

Basic Genetics

Four basic molecules of life

Nucleic acids, proteins, lipids, carbohydrates

Genes are DNA sequences that encode information to make specific RNA or protein

DNA codes for proteins, either stops there or proteins create next product

Proteins are "gene product"

Order of nucleotides in a gene is specific to a product

ATGC in DNA

Transcription-DNA sequence is transcribed into an RNA copy of the DNA sequence

Translation- the RNA sequence is decoded by the ribosome to produce the appropriate protein

Mutations change the DNA sequence of a gene forming new alleles

Different alleles can result in the production of variant forms of the encoded protein

Genotype vs phenotype

Genotype is what the DNA says

Phenotype is what is expressed

Genotype determines how well adapted an individual is to their environment

Phenotype directly interacts with the environment

How well adapted an individual is to its environment depends on its phenotype but phenotype is determined by genotype

Alleles that provide an advantage in a particular environment will become more common in that environment

HbS allele is much more common in humans who live in areas with high malaria infection rates

Diploid organisms have two copies of each gene

One allele of each gene is inherited from the mother and the other from the father

Meiosis results in production of haploid gametes

Diploid has two alleles of each gene

Haploid has one allele of each gene

Fertilization results in a new diploid organism

Sexual reproduction results in variation

New combinations of alleles in every offspring

Natural selection is the process of competition and unequal reproduction of offspring

Variation in phenotype

Environmental - fed vs starved

Genetic-mutation

Evolution: change over time

Individuals do not evolve

Mutation is the source of new alleles and variation

Selection favors reproductive success of better adapted variants