WJEC (Eduqas) Biology A-level

Topic 2.5 - Inheritance

Definitions and Concepts

Allele - A version of a gene.

Autosomal linkage - When two or more genes are positioned on the same autosome. They are unlikely to be separated by crossing over during meiosis so are often inherited together.

Autosome - A chromosome that is not an X or Y chromosome.

Carcinogen - A type of mutagen that causes cancer.

Chi-squared (X^2) test - A statistical test used to determine whether a pattern of inheritance is statistically significant.

Chromosome mutation - A change in the structure or number of chromosomes. This affects many genes.

Codominance - When both alleles for a gene in a heterozygous organism equally contribute to the phenotype.

Degrees of freedom (X^2 test) - The number of categories minus one.

Dihybrid mendelian inheritance - The determination of a trait by the inheritance of two genes.

Dominant - Describes an allele that is always expressed. Represented by a capital letter.

Down's syndrome - A genetic disorder characterised by delayed development and learning disabilities. Due to non-disjunction, an affected individual possesses three copies of chromosome 21.

Duchenne muscular dystrophy (DMD) - An X-linked recessive condition characterised by muscle degeneration and weakness. It is more common among males because they only inherit one X chromosome.

Epigenetics - The study of changes in gene expression that are not due to alterations in the nucleotide base sequence of DNA.

F_1 generation - The first generation of offspring resulting from the cross of two individuals in the parental generation.

F_2 generation - The second generation of offspring resulting from the cross of two individuals in the F_1 generation.

Gene - A length of DNA on a chromosome that codes for the production of one or more polypeptide chains and functional RNA.

Gene mutation - A change to at least one nucleotide base in DNA or the arrangement of bases. Gene mutations can occur spontaneously during DNA replication and may be beneficial, damaging, or neutral.

Genotype - An organism's genetic composition. Describes all alleles.

Haemophilia - An X-linked recessive condition that results in excessive bleeding and blood that is slow to clot. It is more common among males because they only inherit one X chromosome.

Heterozygous - When someone has two different alleles of a gene e.g. Ff.

Histone modification - The alteration of histones by the addition of methyl, acetyl or phosphate groups. This can increase or decrease gene expression by making the histone more or less accessible to transcription factors.

Homozygous - When someone has two identical alleles of a gene e.g. ff.

Locus - The position of a gene on a chromosome.

Methylation - The transfer of methyl groups to cytosine bases of DNA. Methylation inhibits transcription by making the DNA less accessible to transcriptional factors or preventing transcriptional factors from binding. This deactivates the gene.

Monohybrid mendelian inheritance - The determination of a trait by the inheritance of a single gene.

Mutagen - A chemical, biological or physical agent that increases the rate of gene mutations above normal level.

Non-disjunction - The failure of homologous chromosomes to separate in anaphase I or sister chromatids to separate in anaphase II, resulting in a change in the diploid number of chromosomes.

Oncogene - Mutations of proto-oncogenes that are activated continuously, resulting in uncontrolled cell division.

Phenotype - An organism's observable characteristics. Due to interactions of the genotype and the environment.

Recessive - Describes an allele that is only expressed in the absence of a dominant allele. Represented by a small letter.

Sex chromosome - A chromosome that determines the sex of an organism, e.g. X and Y chromosomes in humans and other mammals.

Sex-linkage - Genes which are usually inherited together on the same sex chromosome (on either the X or Y chromosome in animals) and so expression is sex-dependant. This is often due to many gene loci on the X chromosome having no counterpart on the Y chromosome.

Sickle cell anaemia - A recessive genetic disorder caused by a substitution mutation on chromosome 11. This results in abnormal haemoglobin which distorts red blood cells.