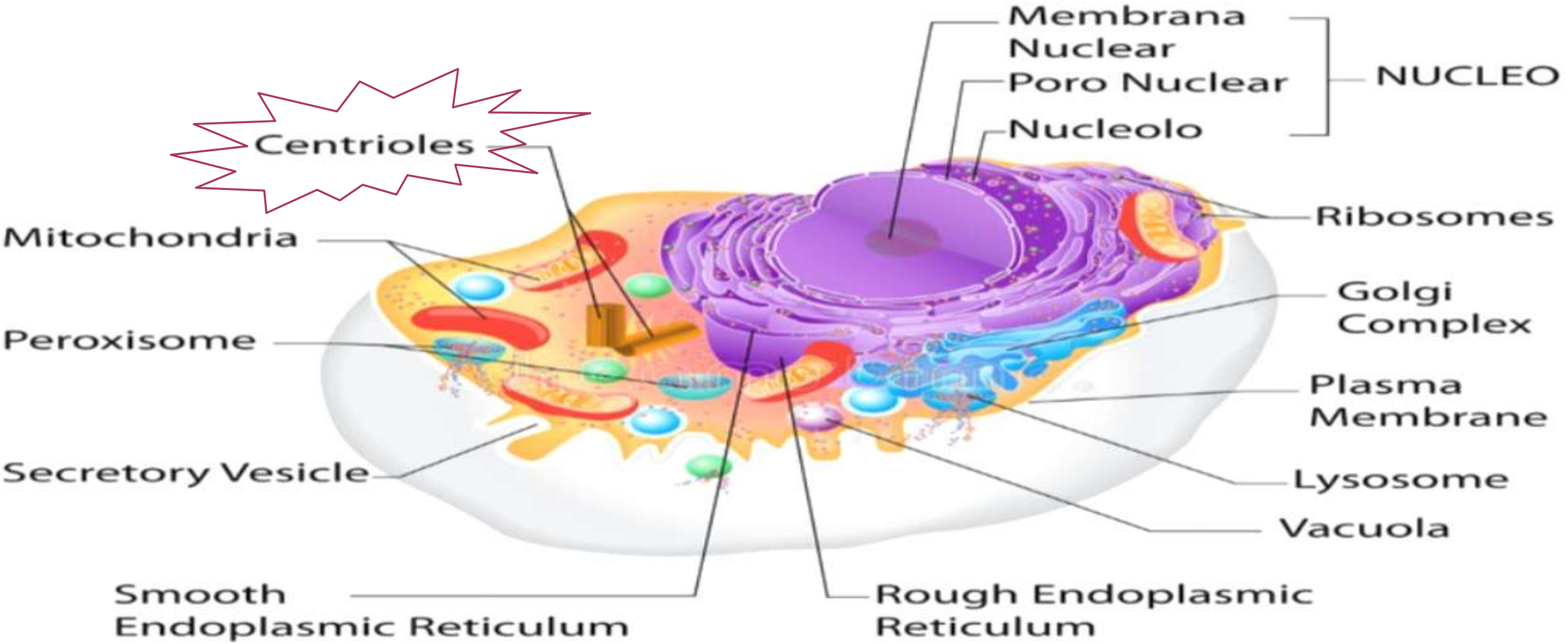
CENTRIOLES

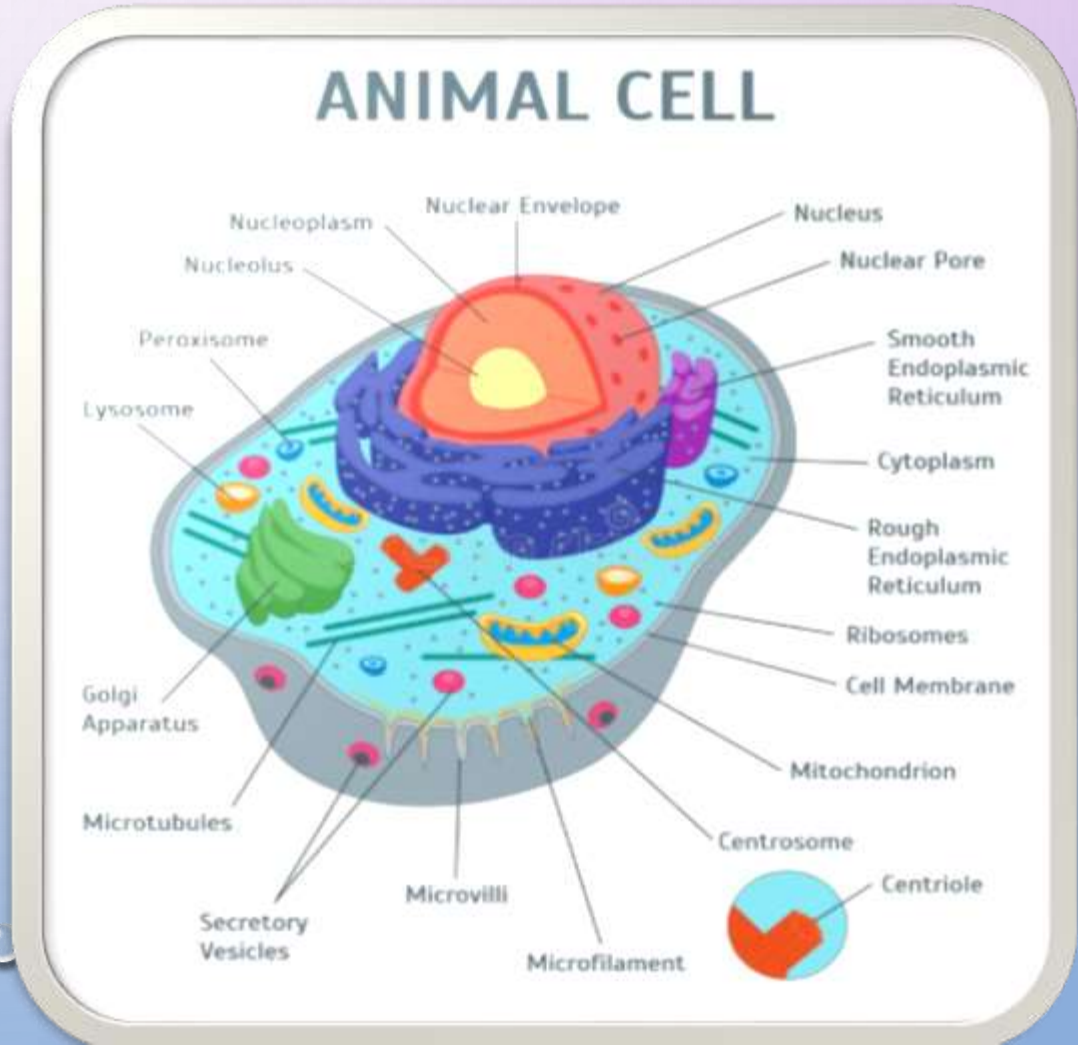
PRESENTED BY:- CHANDANI KUMARI.

YOGESH VISHWAKARMA.


