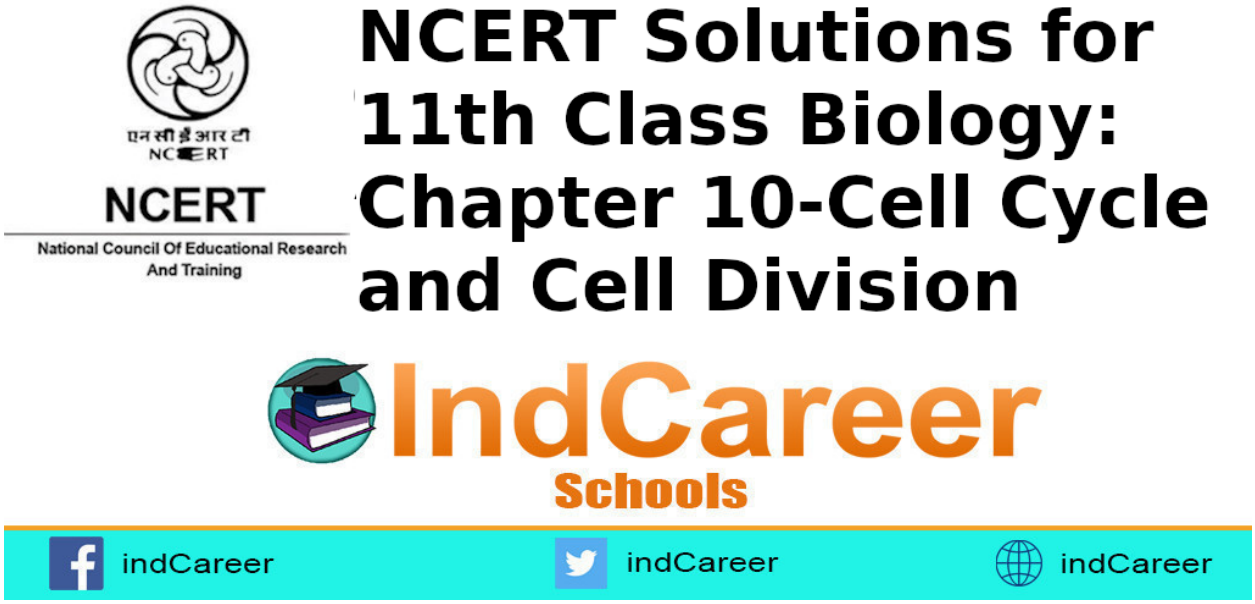

NCERT Solutions for 11th Class Biology: Chapter 10-Cell Cycle and Cell Division

Class 11: Biology Chapter 10 solutions. Complete Class 11 Biology Chapter 10 Notes.

NCERT Solutions for 11th Class Biology: Chapter 10-Cell Cycle and Cell Division

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Exercises

1. What is the average cell cycle span for a mammalian cell?

Answer

The average cell cycle span for a mammalian cell is approximately 24 hours.

2. Distinguish cytokinesis from karyokinesis.

Answer

Cytokinesis	Karyokinesis
Cytokinesis is the biological process involving the division of a cell's cytoplasm during mitosis or meiosis.	Karyokinesis is the biological process involving the division of a cell's nucleus during mitosis or meiosis.
Stages such as prophase, metaphase, anaphase, and telophase are not present in cytokinesis.	It is divided into four stages: prophase, metaphase, anaphase, and telophase

3. Describe the events taking place during interphase.

Answer

The interphase, though called the resting phase, is the time during which the cell is preparing for division by undergoing cell growth and DNA replication. The interphase is-divided into three further phases:

→ G_1 phase - It is the stage during which the cell grows and prepares its DNA for replication. In this phase, the cell is metabolically active.

→ S phase - It is the stage during which DNA synthesis occurs. In this phase, the amount of DNA (per cell) doubles, but the chromosome number remains the same.

→ G_2 phase - In this phase, the cell continues to grow and prepares itself for division. The proteins and RNA required for mitosis are synthesised during this stage.

4. What is G_0(quiescent phase) of cell cycle?

Answer

G_0 or quiescent phase is the stage in which cells are metabolically active but no longer proliferate unless called on to do so depending on the requirement of the organism.

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5. Why is mitosis called equational division?

Answer

During mitosis, the genetic constitution of the daughter cells is identical to that of parent cells. A diploid cell produces four diploid cells. Since, the chromosome number of the daughter cells remains identical to that of the parent cell, it is called as Equational division.

6. Name the stage of cell cycle at which one of the following events occur:

(i) Chromosomes are moved to spindle equator

(ii) Centromere splits and chromatids separate

(iii) Pairing between homologous chromosomes takes place

(iv) Crossing over between homologous chromosomes takes place

Answer

(i) Metaphase

(ii) Anaphase

(iii) Zygotene of meiosis I

(iv) Pachytene of meiosis I

7. Describe the following:

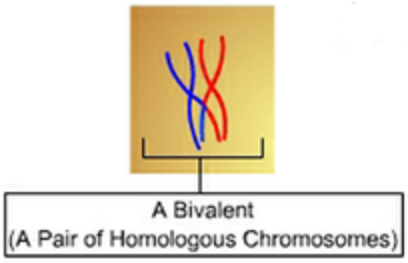
(a) synapsis (b) bivalent (c) chiasmata

Draw a diagram to illustrate your answer.

