

CHAPTER 21

Q.1 What are apoptotic bodies?

Ans. The dying cells shrink during apoptosis. It then condenses and ultimately split up. Thus it releases small membrane bounded apoptotic bodies.

Q.2 What is synapsis?

Ans. The pairing of homologous chromosomes starts during zygotene. It is called synapsis.

Q.3 What is tetrad?

Ans. Each paired (but not fused) complex structure is called as bivalent or tetrad.

Q.4 What is chiasmata?

Ans. Non-sister chromatids of homologous chromosomes exchange their segments by chiasmata formation during crossing over.

Q.5 What is crossing over?

Ans. The exchange of segment of the non-sister chromatids of homologous chromosomes is called crossing over.

Q.6 Differentiate between cytokinesis of animals and plants.

Ans. In animals cytokinesis takes place by cleavage furrow formation. In plants cytokinesis takes place by phragmoplast formation.

Q.7 What is the difference between mitotic apparatus in plants and animals?

Ans. Centrioles are present in animal cells. Microtubules arise from the centrioles. Plants lack centrioles but they have analogous region. The spindle microtubules radiate from this region.

Q.8 What happens during metaphase of mitosis?

Ans. The kinetochore fibers of spindle attach at the kinetochore of the chromosome. These fibers align the chromosome at the equator of the spindle. Thus they form equatorial plate or metaphase plate in the equator. Each kinetochore is attached with two fibers each from opposite poles.

Q.9 What is equatorial plate or metaphase plate?

Ans. The kinetochore fibers align the chromosome at the equator of the spindle and they form equatorial plate or metaphase plate in the equator.

Q.10 Differentiate between meiosis I and meiosis II.

Ans. The first meiotic division is the reduction division. The second meiotic division is just like mitosis.

Q.11 What are homologous chromosome?

Ans. The similar but not necessarily identical chromosomes are called as homologous chromosomes.

Q.12 Differentiate between prophase of mitosis and meiosis.

Ans. The chromosomes are not arranged in homologous pairs in prophase of mitosis. The chromosomes are arranged in homologous pairs in prophase of meiosis.

Q.13 What is karyokinesis? Name its different stages.

Ans. The division of nucleus is called karyokinesis. Its different stages are prophase, metaphase, anaphase and telophase.

Q.14 What is mitotic apparatus?

Ans. The specialized microtubule structure including aster and spindle is called mitotic apparatus.

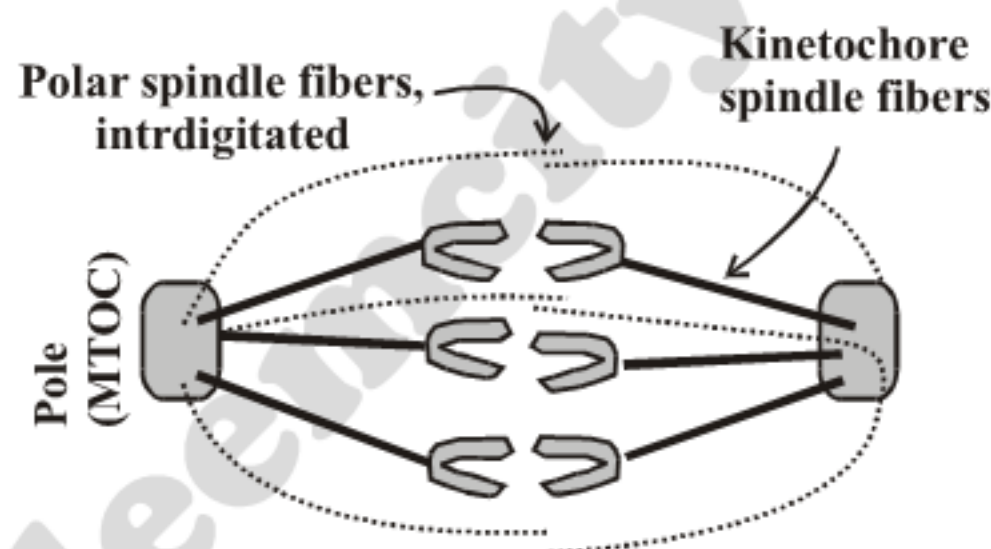
Q.15 Differentiate between kinetochore microtubules and polar microtubules?

Ans. Kinetochore microtubules attach to chromosomes at kinetochores. Polar microtubules do not interact with the chromosomes. Instead, they interdigitate with polar microtubules from the opposite pole.

Q.16 Differentiate between astral and spindle microtubules.

Ans. Astral microtubules radiate outward and form aster.

Spindle microtubules other two (polar and kinetochore) sets of microtubules form the spindle.



Q.17 How does cytokinesis in animal cells take place?

Ans. The actin and myosin form contractile ring. Their contraction forms cleavage furrow. The furrow deepens towards the center of the cells. It finally divides the parent cell into two daughter cells.