Membrana Nuclear
Poro Nuclear
Nucleolo
NUCLEO
Centrioles
Ribosomes
Mitochondria
Golgi Complex
Peroxisome
Plasma Membrane
Secretory Vesicle
Lysosome
Vacuola
Smooth Endoplasmic Reticulum
Rough Endoplasmic Reticulum

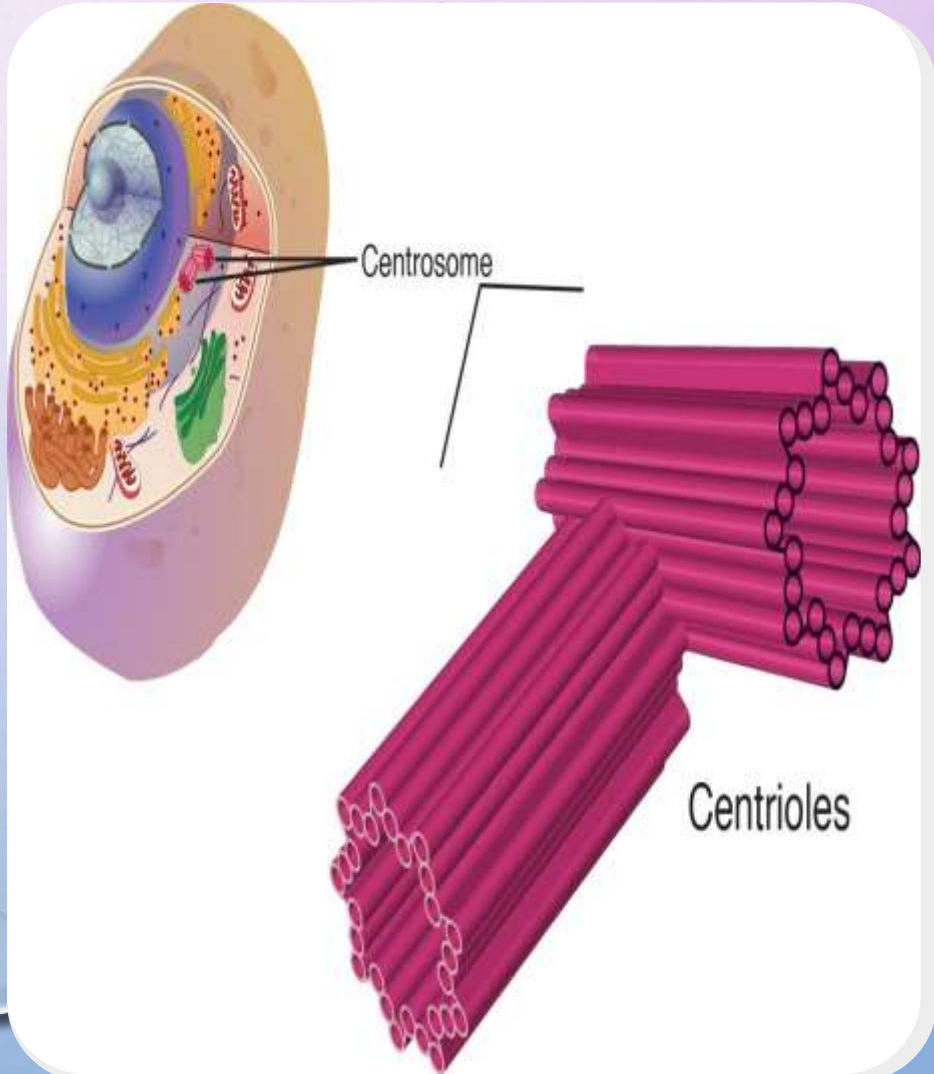
INTRODUCTION

- Centrioles is a cytoplasmic organelles.
- Mostly found in eukaryotic cells.
- Centriole lack limiting membrane and DNA or RNA.
- Form spindle of microtubule during cell division (mitosis and meiosis).



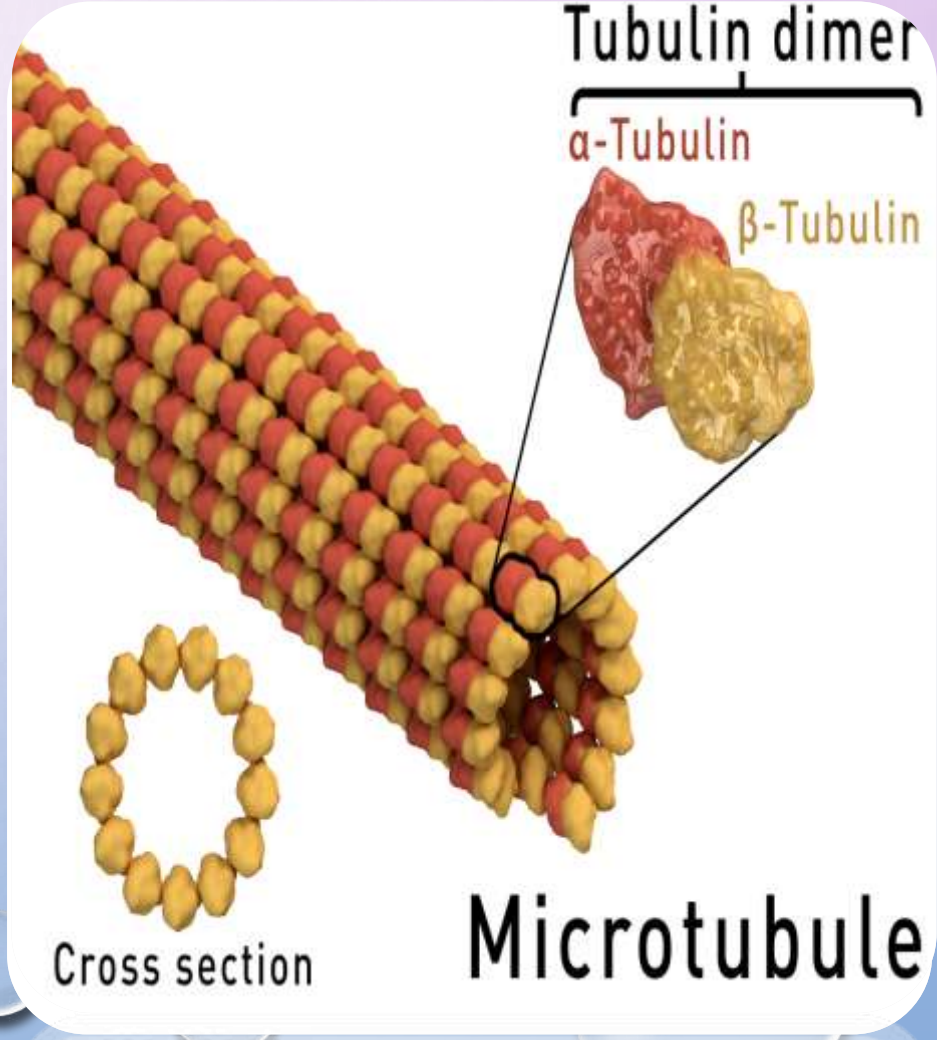
INTRODUCTION CONT'D

- Centrioles form basal bodies which give rise to axonemes of cilia and flagella.
- In eukaryotic cell centrioles are present in pairs.
- Pair is commonly known as centrosome.
- Each centrioles lie at right angle to each other.
- Surrounded by amorphous pericentriolar materials.
- Self-duplicate during S phase of cell cycle.



