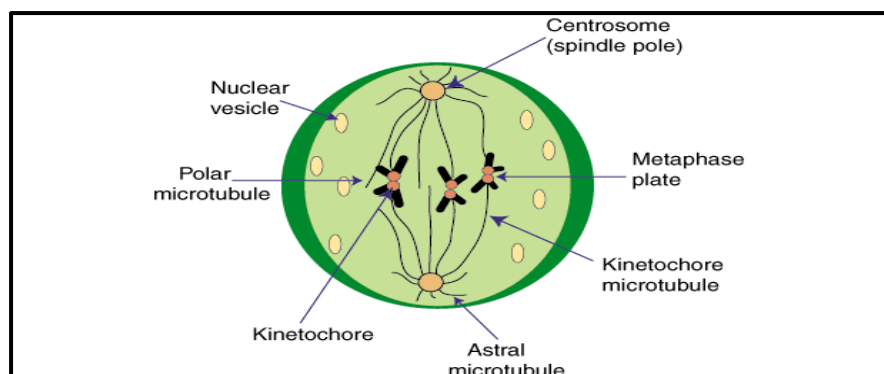
Fifth Lec. Prophase

- 1- Nuclear membrane dissolves (Disappearance of nucleoli).
- 2- DNA becomes visible as chromosomes (Chromatin fibers condense composed of two identical sister chromatids joined at a centromere)
- 3- Formation of mitotic spindle, composed of microtubules between the two centrosomes
- 4- Centrosomes move apart, migrating across surface of nuclear envelope.



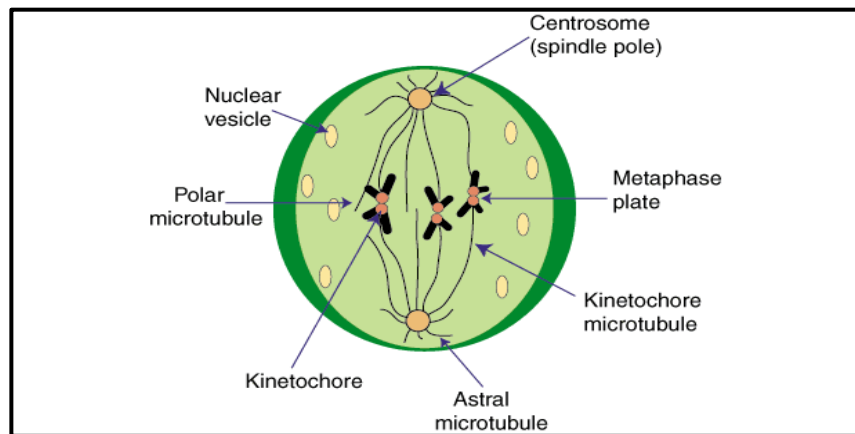
Prometaphase

- 1- Nuclear envelope fragments and dissolves
- 2- Spindle fibers extend from each pole towards the cell equator
- 3- Each chromatid has a specialized center called the kinetochore, located at the centromere
- 4- Kinetochore microtubules attach to the kinetochores
- 5- Non-kinetochore microtubules from each centrosome overlap each other.



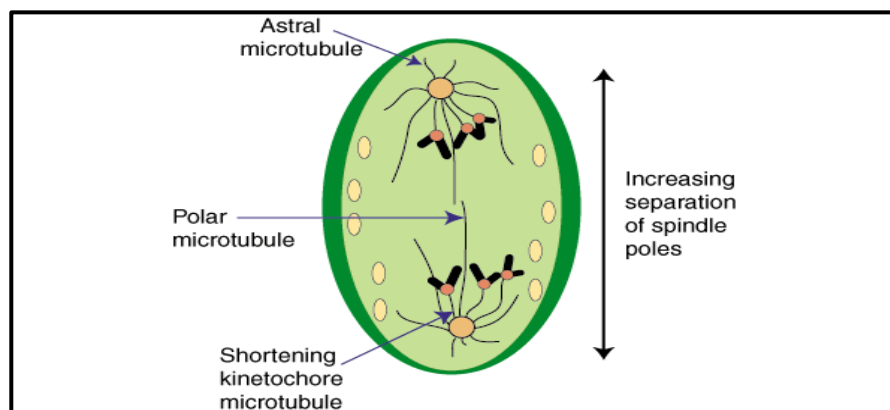
Metaphase

- 1- Centrosomes are at opposite poles of the cell
- 2- Chromosomes migrate to the metaphase plate
- 3- Centromeres of all chromosomes are aligned on metaphase plate
- 4- Kinetochore of sister chromatids face opposite poles, so that identical chromatids are attached to kinetochore fibers radiating from opposite ends of the parent cells
- 5- Entire structure formed by kinetochore and non-kinetochore fibers is termed the *spindle*



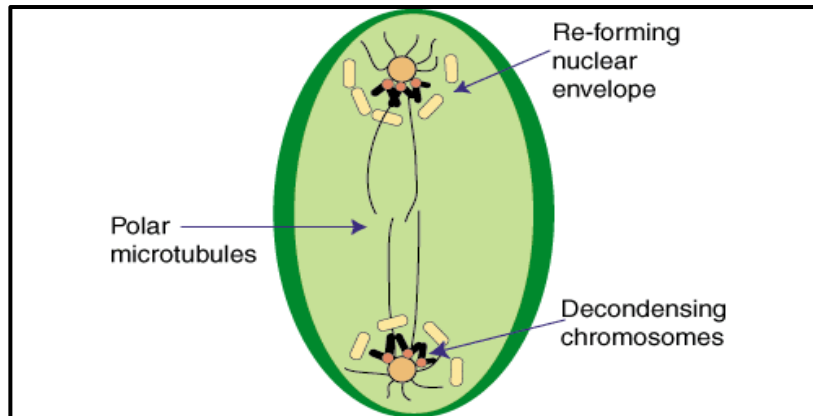
Anaphase

- 1- Sister chromatids split apart into separate chromosomes, moving to opposite ends of the cell (de- polymerization of microtubules at kinetochore end)
- 2- One chromatid goes to each centriole, moving chromatids in a V-shape
- 3- Poles of cell move further apart, elongating cell



Telophase

- 1- Non-kinetochore microtubules further elongate the cell
- 2- Daughter nuclei begin to form at the two poles
- 3- Nuclear envelope forms around chromosomes from fragments of parent cell's nuclear envelope
- 4- Nucleoli reappear
- 5- Chromatin protein uncoils and chromosomes become less distinct



Cytokinesis

- 1- Cytokinesis is the process of cytoplasmic division to form two daughter cells.
- 2- Cytokinesis usually begins before nuclear division is completed.
- 3- In animal cells, the cytoplasm contracts to pull the plasma membrane inwards, forming groove called a cleavage furrow. Done by a contractile ring of microtubules on cytoplasm side of membrane
- 4- By end of cytokinesis two separate daughter cells with genetically identical nuclei.