Q.18 What does happen during diakinesis?

Ans. The condensation of chromosomes reaches to its maximum point during this phase. At the same time separation of the homologous chromosomes is completed.

Q.19 Differentiate between interphase and mitotic phase?

Ans. The period of life cycle of cell (cell cycle) between two consecutive divisions is called interphase. Mitosis is the period of division.

Q.20 What is G₁ phase? Give some processes taking place during this phase?

Ans. It is the period of extensive metabolic activity. Following metabolic processes take place in this step: The cell normally grows in size. Specific enzymes are synthesized. DNA base units are accumulated for the DNA synthesis.

Q.21 How do cells enter into G₀ phase?

Ans. Sometimes, the post-mitotic cell exits without any change. Such cells enter into a phase called G_0 phase.

Q.22 What is the difference between metaphase of mitosis and mitosis I?

Ans. During metaphase of mitosis chromosomes do not arrange in pairs on spindle. But in metaphase of meiosis I the chromosomes are arranged as homologous pairs on spindle.

Q.23 What are cancer and tumor?

Ans. The uncontrolled or unregulated cell division is called cancer. The clone of cells is called tumor.

Q.24 Differentiate between malignant and benign tumor?

Ans. The tumor that spreads to the other parts of the body is called malignant tumor. The tumor that is not transferred to the other parts of the body is called benign tumor.

Q.25 What are malignancy and metastasis?

Ans. The presence of invading cells in the normal tissue is an indication of malignancy. The spread of tumor cells and establishment of secondary areas of growth is called as metastasis.

Q.26 Differentiate between anaphase of mitosis and meiosis I.

Ans. During anaphase of mitosis the chromatids get separated. But during anaphase of meiosis I complete homologous chromosomes move apart.

Q.27 How cell cycle is controlled?

Ans. There are specific check points at each stage. These check points determine the fate of new phase according to cell's internal make up.

Q.28 What is non-disjunction?

Ans. The abnormality in which the chromosomes fail to segregate during anaphase and telophase and the chromosomes do not distribute equally among all the daughter nuclei is called non-disjunction.

Q.29 What is Turner's Syndrome?

Ans. It is a sexual non-disjunction in woman. The affected individuals have one missing X chromosome. So they have only 45 chromosomes (44 autosomes + Y).

Q.30 What is cell cycle?

Ans. The sequence of changes in a cell involving period of growth, replication of DNA, followed by cell division is called cell cycle.

Q.31 What is a disease?

Ans. The departure from normal or steady internal state of homeostasis through structural or functional disorders of the body is called disease.

Q.32 Name some pathogenic diseases.

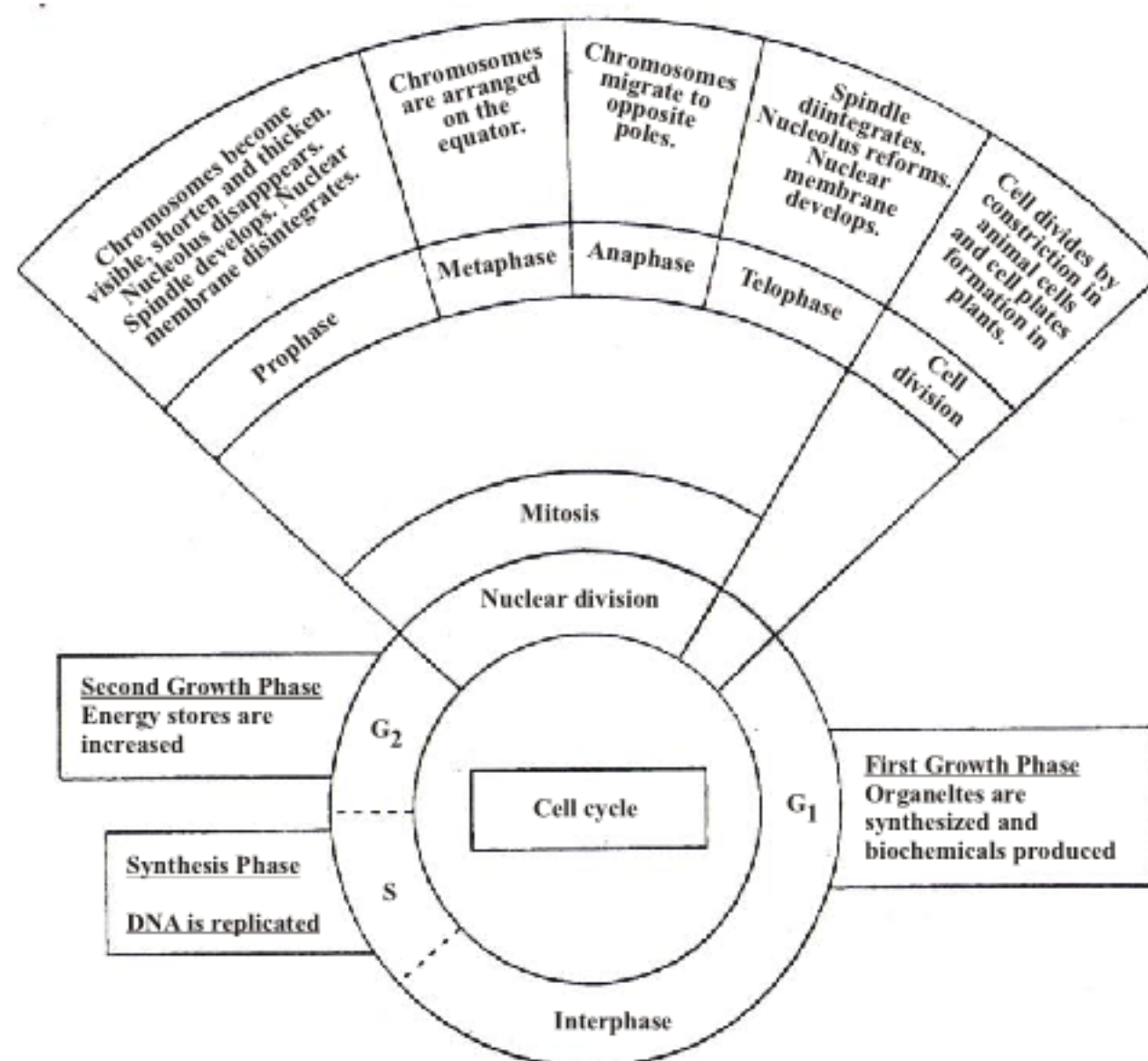
Ans. Diphtheria, Malaria, Small pox, Tuberculosis, Cholera, Gonorrhea and AIDS.