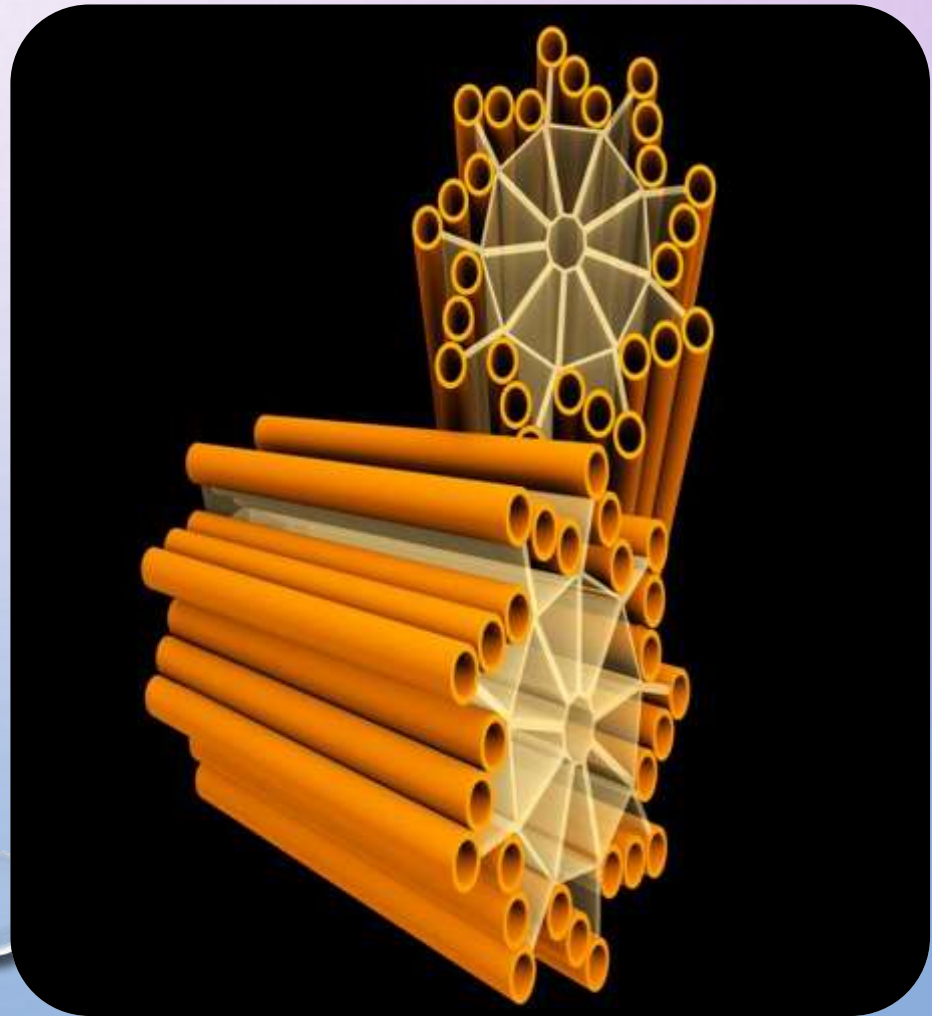
STRUCTURE

- The length of the centriole is about 3,000 to 5,000 Ã and diameter is about 1,500 to 1,800 Ã.
- Centrioles is made up of lipid and protein, also contain carbohydrate.
- Centriole is a set of microtubules.
- Made up of mainly tubulin protein (alpha tubulin and beta tubulin)



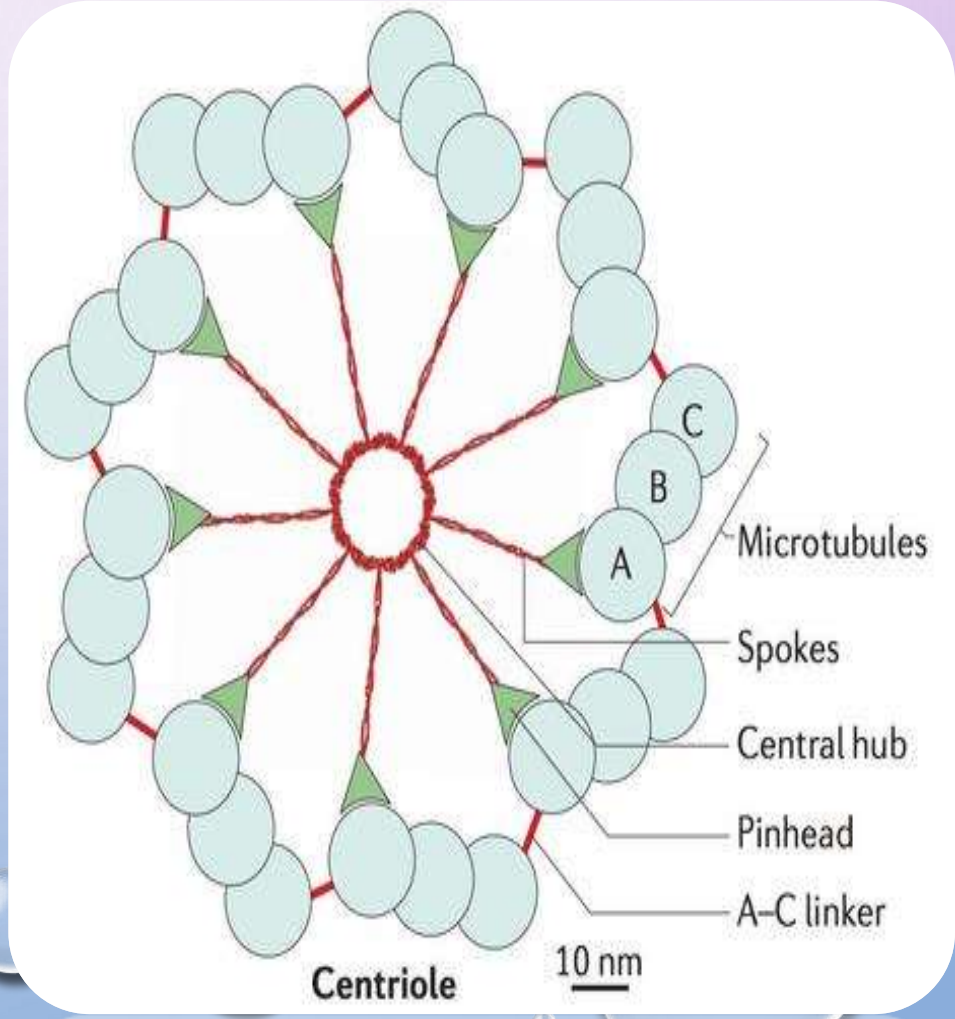
STRUCTURE CONT'D

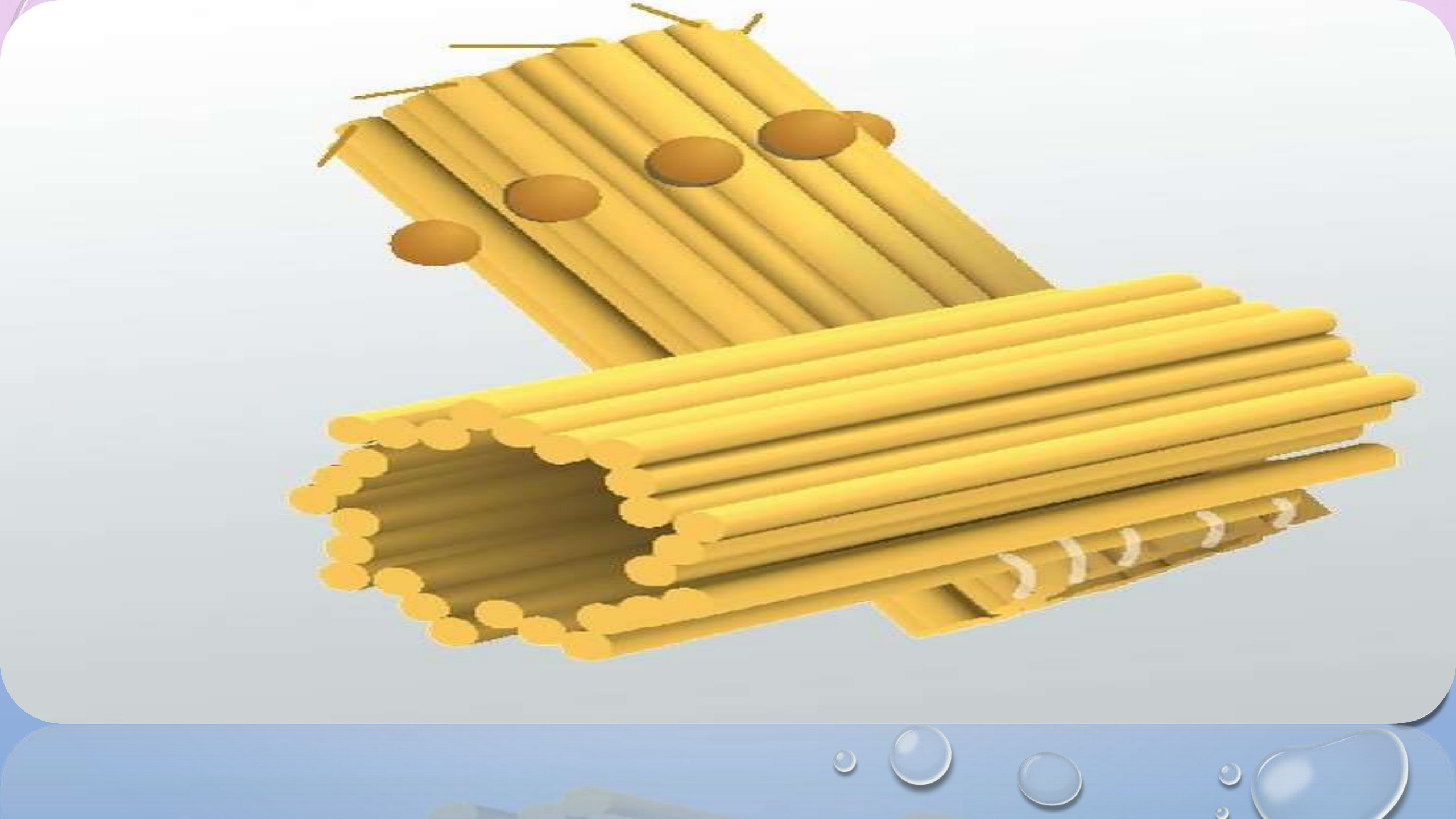
- Microtubule are arranged in the form of open ended cylinders.
- The cylindrical structure exhibits cart wheel type structure in transverse section.
- Centrioles mainly consists of 9 evenly spaced peripheral triplet fibrils of microtubules.
- The nine triplet microtubules are arranged in a pattern of 9+3.



