Cell Division

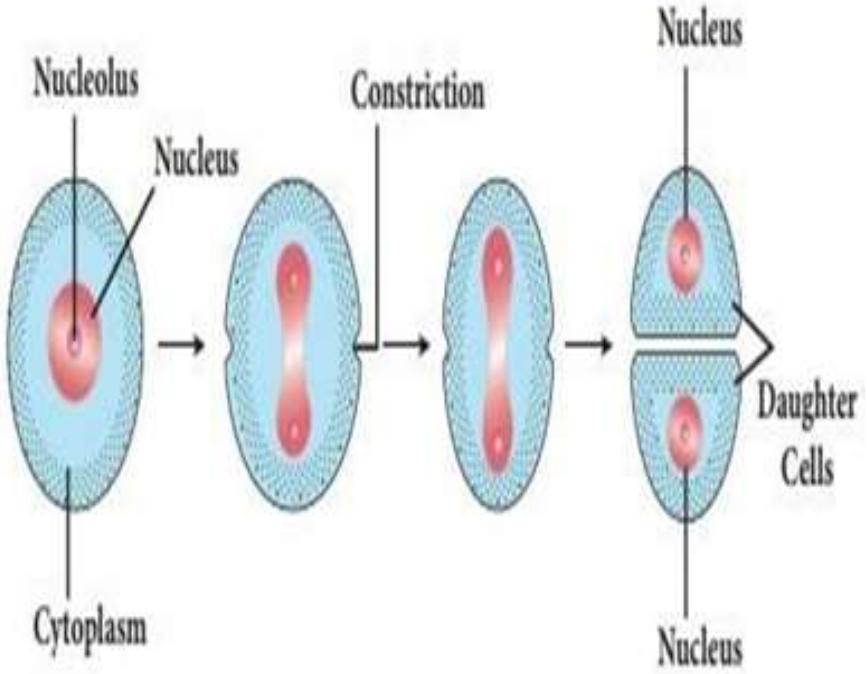
- Is a complex phenomenon by which cellular material is divided equally between daughter cell. During embryonic development most cells are undergoing repeated division as the body grows in size and complexity .As a particular cell matures it becomes differentiated in structure and function and may eventually lose the ability to divide as a neurons and skeletal muscle cells ,do not divide at all ;others ,such as liver cells normally divide only once every year or two while certain epithelial cells in the gut and skin divide more than twice a day in order to renew

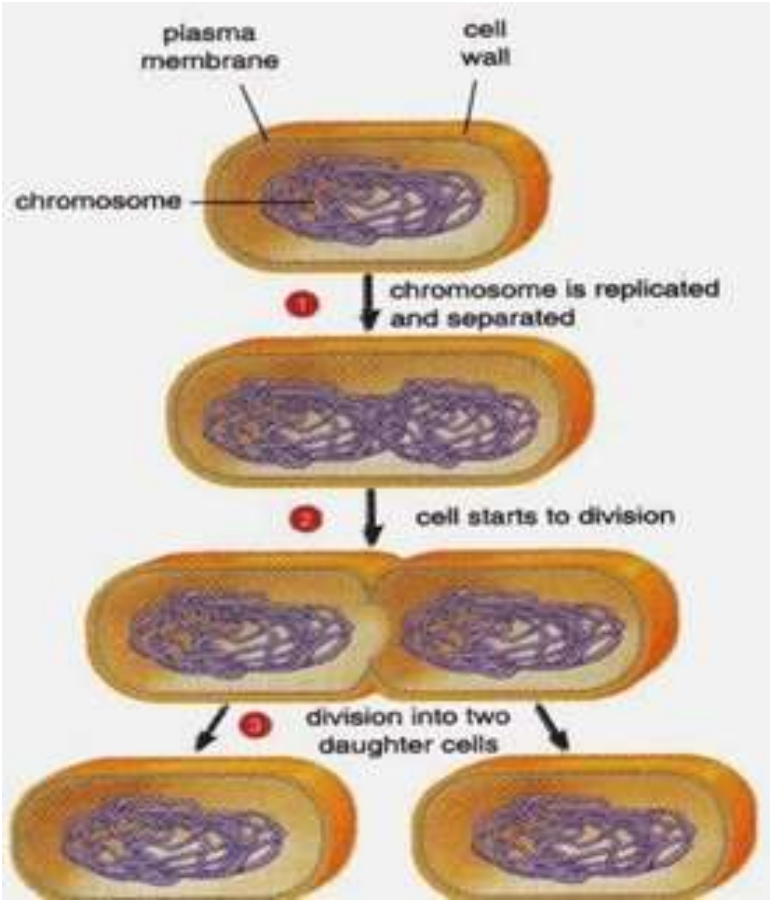
.

