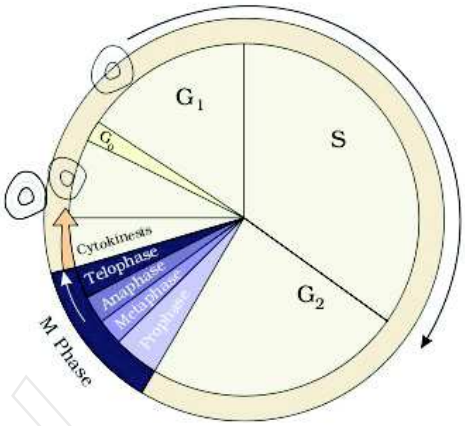
CELL CYCLE AND CELL DIVISION

Cell cycle

- The cell cycle constitute a interphase and mitotic phase
- The interval period between the two consecutive cell division is called interphase
- mitotic phase is the division phase
- the interphase can again classify into 3 stages; G1 phase, S phase and G2 phase

G1 phase

- in this phase the RNA, proteins, ribosomes production take place



S phase

- here the DNA replication take place

G2 phase

- RNA and protein synthesis occur here.

G0 phase

- sometimes there is resting phase can be seen prior to G1 phase called G0 phase

MIITOSIS

It is divided into four phases like

a) prophase b) metaphase c) Anaphase d)Telophase

Prophase: events

- longest phase of division
- chromatin begins to condense
- chromosome is duplicated
- nuclear membrane and nucleolus disappear
- spindle fiber appear

Metaphase : Events

- spindle fiber get attached with centomere
- chromosomes are arranged at equator as all the centromere seen in a line

Anaphase: events

- centromere splits
- daughetr chromosomes move towards opposite poles

Telophase : events

- chromosomes reach at poles
- chromosomes uncoil and form threads
- spindle fiber disappear
- nucleolus and nuclear membrane appear

Cytokinesis

after telophase cytokinesis occur. That means the division of cytoplasm

in plant cells middle lamella is formed between two nuclei. They later form cell wall.
In animal cell a cleavage furrow is formed in between nuclei and it deepens.

Significance of mitosis

this division is responsible for growth
the chromosome number is retained [that is why it is otherwise called as equatorial division]

Meiosis

it is otherwise called as reduction division because here the chromosome number is reduced to half.

It take place in two sequences ; meiosis I and meiosis II
Meiosis I : comprises four phases:
a) prophase I b) Metaphase I c) Anaphase I d) Telophase I

Meiosis I I: also comprises four phases:
a) prophase II b) Metaphase II c) Anaphase II d) Telophase II

ProphaseI

- it is the longest phase. So it is again divided into five substages
- a) Leptotene b) Zygotene c) Pachytene d) Diplotene e) diakinesis

Leptotene	Zygotene
• nuclear volume increases • chromatin begins to condense	• Pairing of homologous chromosomes (synapsis) take place • Synaptonemal complex formation • bivalent is formed

Pachytene	Diplotene
• Crossing over take place (exchange of genetic material between non sister chromatids) • recombination nodules are formed(they are the sites of crossing over) • recombinase enzyme is produced	• Dissolution of synaptonemal complex • Chiasma formation(they are the "X' shaped structures)

Diakinesis	
• Terminalisation of chiasmata(movement of chiasma towards terminal side) • nuclear membrane, nucleolus disappear • spindle fibers appear	

Metaphase I

- chromosomes arranged at the equatorial plate
- spindle fibers attached to chromosomes

Anaphase I

- The homologous chromosomes separate, and move towards poles. while sister chromatids remain associated at their centromeres

Telophase I

- chromosomes reach at poles
- nuclear membrane, nucleolus appear , spindle fibers disappear

cytokinesis take place after meiosis I
The stage between the two meiotic divisions is called interkinesis and is generally short lived.

Meiosis II

Prophase II: The nuclear membrane disappears by the end of prophase II . The chromosomes again become compact.
Metaphase II: At this stage the chromosomes align at the equator and the spindle get attached to the kinetochores
Anaphase II: splitting of the centromere and move toward opposite poles of the cell
Telophase II: nuclear membrane , nucleolus again appear. Spindle fibers dis appear

MEIOSIS significance

1. chromosome number is maintained generation to generation
2. increases the genetic variability in the Variations are very important for the process of evolution.