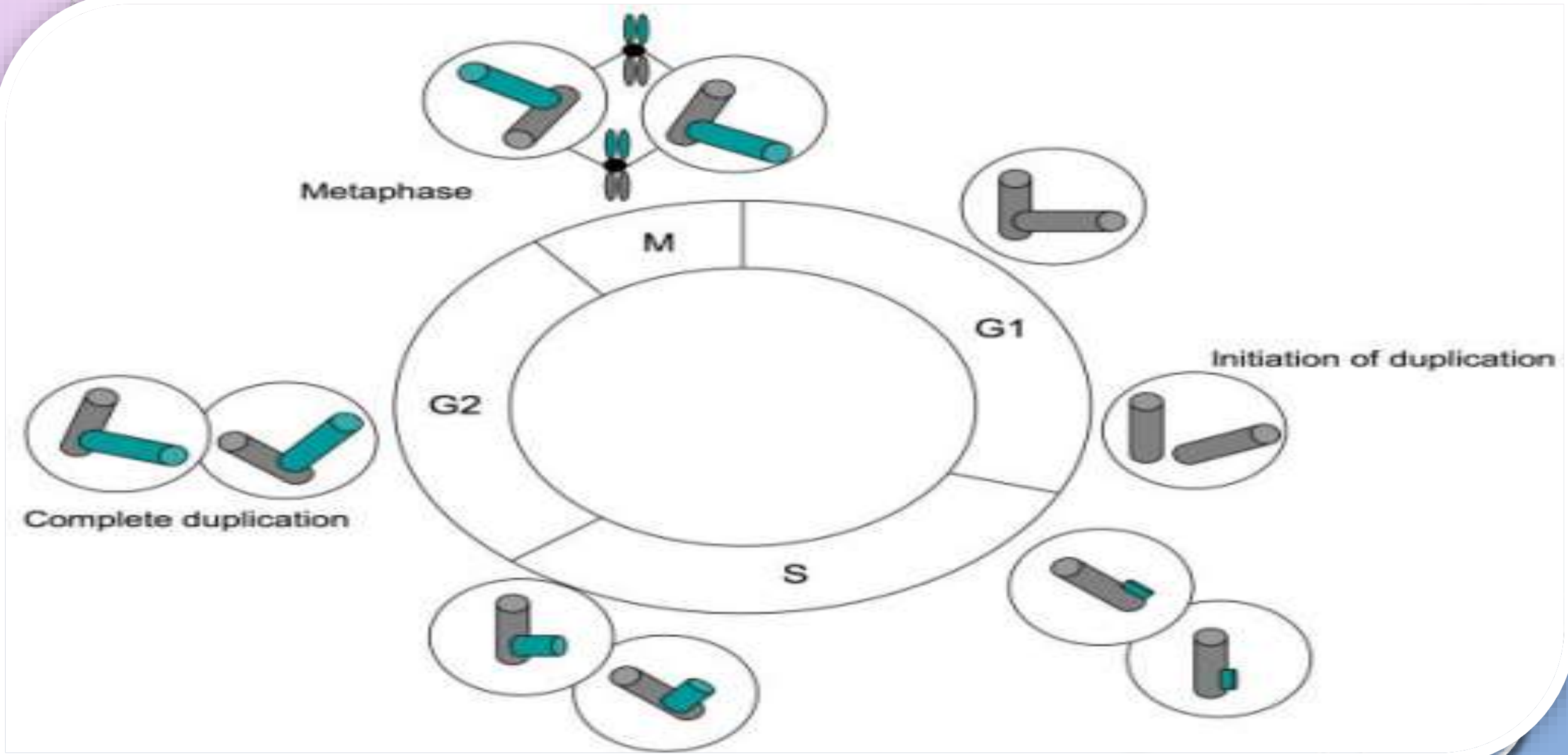
STRUCTURE CONT'D

- The pattern is named because nine 'triplet' arranged at right angle to each other.
- These triplets are linked with the help of a-c linker.
- The triplets are tilted, they form an angle of 40 degrees to the radius of the cylinder.