Reproduction of cell

Multiplication (division) of the cell belongs to its primary functions. Cell division is a part of subsequent processes . Known as cell cycle. In regard to course of division and its result , we recognize generally three types of cell division – amitosis,mitosis and meiosis

Amitosis (direct division) happens immediately after replication of DNA . In form of “binary fission “ is typical for bacterial cells

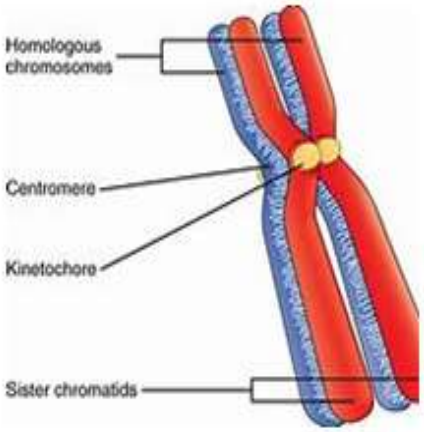

Nucleolus
Nucleus
Constriction
Nucleus
Daughter
Cells
Cytoplasm
Nucleus

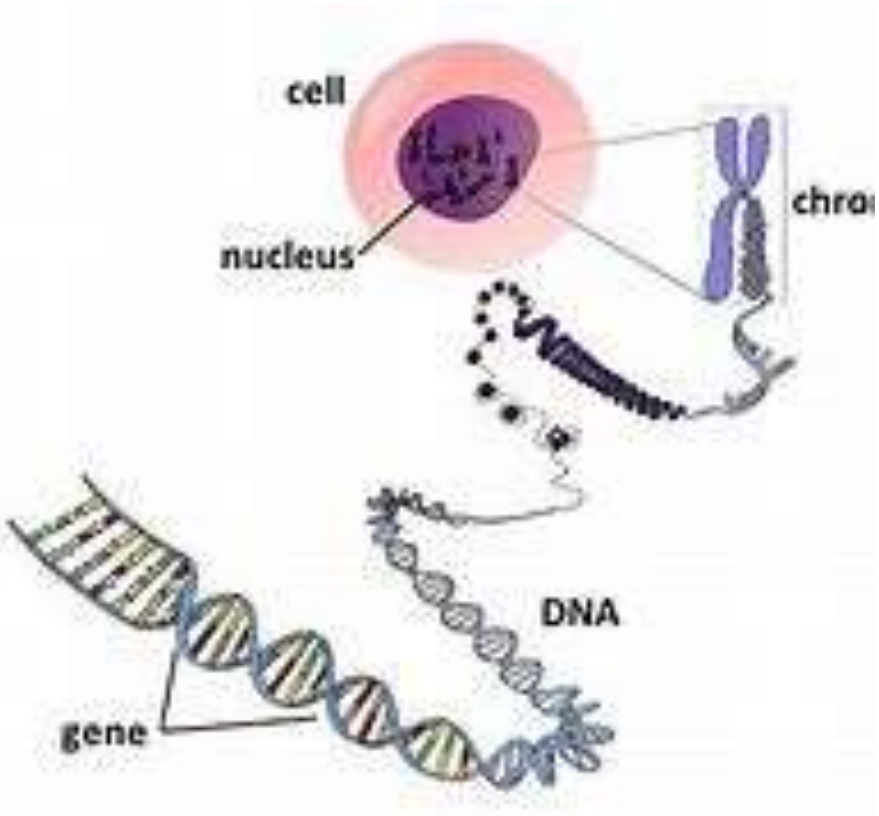

plasma
membrane
cell
wall
chromosome
1
chromosome is replicated
and separated
2
cell starts to division
3
division into two
daughter cells

The cell cycle of eukaryotic cells

Inside every tissue .cell are constantly replenishing themselves through the process of division . The rate of division different. The cell cycle consists of two main phases .which are interphase and M-phase (mitosis phase)

Mitosis is a process of cell division that result in two genetically identical daughter cells developing from a single parent cell used for the growth of tissues , fibers and membranes.