Q.33 What happens during leptotene stage?

Ans. The chromosomes become shorten and thick and become visible. The size of the nucleus increases and homologous chromosomes start getting closer to each other.

Q.34 Give a concept map of cell cycle.

Ans.



The cell cycle

Q.35 Differentiate between plant mitosis and animal mitosis.

Ans.

Plant mitosis	Animal mitosis
(i) <i>No centriole</i> present.	(i) Centrioles present.
(ii) <i>No aster</i> forms.	(ii) Asters formed.
(iii) Cell division involves formation of <i>cell plate</i> .	(iii) Cell division involves <i>furrowing</i> and cleavage of cytoplasm.
(iv) Occurs mainly in <i>meristems</i> .	(iv) Occurs in tissues <i>through out the body</i> .

Q.36 What is the difference between mitosis and meiosis?

Ans. Difference between mitosis and meiosis:

Mitosis	Meiosis
(i) A single division of the chromosomes and the nucleus.	(i) A single division of the chromosomes but a double division of the nucleus.
(ii) The number of chromosomes remains the same.	(ii) The number of chromosomes is halved.

(iii) Homologous chromosomes do not associate.

(iv) Chiasmata are never formed.

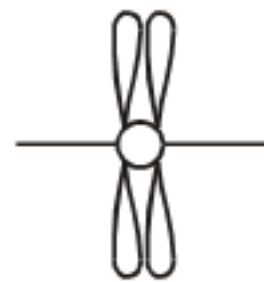
(v) Crossing over never occurs.

(vi) Daughter cells are identical to parent cells (in the absence of mutations).

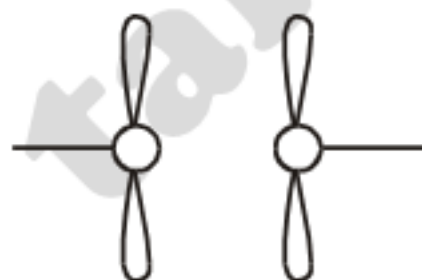
(vii) Two daughter cells are formed.

(viii) Chromosomes shorten and thicken.

(ix) Chromosomes form a single row at the equator of the spindle.



(x) Chromatids move to opposite poles.



(iii) Homologous chromosomes associate to form bivalents in prophase I.

(iv) Chiasmata may be formed.

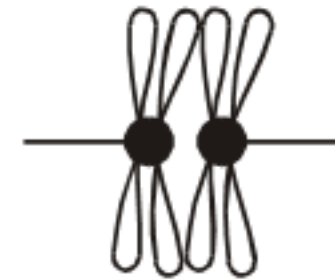
(v) Crossing over may occur.

(vi) Daughter cells are genetically different from parental ones.

(vii) Four daughter cells are formed, although in females only one is usually functional.

(viii) Chromosomes coil but remain longer than in mitosis.

(ix) Chromosomes form a double row at the equator of the spindle during metaphase I.



(x) Chromosomes move to opposite poles during the first meiotic division.