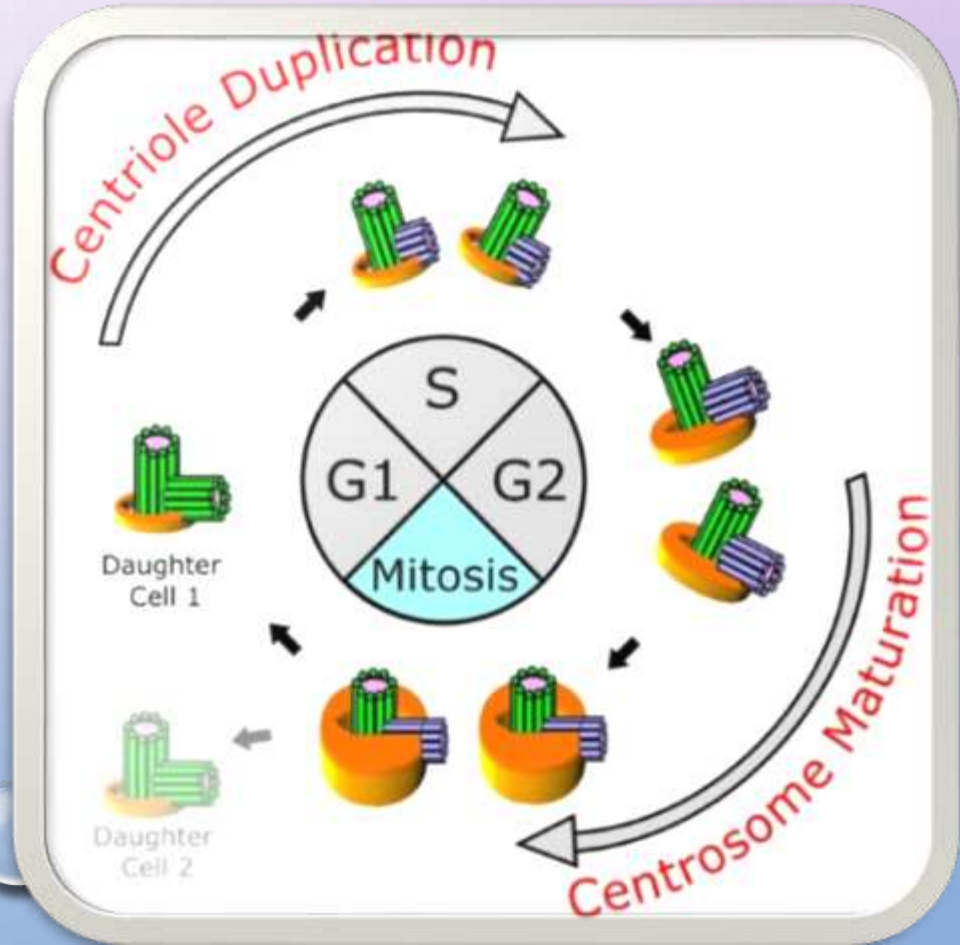


CENTRIOLES DUPLICATION



CENTRIOLES DUPLICATION

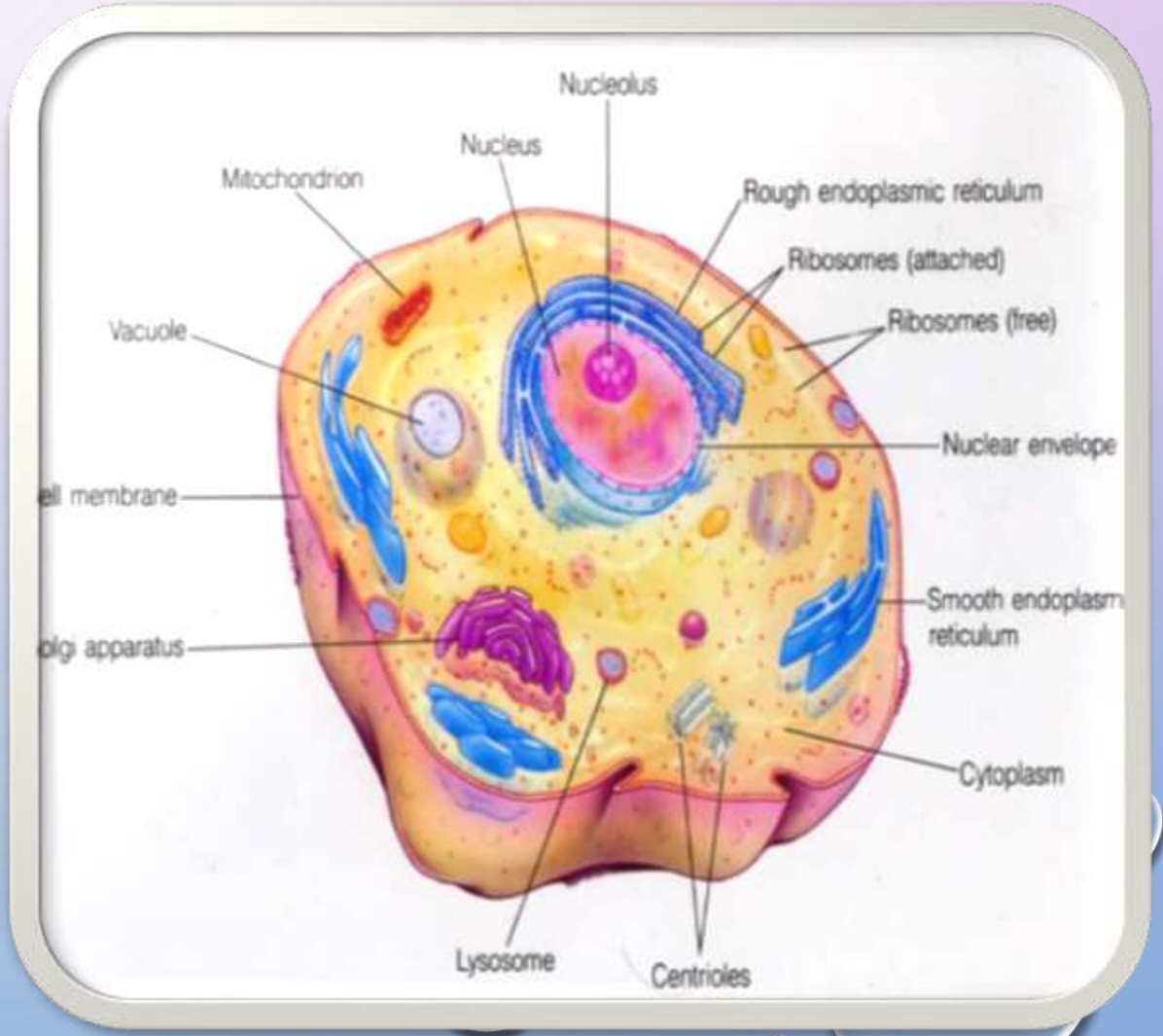
- Before the chromosome replication, cell contain two centrioles (centrosome).
- In the centrosome the older centriole is termed as mother centriole and another one is termed as daughter centriole.
- During S-phase of cell cycle, new centrioles grow at the proximal end of mother and daughter centrioles.
- The two pairs centrioles remain attached to each other until mitosis.
- They separate in mitosis with the help of enzyme ‘separase’.