Homologous chromosomes
Centromere
Kinetochore
Sister chromatids


cell
nucleus
DNA
gene

Mitosis phase;-

interphase:- is actually a period of diverse activities lasts at leas† 12 to 24 hours in mammalial tissue . Can be divided into 4 steps:

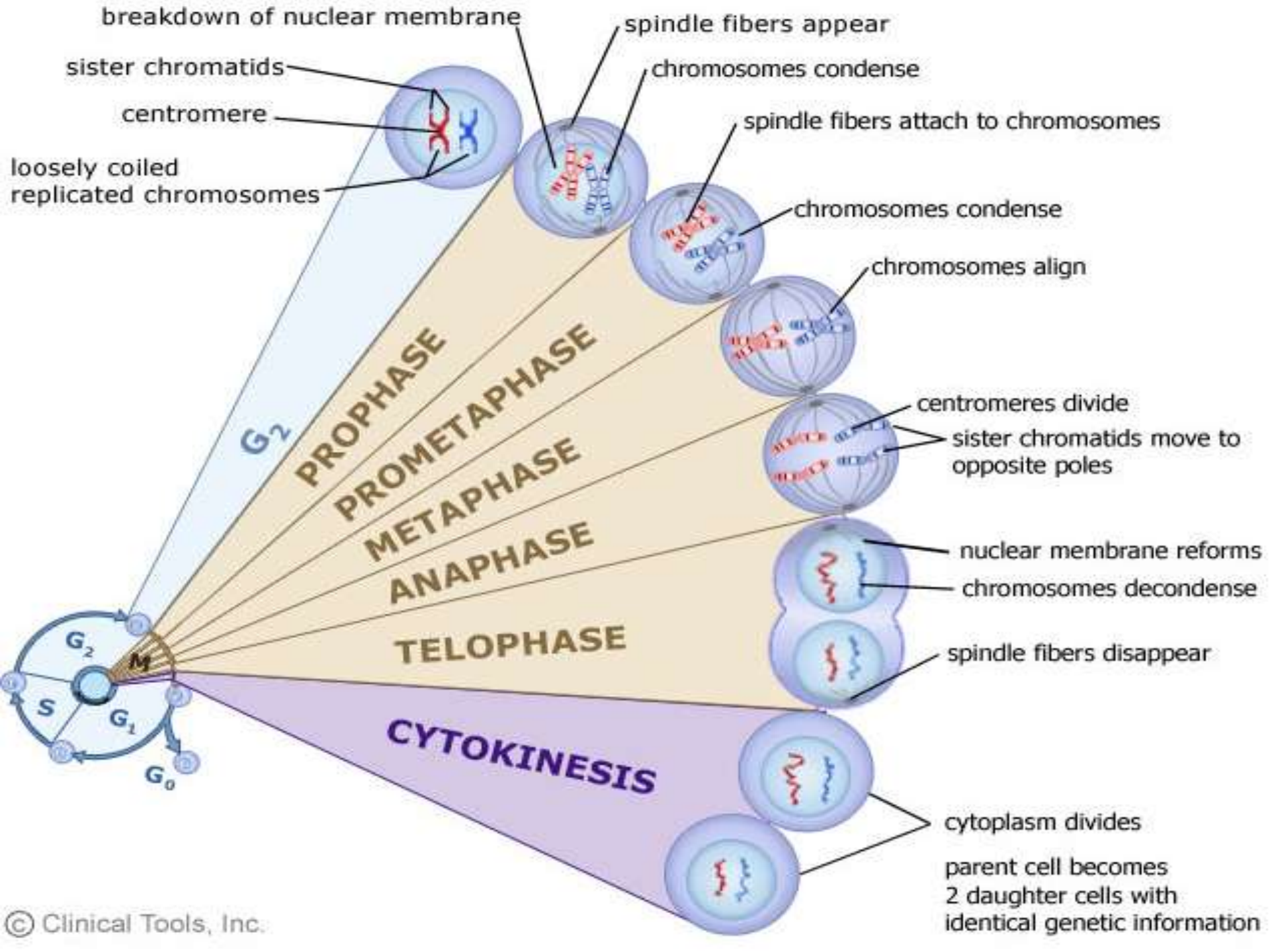
Gap 0 (G0)This may be a temporay resting period or more permanent (will no longer divided e.g.neuron)

Gap 1 (G1):- Produce RNA and synthesize protein including the enzymes :An important cell cycle control (G1 checkpoint) ensures that everything is ready for DNA synthesis.

