

M Phase :- (Mitosis) → • Occurs in diploid cells
 • Occurs in haploid cells with one set of chromosomes Eg. Yeast

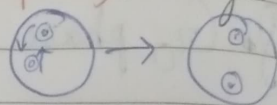
In M-phase, after cell division, the daughter cells receive same equal amount of chromosomes ($2n$ each) ~~or~~ DNA ($2C$ each) [Maintaining same no. of chromosomes]

Karyokinesis :-

1. Prophase :-

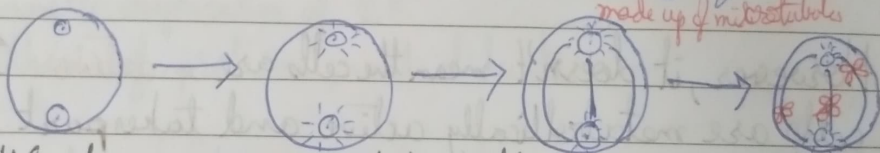
Early prophase :-

- Condensation of chromosome to form chromatid $X \rightarrow \text{X}$ [2 chromatid = chromosome]
- Nuclear membrane/envelope breaks down
- Centrioles (which underwent duplication in S phase) will begin to move towards opposite poles of the cell



Later prophase :-

- The centrioles will occupy opposite pole regions and give rise to ~~aster~~ asters (Helps in attachment of spindle fibres)

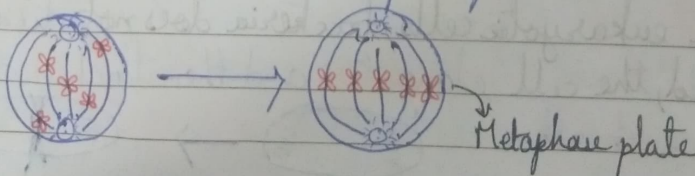


- The 46 chromosomes will hang themselves onto the spindle fibres with the help of their kinetochores

2. Metaphase :-

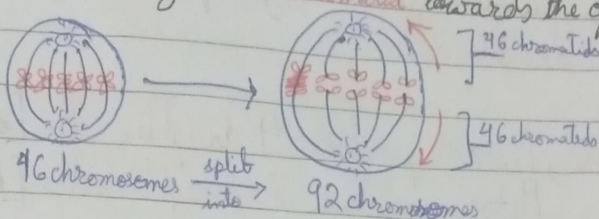
- The complete disintegration of the nuclear envelope starts the 2nd phase of mitosis, hence the chromosomes are spread through the cytoplasm of the cell.

- The chromosomes in spindle fibres align themselves along the straight equator of the cell called metaphase plate



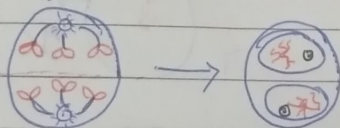
3. Anaphase:-

- Centromeres split and ^{sister} chromatids separate
- The separated chromatids move towards opposite poles since the spindle fibres will carry each chromatid towards the opposite poles.



4. Telophase - (Opposite of Prophase)

- Chromosomes cluster at opposite poles
- The spindle fibres and asters disintegrate
- Nuclear membrane/envelope reappears around chromosome cluster at each pole → forming two daughter nuclei
- Chromatids will ~~form~~ unwind ^{to form} thin spindle fibres
- Nucleolus, golgi complex and ER reform.



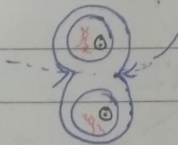
1, 2, 3, 4 → Karyokinesis

Cytokinesis:-

Animal cell

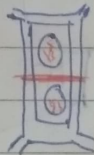
Plant cell

- Plasma membrane constricts inward



This movement is called **Centripetal**

- Plasma membrane ^{expands} ~~constricts~~ outward



Cell plate formation takes place from the center

This movement is called **Centrifugal**

Q. Which of the following duplicates in the cytoplasm during S-phase

(a) Centriole

In Nucleus, DNA replication takes place

(b) DNA

In Cytoplasm, Centrioles duplication takes place (of centrosome)

(c) Chromosome

(d) Chromatids