FUNCTIONS

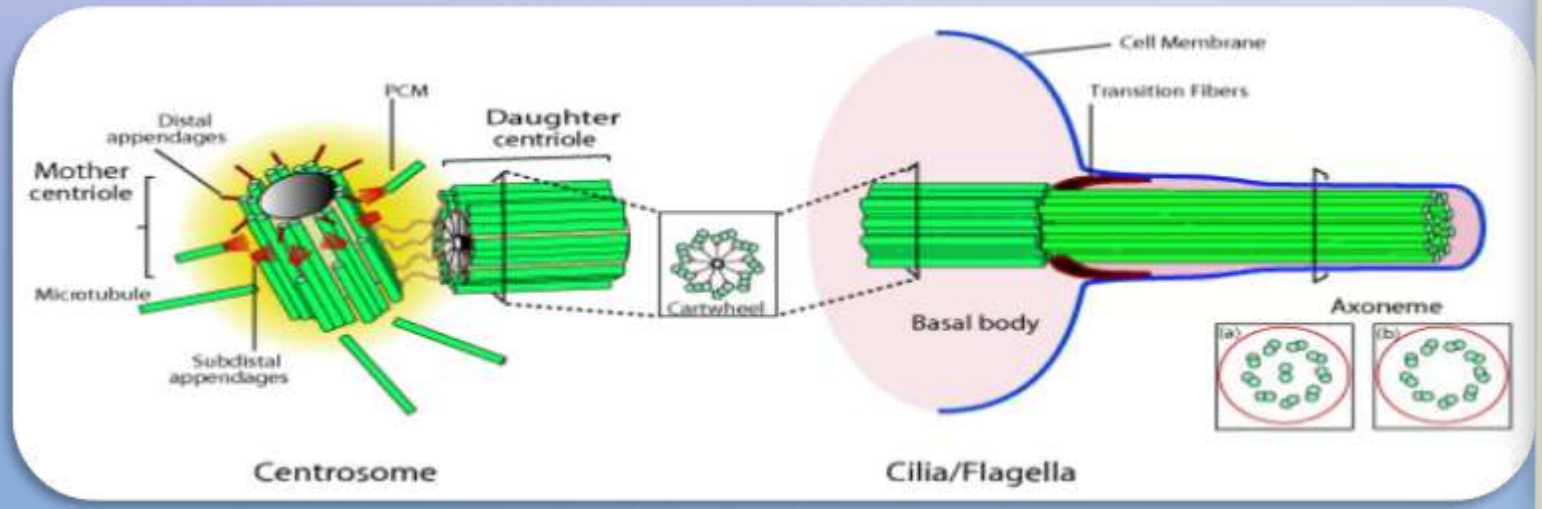
➢Cellular organization:-

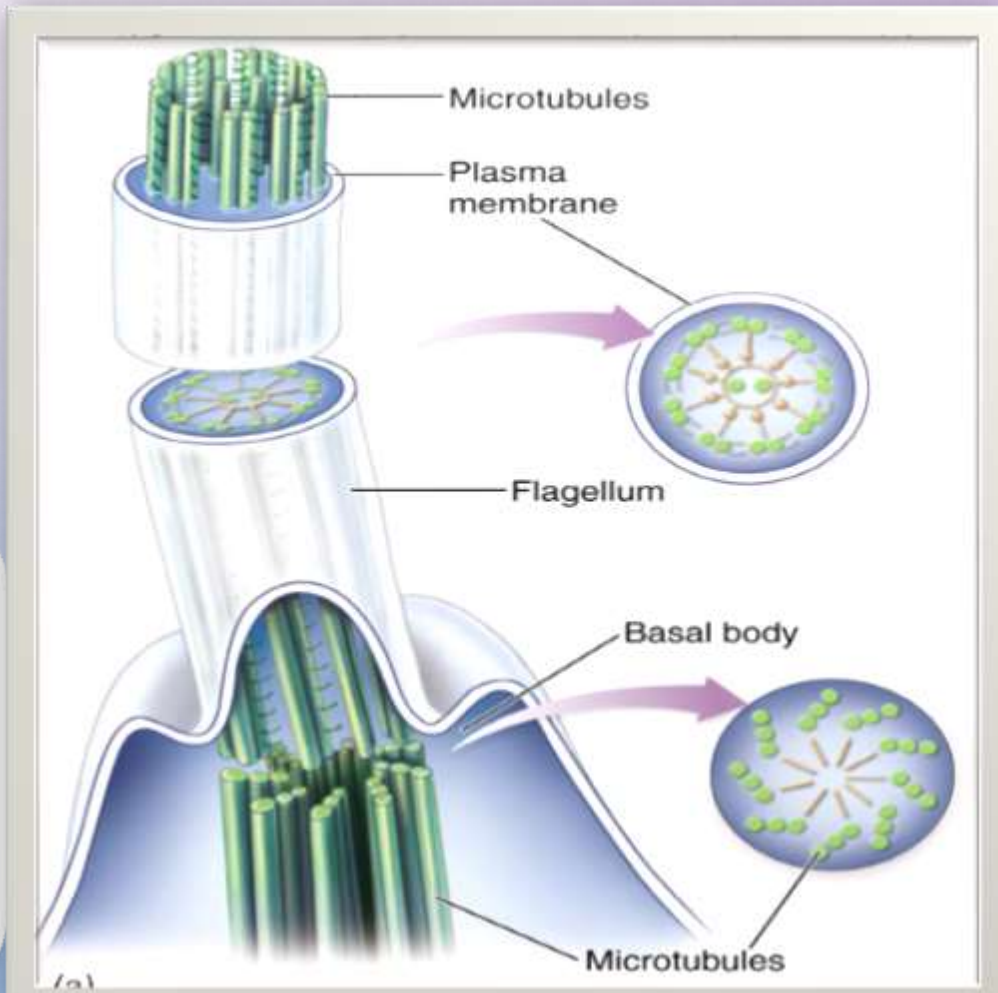
- Centrioles are involved in organizing microtubules in the cytoplasm.
- The position of centriole in cell determine the position of nucleus and play critical role in the arrangement of cell organelles.



FUNCTIONS CONT'D

- Formation of cilia and flagella:-
- In organism with cilia and flagella position of these organelles determine by the mother centrioles, which becomes basal body.





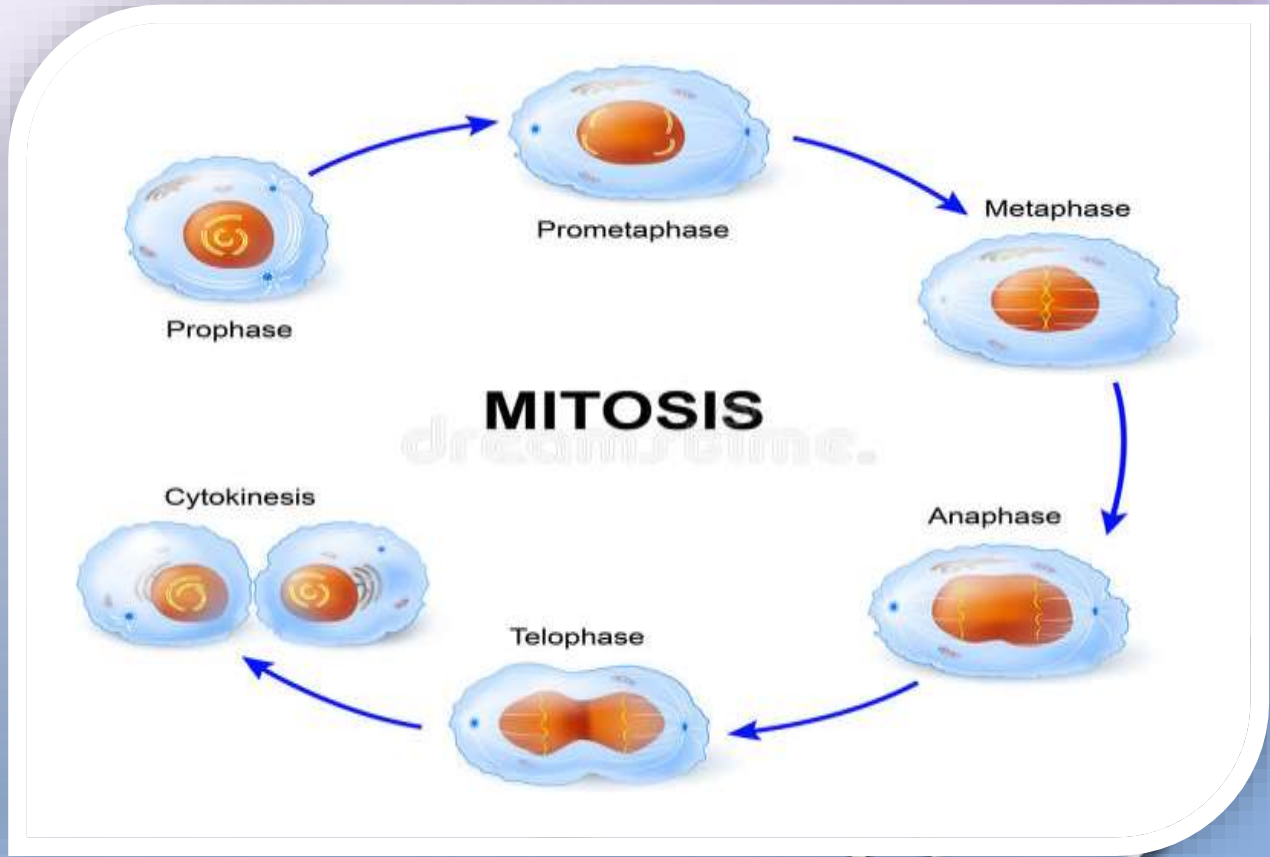
FUNCTIONS CONT'D

➢ IN CELL DIVISION:-

❖Mitosis.

