

Cell and nuclear division

What happens in cell division?

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How does cytokinesis happen in an animal cell?

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How does cytokinesis happen in a plant cell?

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Name two examples of unequal cytokinesis.

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Why must the nucleus divide before the cell divides?

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Mitosis vs meiosis: effect on chromosome number?

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What does a chromosome consist of after DNA replication?

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How are chromosomes condensed and moved?

A ring of contractile actin and myosin proteins pinches the cell membrane inwards until the cytoplasm is split.

A parent (mother) cell divides to produce two daughter cells.

Oogenesis in humans (polar bodies are tiny) and budding in yeast.

Vesicles gather at the equator and assemble sections of new cell membrane and cell wall across the cell.

Mitosis maintains the chromosome number and genome; meiosis halves the chromosome number and generates genetic diversity.

To avoid producing anucleate cells (cells with no nucleus).

DNA supercoils around histones to condense; spindle microtubules and microtubule motor proteins move the chromosomes.

Two elongated DNA molecules (sister chromatids) held together until anaphase.

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Phases of mitosis in order?

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Why are the nuclei produced by mitosis genetically identical?

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How do you recognise metaphase in a micrograph?

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Diploid vs haploid?

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The two rounds of segregation in meiosis?

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What is non-disjunction, and an example?

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Two ways meiosis generates genetic diversity?

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Three uses of cell proliferation, with examples?

Replication makes exact copies of each chromosome, and one chromatid of every chromosome goes to each pole in anaphase.

Prophase, metaphase, anaphase, telophase.

Diploid ($2n$): two of each type of chromosome. Haploid (n): one of each type of chromosome.

Chromosomes lined up across the equator (middle) of the cell, with no nuclear membrane.

Failure of homologous chromosomes or sister chromatids to separate in meiosis. Example: trisomy 21, Down syndrome.

Meiosis I: homologous chromosomes separate. Meiosis II: sister chromatids separate. Result: four haploid nuclei.

Growth (plant meristems, early embryos), cell replacement (skin) and tissue repair (wound healing in skin).

Crossing over between non-sister chromatids (prophase I) and random orientation of bivalents (metaphase I).

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Stages of the cell cycle in order?

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What happens to cell growth in interphase?

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How do cyclins control the cell cycle?

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Proto-oncogene vs tumour suppressor gene mutation?

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Benign vs malignant tumour?

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Primary vs secondary tumour?

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Mitotic index formula?

Metabolically active: biosynthesis of proteins and DNA; mitochondria and chloroplasts grow and divide.

Interphase (G1, S, G2), then mitosis, then cytokinesis.

Proto-oncogene mutates to an oncogene that stimulates division constantly; tumour suppressor gene loses its function of slowing division.

Concentrations of different cyclins rise and fall; a threshold level of a specific cyclin is needed to pass each checkpoint.

Primary: where the tumour first forms.
Secondary: formed elsewhere by cells that spread (metastasis).

Benign: slow, stays in place, not cancer.
Malignant: fast, invades neighbouring tissue, metastasises, causes cancer.

Number of cells in mitosis $\div$ total number of cells observed.