

Chapter 12

Overhead notes

I. Underline Theme of Cell Division

- 1.
- 2.
- 3.

II. Cellular Organization of Genetic Material

- Cell division leads to:

-

-

-

Question 12.1

-

II. Cellular Organization of Genetic Material

- Genome =

- Chromatin =

- Chromosomes =

II. Cellular Organization of Genetic Material

- Each species has a characteristic number of chromosomes. (see chart)

Question 12.2

-

II. Cellular Organization of Genetic Material

-

II. Cellular Organization of Genetic Material

- Human genome = ~ 6 billion nucleotides
- 98.4% similarity between chimps and humans
- 99.9% identical DNA between all humans.
~ _____

III. Distribution of Chromosomes during Cell Division

- Duplicated chromosomes:
 -
 -
 -

IV. Phases of the Cell Cycle

- Two main phases:
 1. Interphase (90% of the cycle)
 - A.
 - B.
 - C.
 2. Mitotic Phase (M)
 - A.
 - B.

Question 12.3

-

V. Steps of Mitosis

Prophase
Prometaphase
Metaphase
Anaphase
Telophase

P(PM)MAT

V. Steps of Mitosis

Prophase

1. Chromatin fibers condense into chromosomes.
2. Nucleolus disappears

3. Mitotic spindle formation (contains centrosome and microtubules)
4. Centrosomes migrate to opposite poles.

V. Steps of Mitosis

Prometaphase

1. Nuclear envelope fragments.
2. Kinetochore structures form on chromosomes

3. Microtubules extend
 - **Kinetochore microtubules**
 - **Nonkinetochore microtubules**

V. Steps of Mitosis

Metaphase

1. Centrosomes are located at opposite poles.
2. Chromosomes line up at the metaphase plate (equator)

V. Steps of Mitosis

Anaphase

1. Sister chromatids split, forming unduplicated chromosomes.
2. Kinetochore microtubules shorten
3. Nonkinetochore microtubules contribute to cell elongation by sliding past one another.

V. Steps of Mitosis

Telophase

1. Two nuclear envelopes form
2. Nucleoli reappear
3. Chromosomes decondense

Outcome:

Equal division of one nucleus into two genetically identical nuclei.

Question 12.4

-

VI. Cytokinesis Divides the Cytoplasm

- Cytokinesis Begins at Telophase
- Different in plants and animals
 1. **Animals:**
 -
 -
 2. **Plants:**
 -
 -
 -

VI. Cytokinesis Divides the Cytoplasm

- Outcome: Cytokinesis results in the equal division of one cell into two identical cells.

VII. Cell Cycle Control

- Cells must pass the G1 checkpoint in order to enter S phase.

-

-

VII. Cell Cycle Control

-

VIII. Normal Cells vs. Cancer Cells

- Normal cells:

-

-

-

- Cancer Cells:

-

-

-