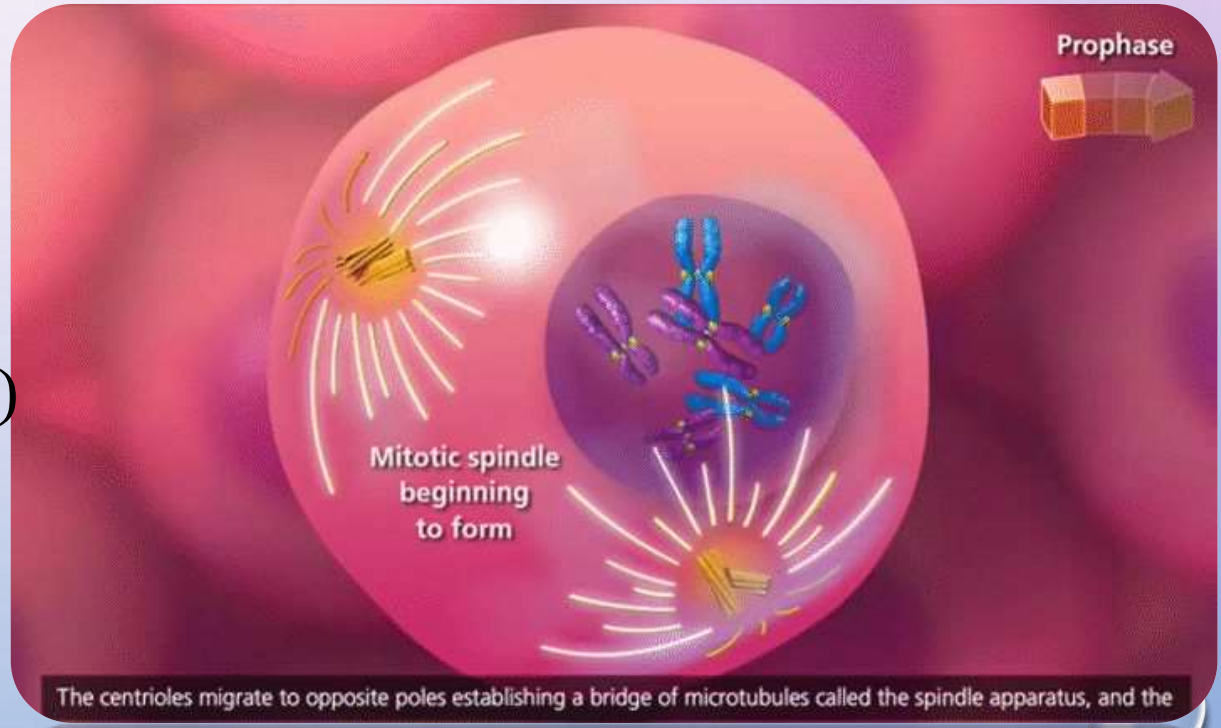
- Mitosis is divided into four stages:-

1. Prophase.
2. Metaphase.
3. Anaphase.
4. Telophase.



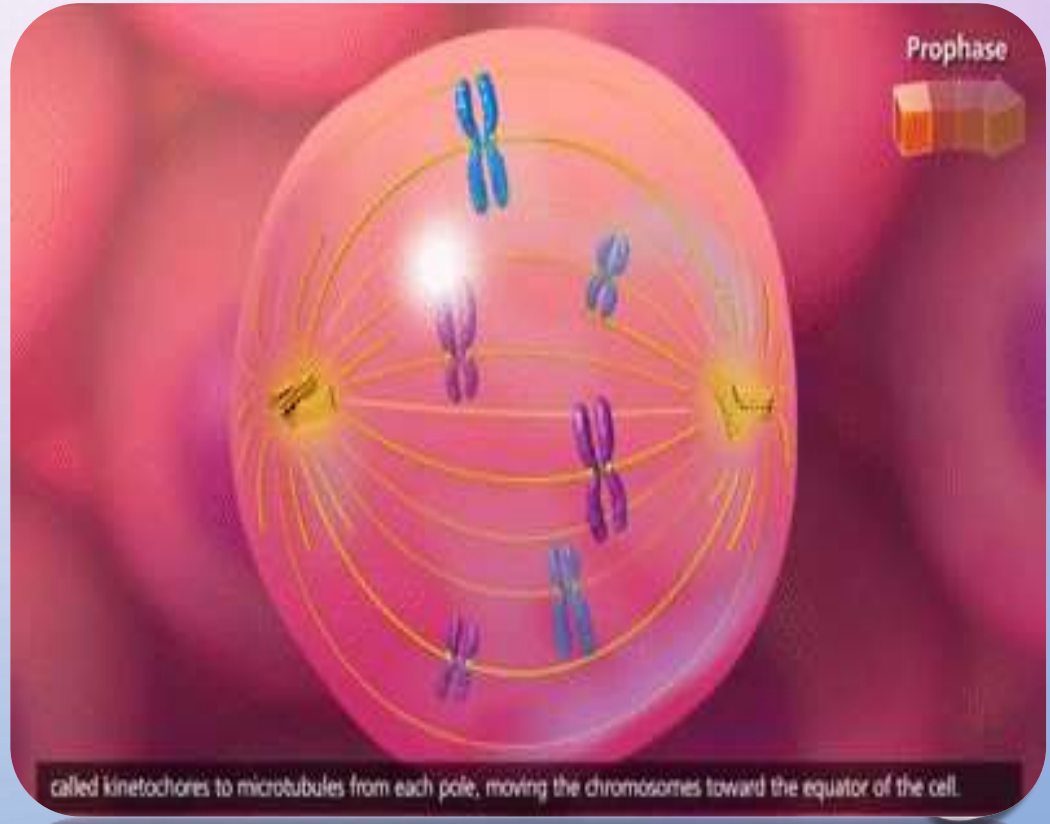
Prophase

- Prophase is marked by condensation of chromosomal material.
- The nuclear membrane start dissolving.
- The centrioles(which is divided during S-phase) move to opposite ends of nucleus.
- The mitotic spindle of threads appear.



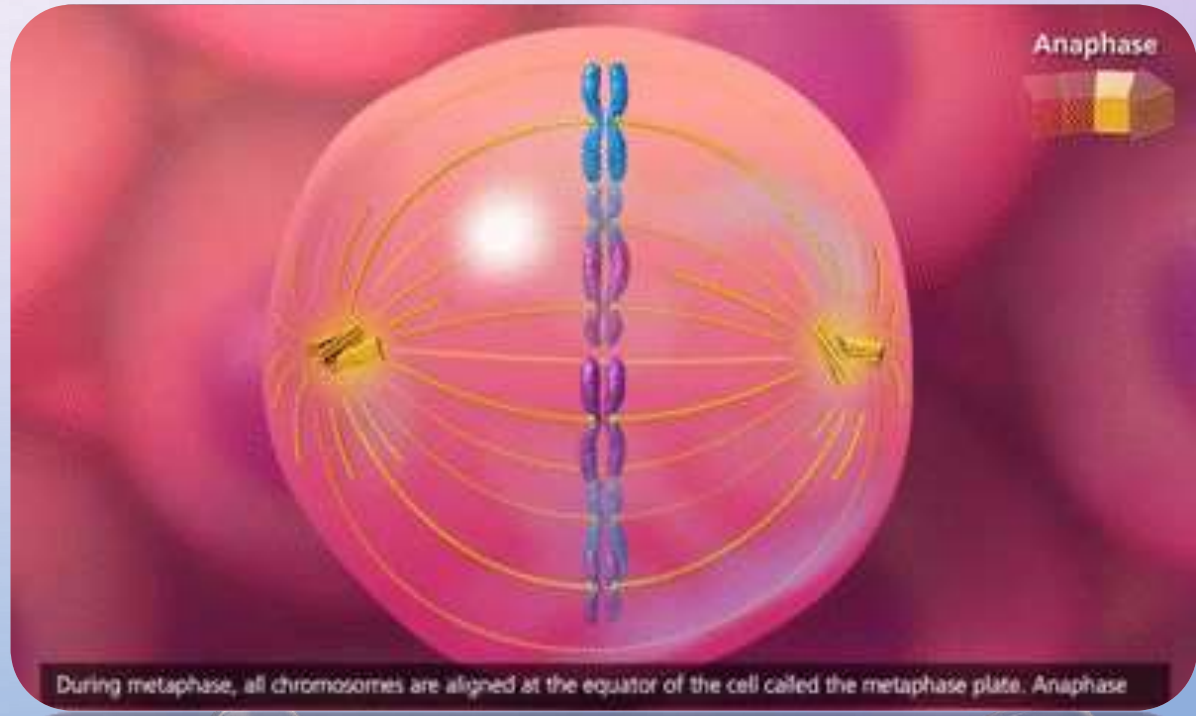
Metaphase

- In metaphase spindle fiber attached with the centromere on kinetochore (protein structure where spindle fiber attached).
- Centrioles are at the opposite poles of each other, centrioles pull the chromosome to the center of cell (metaphase plate).