S phases ;DNA replication occure during this S (asynthesis) phase , chromosomes duplication

Gap 2 (G2) The cell will continue to grow produce new proteins.

At the end of this gap is another control checkpoint (G2 Checkepoint) to determine if the cell can now proceed to enter and divide.

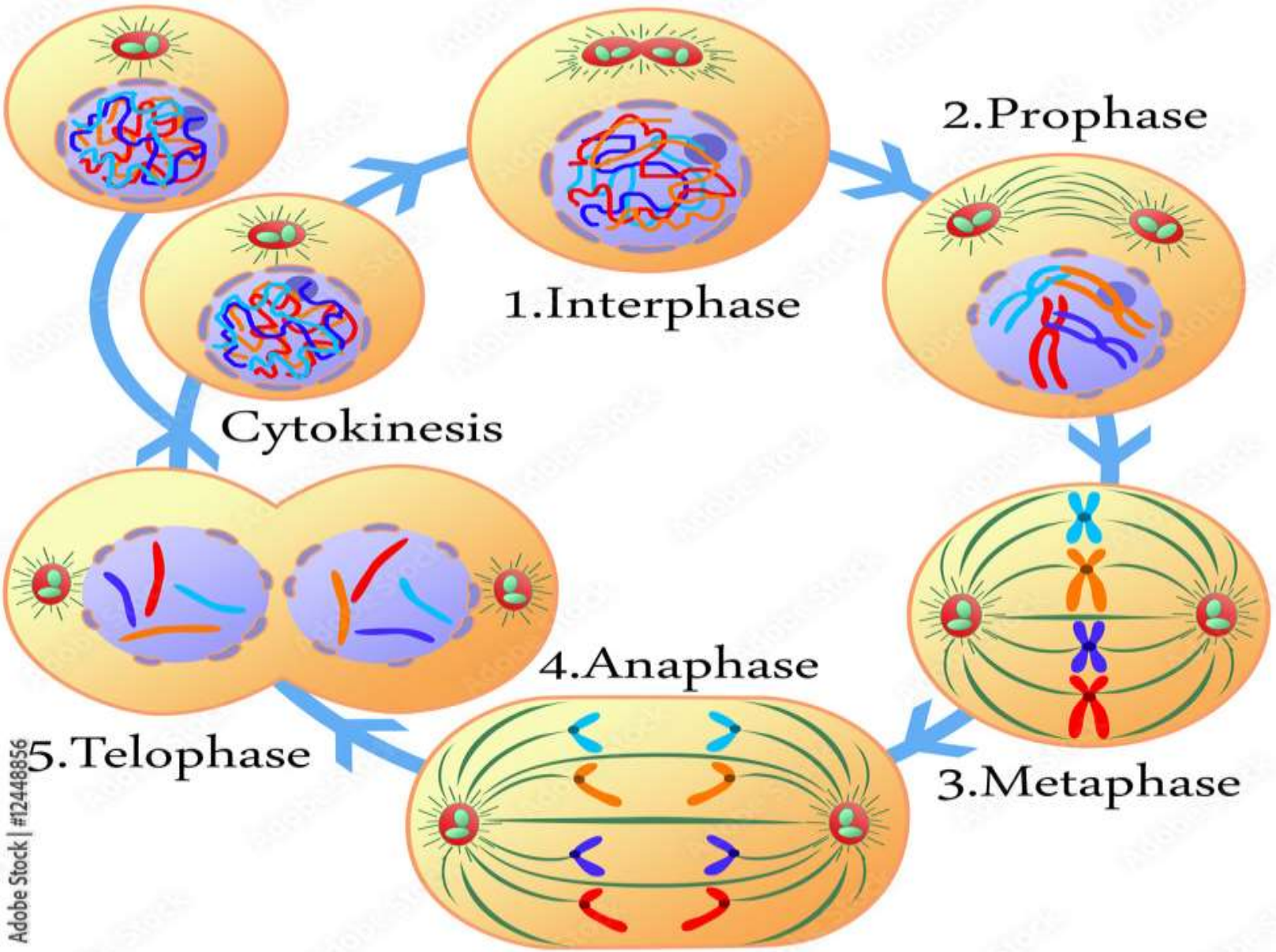


During prophase (the condensation of chromatin and chromosomes) begins , starts the movement of controsomes toward the apposite cell sides (poles), An early ,division spindel is formed . Starts the process of nuclear envelope “disappears”

Metaphase: Tension applied by the spindle fibers sligns all chromosomes in one plane at center of the the cell

Anaphase: spindle fibers shorten , the kinetochores separate and the chromatids (daughter chromosomes) are pulled apart and begin moving to the cell poles.

