AQA Biology A-level

4.3 - Genetic diversity can arise as a result of mutation or during meiosis

Flashcards

What is a mutation?

What is a mutation?

An alteration to the DNA base sequence.

Often arise spontaneously during DNA replication.

Why might a mutation **not** lead to change in the amino acid sequence?

Why might a mutation **not** lead to change in the amino acid sequence?

- Genetic code is degenerate so mutation may end up coding for same amino acid as the original triplet.
- Mutation may occur in intron.

What is a substitution mutation?

What is a substitution mutation?

When a nucleotide in the DNA sequence is replaced by another. This is more likely to be a quiet mutation, meaning no change occurs in the amino acid sequence.

What is a deletion mutation?

What is a deletion mutation?

When a nucleotide in the DNA sequence is lost. This is more likely to be harmful and significant, as it leads to a frame shift which means the entire amino acid sequence will be different.

What is a mutagenic agent? Give examples of this.

What is a mutagenic agent? Give examples of this.

Factors that increase the rate of gene mutation. X-rays, UV light, gamma rays, certain chemicals e.g. in alcohol and tobacco.

What is a polyploidy chromosome mutation?

What is a polyploidy chromosome mutation?

Where an individual has three or more sets of chromosomes instead of two.

What is chromosome non-disjunction?

What is chromosome non-disjunction?

When chromosomes fail to separate correctly in meiosis, resulting in gametes with one more or less chromosome than normal.

What is meiosis?

What is meiosis?

A form of cell division that produces four genetically different haploid cells (cells with half the number of chromosomes found in the parent cell) known as gametes.

How does meiosis differ from mitosis?

How does meiosis differ from mitosis?

- Meiosis produces four genetically different cells with half the number of chromosomes as the parent cells.
- Mitosis produces two genetically identical cells with the same number of chromosomes as the parent cells.

What happens during meiosis I?

What happens during meiosis I?

1. Homologous chromosomes pair to form bivalents.
2. Crossing over (exchange of sections of genetic material) occurs at chiasmata.
3. Cell divides into two. Homologous chromosomes separate randomly. Each cell contains either maternal or paternal copy.

What happens during meiosis II?

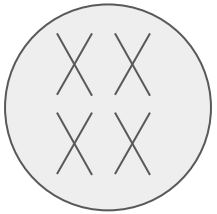
What happens during meiosis Ⅱ?

1. Independent segregation of sister chromatids.
2. Each cell divides again, producing 4 haploid cells.

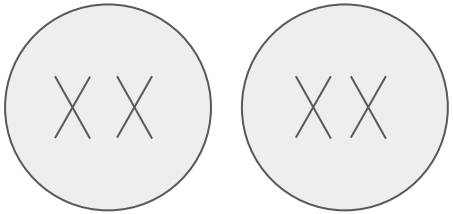
Draw diagrams to show cells after each stage of meiosis.

Draw diagrams to show cell contents after each stage of meiosis.

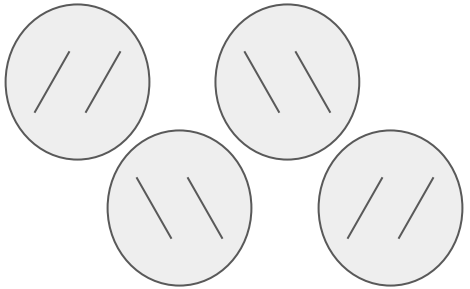
Parent cell



After meiosis 1



After meiosis 2



In which two ways does meiosis produce genetic variation?

Give 2 ways meiosis produces genetic variation?

1. Crossing over during meiosis I
2. Independent assortment (random segregation) of homologous chromosomes & sister chromatids

Result in new combinations of alleles.