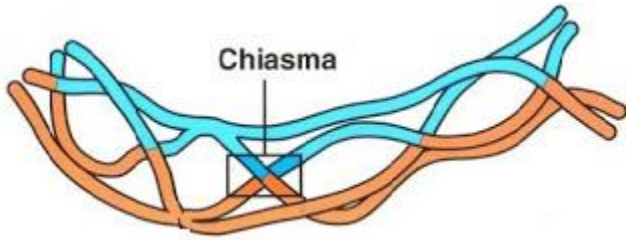
Answer

(i) The pairing of homologous chromosomes is called synapsis. This occurs during the second stage of prophase I or zygotene.

(ii) Bivalent or tetrad is a pair of synapsed homologous chromosomes. They are formed during the zygotene stage of prophase I of meiosis.



(iii) Chiasmata is the site where two non-sister chromatids of homologous chromosomes have crossed over. It represents the site of cross-over. It is formed during the diplotene stage of prophase I of meiosis.



8. How does cytokinesis in plant cells differ from that in animal cells?

Answer

Cytokinesis	Animal Cells
The division of the cytoplasm takes place by cell plate formation.	The division of the cytoplasm takes place by cleavage.
Cell plate formation starts at the centre of the cell and grows outward, toward the lateral	Cleavage starts at the periphery and then moves inward, dividing the cell into

walls. two parts.

9. Find examples where the four daughter cells from meiosis are equal in size and where they are found unequal in size.

Answer

Examples are:

→ During microsporogenesis, four daughter cells formed in flowering plants are equal in size while during megasporogenesis, four daughter cells formed in flowering plants are unequal in size.

→ During Spermatogenesis or the formation of sperms in human beings occurs by the process of meiosis, four daughter cells formed are equal in size while during Oogenesis or the formation of ovum in human beings occurs by the process of meiosis, four daughter cells formed are unequal in size.

10. Distinguish anaphase of mitosis from anaphase I of meiosis.

Answer

Anaphase of mitosis	**Anaphase I of meiosis**
Anaphase is the stage during which the centromere splits and the chromatids separate. The Chromatids move to opposite poles.	The homologous chromosomes separate, while sisterchromatids remain associated at their centromeres

11. List the main differences between mitosis and meiosis.

Answer

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Mitosis	Meiosis
This type of division takes place in somatic cells	This type of division takes place in gametic cells
Two daughter cells are formed	Four daughter cells are formed
Number of chromosomes remains diploid in daughter cells	Number of chromosomes becomes haploid in daughter cells are formed
Mitosis is necessary for growth and repair	Meiosis is necessary for sexual reproduction
Crossing over does not take place	Crossing over takes place

12. What is the significance of meiosis?

Answer

Significance of meiosis are:

→ Conservation of specific chromosome number of each species is achieved across successive generations in sexually reproducing organisms through meiosis.

→ It also increases the genetic variability in the population of organisms from one generation to the next.

13. Discuss with your teacher about

(i) haploid insects and lower plants where cell-division occurs, and

(ii) some haploid cells in higher plants where cell-division does not occur.

Answer

(i) Male bees, wasps and ants are haploid as they are produced from unfertilized eggs.

(ii) Cell division does not happen in synergids and antipodal cells in ovule.

14. Can there be mitosis without DNA replication in S phase?

Answer

No, there cannot be mitosis without DNA replication in S phase because additional DNAs are required for the formation of new cells. DNA duplication is important as it maintains the chromosome number in the daughter cells and hence Mitosis is an equational division. Therefore, the duplication of DNA is an essential step and without it, no mitosis can take place.

15. Can there be DNA replication without cell division?

Answer

DNA replication can take place without cells division as in case of formation of new mitochondria and chloroplasts. During cell division, the parent cell gets divided into two daughter cells. However, if there is a repeated replication of DNA without any cell division, then this DNA will keep accumulating inside the cell. This would increase the volume of the cell nucleus, thereby causing cell expansion.

16. Analyse the events during every stage of cell cycle and notice how the following two parameters change

(i) Number of chromosomes (N) per cell

(ii) Amount of DNA content (C) per cell

Answer

(i) The number of chromosomes (N) remains constant throughout the different stages in mitosis. In meiosis the number of chromosome is reduced to half that is from diploid to haploid. During the anaphase I stage this half number is carried on till the end of meiosis.

(ii) The amount of DNA (C) becomes double during the interphase stage which is followed by mitosis. This doubling occurs due to the replication of the DNA.

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Chapterwise NCERT Solutions for Class 11 Biology:

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- Chapter 20: Locomotion and Movement
- Chapter 21: Neural Control and Coordination
- Chapter 22: Chemical Coordination and Integration

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