Telophase: The daughter chromosomes arrive at the poles and the spindle fibers that have pulled them disappear

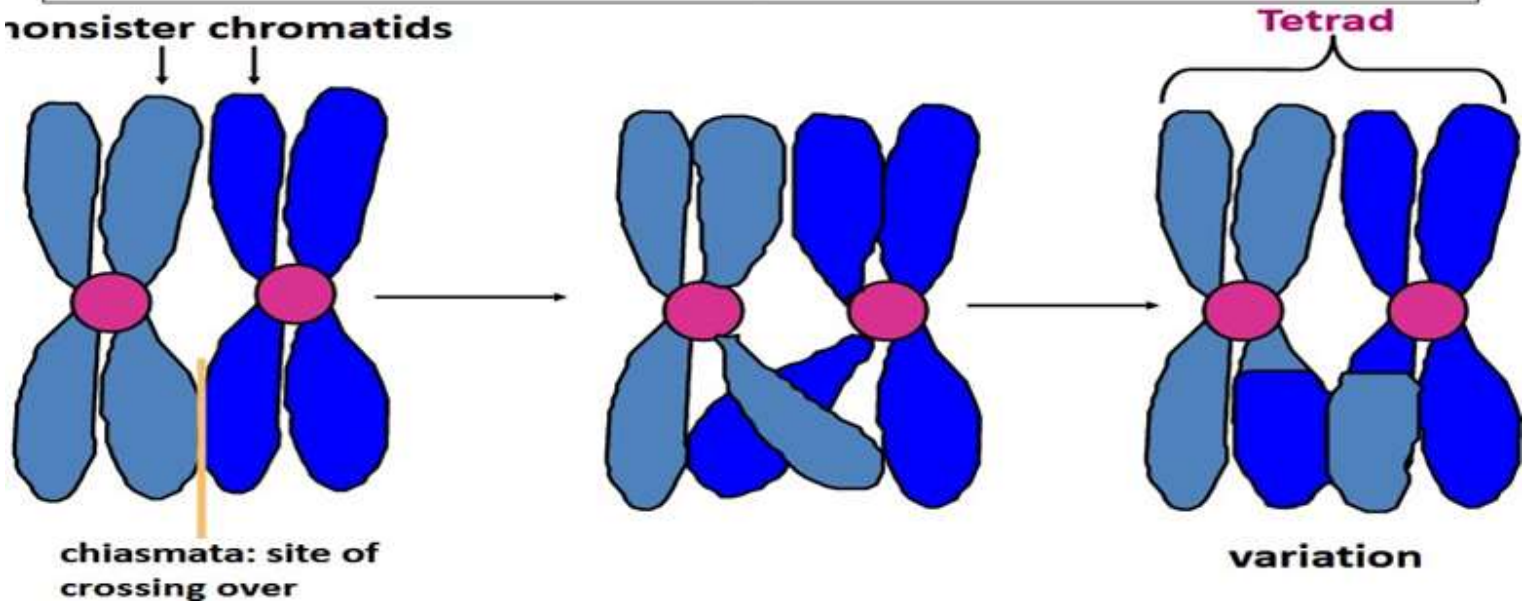

1.Interphase
2.Prophase
3.Metaphase
4.Anaphase
5.Telophase
Cytokinesis
Adobe Stock | #12448856

Cytokinesis: is a contractile ring cleaves the cell into two daughter cells.Microtubules then reorganize into a new cytoskeleton for the return to interphase.

Meiosis Is the division of a germ cell involving two fissions of the nucleus and giving rise to four gametes, each have half the number of chromosomes of the original cell . Reduction division **synapsis** and **crossing over** occure

Crossing Over

creates variation (diversity) in the offspring's traits.



