

Cell division, variation and evolution

What does mitosis produce?

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When does mitosis occur?

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What does meiosis produce?

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How does random fertilisation cause variation?

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Diploid and haploid numbers of chromosomes in humans

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What causes variation within a species?

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Give an example of environmental variation.

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What is a mutation?

During growth, repair, cloning and asexual reproduction.

Two cells with identical sets of chromosomes, genetically identical to the parent cell.

Gametes are genetically different and any sperm can fuse with any egg, so offspring have different combinations of alleles.

Four genetically different haploid gametes, each with half the number of chromosomes.

Genetic differences, environmental differences, or a combination of both.

Diploid is 46. Haploid is 23.

A rare, random change in genetic material that can be inherited.

A scar, or body mass affected by diet, or plant height affected by light.

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How can a mutation change the phenotype?

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What effect do most mutations have on the phenotype?

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What increases the rate of mutation?

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Outline Darwin's theory of natural selection.

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What does evolution mean?

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How does antibiotic resistance increase in bacteria?

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Why are infections with resistant bacteria difficult to control?

Most have no effect, some have a small effect and rarely one has a significant effect.

It changes the DNA base sequence, so the amino acid sequence of the protein changes, altering its shape and function.

Variation exists; the better adapted survive and reproduce; they pass on their alleles; the proportion with those alleles rises over generations.

Ionising radiation (gamma rays, X-rays, UV rays) and chemical mutagens such as chemicals in tobacco.

A mutation gives resistance. The antibiotic kills non-resistant bacteria, the resistant ones survive, reproduce and pass on the allele.

A change in the inherited characteristics of a population over many generations.

The antibiotic no longer kills the bacteria, so the infection persists and can spread.