

Edexcel (A) Biology A-level

5.17 to 5.19 - Natural Selection, Evolution and Speciation

Flashcards



What is a mutation?



What is a mutation?

An alteration to the DNA base sequence.
Often arise spontaneously during DNA replication.



What is evolution?



What is evolution?

Change in allele frequency in gene pool of a population. Results in development of new dominant characteristics.



How does natural selection lead to evolution?



How does natural selection lead to evolution?

- Random mutations result in new alleles.
- Some alleles provide an advantage, making an individual more likely to survive and reproduce.
- Offspring receive the new allele & frequency increases over many generations. Frequency of unfavourable alleles decreases.



Why does natural selection occur?



Why does natural selection occur?

1. Predation
2. Disease
3. Competition

All resulting in differential survival and reproduction.



Define speciation.



Define speciation.

When a population is split and reproductively isolated, there are different selective pressures on the two groups. If the genetic makeup changes to the extent the two groups can no longer interbreed, they have become separate species.



What is meant by allopatric speciation?



What is meant by allopatric speciation?

Speciation resulting from a physical barrier e.g. river, mountain range. The environments occupied by the two groups are different, and therefore different alleles are favoured.



What is meant by sympatric speciation?



What is meant by sympatric speciation?

Speciation resulting from a non-physical barrier e.g. a mutation that no longer allows two organisms to produce fertile offspring. Any changes in anatomy or behaviour may also prevent breeding.



How does the scientific community
validate new evidence?



How does the scientific community validate new evidence?

- Findings are submitted for peer review & published in journals to check validity of data & conclusions.
- Findings are discussed with other experts at conferences.



How can we analyse evolutionary relationships on a molecular level?



How can we analyse evolutionary relationships on a molecular level?

Genomics: gel electrophoresis, DNA sequencing, bioinformatics.

Proteomics: analysis of amino acid sequence.



How do proteomics and genomics support the theory of evolution?



How do proteomics and genomics support the theory of evolution?

Universal genetic code. DNA base sequence of many proteins e.g. cytochrome c is similar for many organisms. Species with fewer differences in base sequence have more homologous characteristics. Suggests diversion from common ancestors.