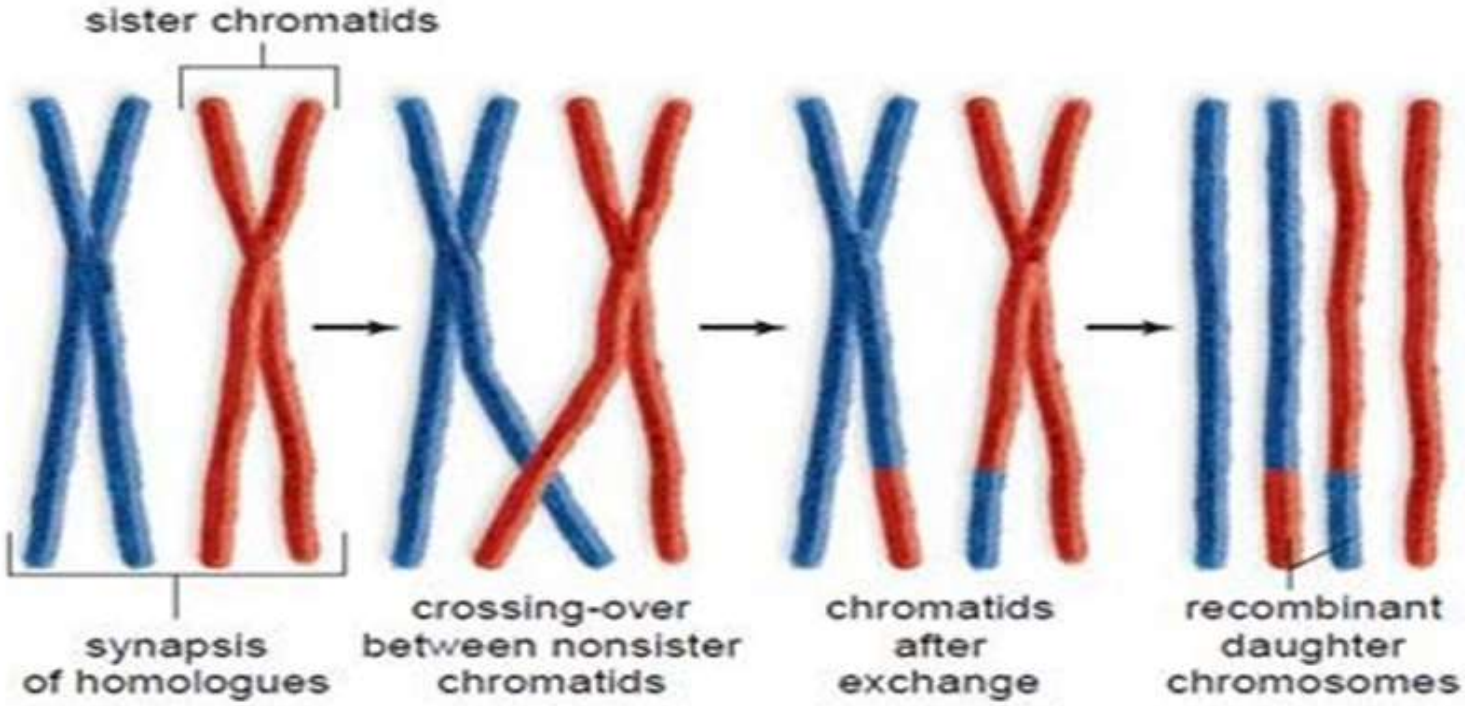
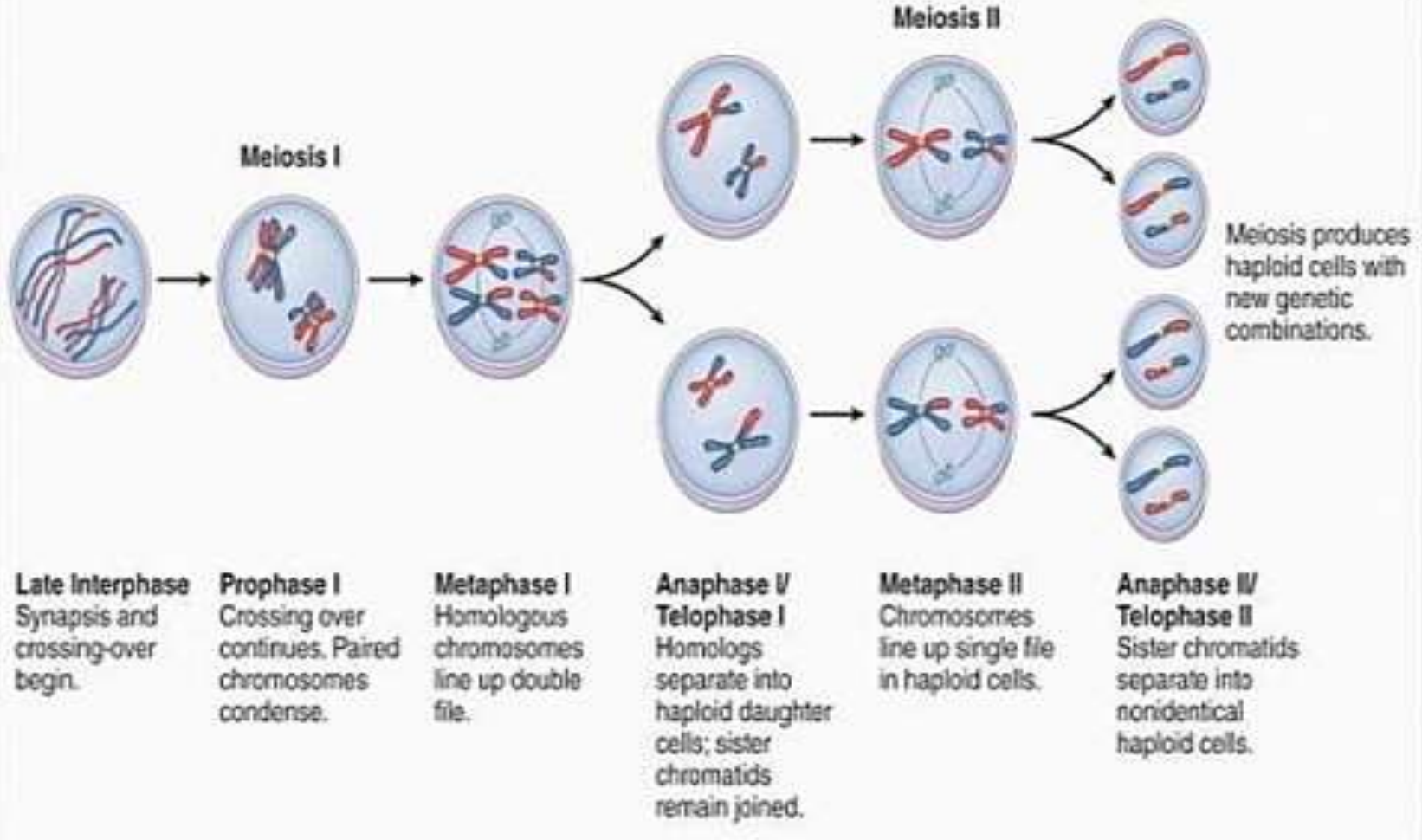


