Definitions and Concepts for Edexcel Biology IGCSE

Topic 3: Reproduction and Inheritance

Definitions marked by '' are for separate sciences only*

Reproduction

Amniotic fluid - The fluid that surrounds and protects the embryo in the uterus.

Asexual reproduction - A form of reproduction involving a single parent. It creates genetically identical offspring.

Cuttings - The simplest method of cloning plants. A branch is cut from a parent plant and replanted in compost after removing the lower leaves.

Embryo - An unborn organism in an early stage of development.

Fertilisation - The fusion of the nucleus of male and female gametes. It restores the full chromosome number.

***Follicle-Stimulating Hormone (FSH)** - A hormone produced by the pituitary gland that stimulates the growth of follicles in the ovary and the secretion of oestrogen.

Gametes - Sex cells (sperm and egg cells) with half the usual number of chromosomes.

***Luteinising Hormone (LH)** - A hormone secreted by the pituitary gland that initiates ovulation (the release of an egg from the ovary).

Menstrual cycle - The monthly cycle in women that involves the development of the uterus lining, ovulation, maintenance of the uterus lining and its shedding.

Oestrogen - The main female reproductive hormone released by the ovaries that causes the growth and repair of the uterus lining. Oestrogen is also responsible for the development of secondary sexual characteristics in females.

Placenta - A temporary organ attached to the lining of the uterus during pregnancy that provides nutrients to the developing embryo.

Pollination - The transfer of pollen grains (either by the wind or insects) from the male part of a plant to a female part, enabling fertilisation.

Progesterone - A hormone produced in the ovaries and placenta that maintains the uterus lining.

Secondary sexual characteristics - Features that appear during puberty and differ between males and females e.g. voice changes, development of breasts, facial hair.

Sexual reproduction - A form of reproduction involving the fusion of male and female gametes. It creates genetic variation.

Testosterone - The main male reproductive hormone produced by the testes. It stimulates the production of sperm and is responsible for the development of male secondary sexual characteristics.

Zygote - A fertilised egg.

Inheritance

Allele - A version of a gene. Alleles cause differences in inherited characteristics e.g. eye colour.

***Anticodon** - Part of a tRNA molecule that is complementary to the codon on a corresponding molecule of mRNA.

Chromosome - A long, coiled molecule of DNA that carries genetic information in the form of genes.

***Codominance** - When two different alleles are both expressed in the phenotype.

***Codon** - A sequence of three bases on the mRNA molecule. Each codon corresponds to a particular amino acid.

***Complementary base pairing** - Describe how the bases in nucleic acids pair. Adenine always pairs with thymine. Cytosine always pairs with guanine.

Diploid - Refers to a cell that contains two sets of chromosomes i.e. almost every body cell except gametes. A diploid human cell contains 46 chromosomes.

***DNA** - A double-stranded polymer wound to form a double helix that carries the genetic code. Each polymer strand contains long sequences of four bases: adenine (A), cytosine (C), guanine (G) and thymine (T).

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

Evolution - The gradual change in the inherited traits within a population over time. Occurs due to natural selection.

Gene - A section of DNA that codes for a specific sequence of amino acids which undergo polymerisation to form a protein.

Genome - The complete genetic material of an organism.

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

Haploid - Refers to a cell that contains one set of chromosomes i.e. a gamete. Human gametes have 23 chromosomes.

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

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

Meiosis - A form of cell division that produces gametes, non-identical cells with half the usual number of chromosomes.

Mitosis - A form of cell division that produces two genetically identical daughter cells (with a full set of chromosomes) from one parent cell. Mitosis is involved in repair, growth, cloning and asexual reproduction.

Monohybrid cross - A cross between two organisms (homozygous for a given trait but each possessing different alleles) that is used to investigate the inheritance of one gene.

***mRNA** - A molecule of RNA that has a complementary sequence to that of a specific DNA molecule. The mRNA molecule is formed in the nucleus. It leaves and moves to the ribosomes in the cytoplasm.

***Mutagens** - Chemicals that increase the frequency of mutations in DNA e.g. tobacco smoke.

Mutation - A random change in DNA which may result in genetic variants.

Natural selection - The process by which the frequency of advantageous traits passed on in genes gradually increases in a population over time.

Nucleus - An organelle found in most eukaryotic cells that contains the genetic material of the cell and controls the activities of the cell.

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

***Protein synthesis** - The formation of a protein from a gene.

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

***Ribosome** - Organelles that are the site of translation during protein synthesis.

***RNA** - A single-stranded polymer that contains the same bases as DNA, except that

thymine (T) is replaced with uracil (U).

Sex chromosomes - A pair of chromosomes that determines the sex of an individual. XX in human females and XY in human males.

Sexual reproduction - A form of reproduction involving the fusion of male and female gametes. It creates genetic variation.

***Transcription** - The first stage of protein synthesis in which an mRNA molecule is synthesised in the nucleus. It is complementary to a particular sequence of DNA.

***Translation** - The second phase of protein synthesis that takes place in the ribosomes. mRNA is used as a template for the attachment of tRNA molecules with complementary anticodons. The amino acids carried on adjacent tRNA molecules are joined to form a protein.

***tRNA** - A form of RNA that carries specific amino acids to the ribosomes for translation.

Variation - The differences between individuals due to genes, the environment or a combination of both.