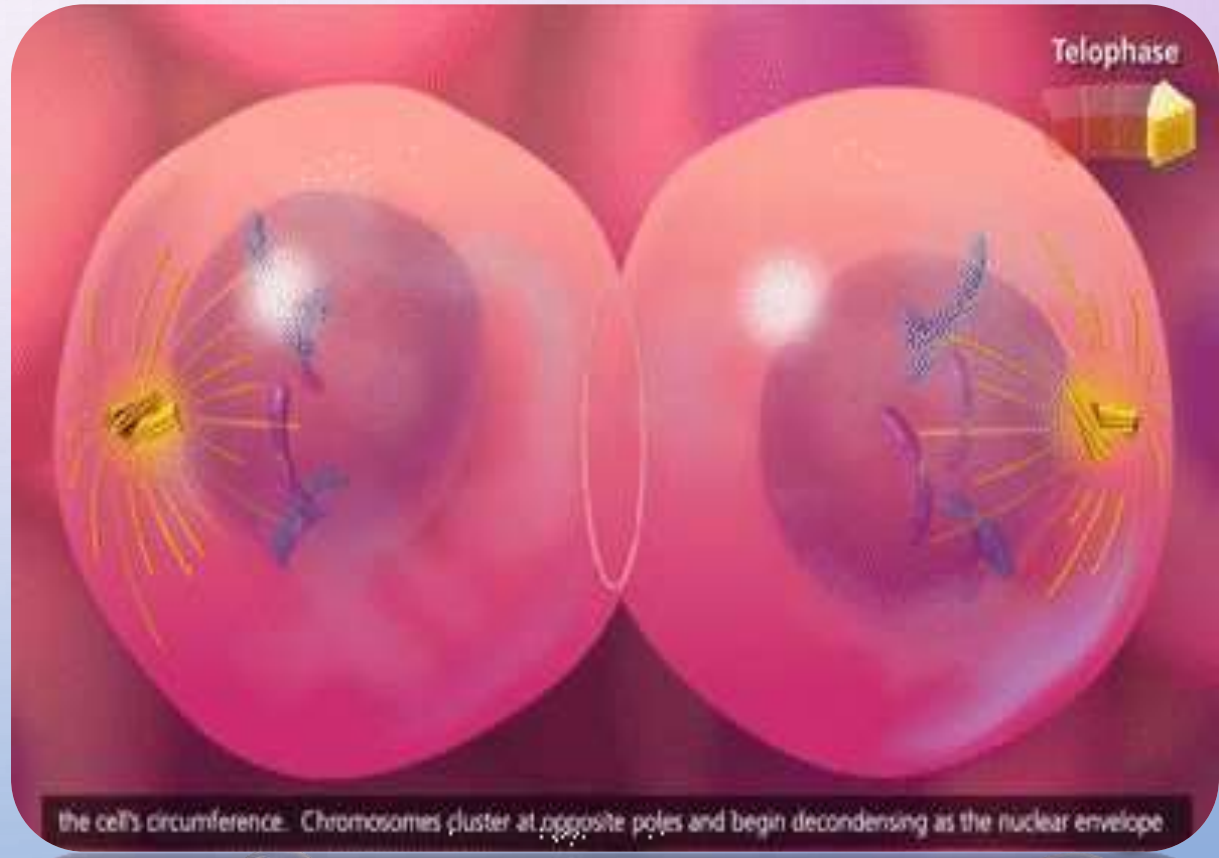
Anaphase

- During anaphase chromosome splits lengthwise, sister chromatids separate.
- The spindle fiber centrioles contract and they pull one sister chromatid towards opposite pole.

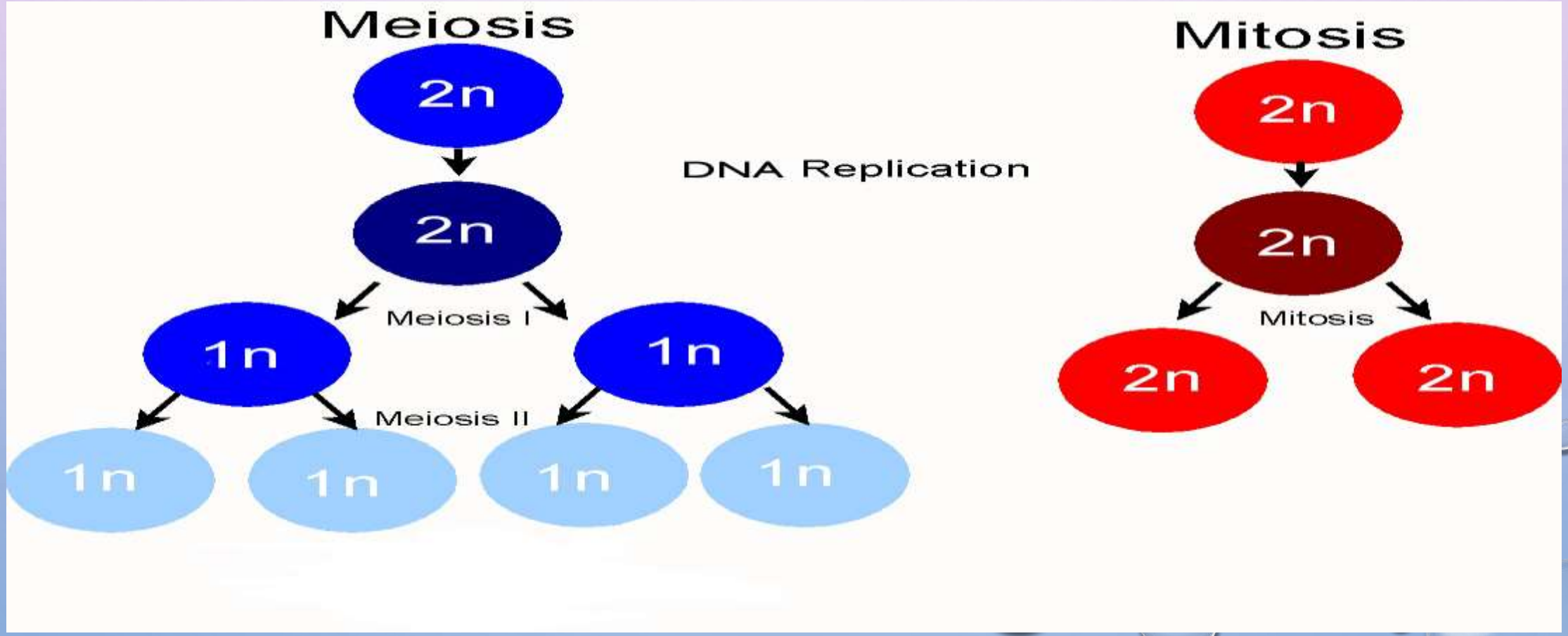


Telophase (reverse prophase)

- The cell division occur in telophase.
- Nuclear membrane reappear around the chromatid cluster.
- The new daughter cells contains pair of centrioles.



DIFFERENCE BETWEEN MITOSIS & MEIOSIS



❖MITOSIS:-

- Takes place in somatic cell of body.
- The two chromatid do not exchange segments.
- Spindle fiber of centriole disappear completely in telophase.
- Nucleoli reappear in telophase.

❖MEIOSIS:-

- Only in germ cell.
- The chromatids of homologous chromosome exchange segment during crossing over.
- Spindle fiber of centriole do not disappear completely in telophase 1.
- Nucleoli do not reappear in telophase 1.

QUESTIONS..

1). What is centrosome?

Ans:- The pair of centriole is known as centrosome.

2). Centriole duplicate during which phase of cell cycle?

Ans:- S-phase of cell cycle.

3). Centriole is mainly made up of which type of protein?

Ans:- Tubulin Protein.

4). Main functions of centrioles?

Ans:- > Cellular organization.

> Formation of cilia and flagella.

>Help in cell division.

5). What is kinetochore?

Ans:- Protein structure where spindle fiber attached.

That's all folks!

Thank You