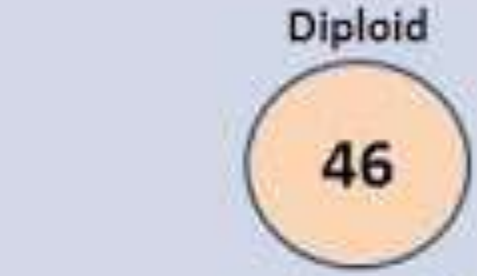
Figure 18.12 Synapsis and crossing-over increase variability.

chromosomes pair up precisely with homologue so that crossing over can occure (process where homologous chromosomes exchange genetic material ensure greater variety in the gametes.

Meiosis ||

The stage is simillar to mitosis sister chromatids separate this division maintanse haploid number of chromosomes.This phase completes the goal of meiosis- producing four geneticaly unique cells from one original mother cell


Meiosis I
Meiosis II
Meiosis produces haploid cells with new genetic combinations.
Late Interphase
Synapsis and crossing-over begin.
Prophase I
Crossing over continues. Paired chromosomes condense.
Metaphase I
Homologous chromosomes line up double file.
Anaphase I/ Telophase I
Homologs separate into haploid daughter cells; sister chromatids remain joined.
Metaphase II
Chromosomes line up single file in haploid cells.
Anaphase II/ Telophase II
Sister chromatids separate into nonidentical haploid cells.

	Mitosis	Meiosis
Start		
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