Cells

Cells are the basic units of all living things including human beings. Cells aren't all exactly the same in shape but their structure is similar. New cells are produced from existing cells.

All human cells contain:

Cell membrane (Gate of the cell) - Holds and filters everything in and out of the cell

Cytoplasm (Area of movement) - Watery gel-like material that holds everything in place

Mitochondria (Powerhouse of the cell) - Produces the energy for the cell

Nucleus (Control center of the cell) - Regulates and controls the cell

Nuclear membrane (Gate of the nucleus) like the cell membrane, it protects and filters the nucleus.

Chromosomes (Director of the cell) - Directs activity of the cell

Cell division

Mitosis Cells divide by the process of mitosis for growth and to replace worn out or injured cells. Mitosis produces two Genetically identical daughter cells to the parent cell so that the same cell functions and processes can continue.

Meiosis Meiosis is a special type of cell division that occurs in the sex organs to produce male and female gametes which are Genetically different

Gametes Human - sperm (male) egg (female) Plants - pollen and ovule Human body cells (somatic cells) contains 46 chromosomes. This is known as the Diploid number. Gametes produced in meiosis have half the diploid number of chromosomes known as the Haploid number. When the ovum and sperm fuse in fertilisation, the diploid number of chromosomes is restored in the zygote. If cells didn't divide you wouldn't grow. Mitosis makes identical cells.

DNA

Chromosomes and their genes are made up of a molecule called DNA. Each chromosome is a very long section of tightly coiled DNA. DNA molecules create the code that controls what your cells are and what they do.

DNA is made up of nucleotides. Each nucleotide contains: a nitrogen base, a deoxyribose sugar and a phosphate group. The nucleotides are arranged in a way that gives the DNA it's characteristic double helix shape, which looks like a twisted ladder.

Base pairs hold the strands of the DNA helix together. Each different nucleotide has a letter, either A, T, C, or G, which is determined by the nitrogen base it has.

A = Adenine C = Thymine T = Cytosine G = Guanine

A always pairs with T. You can remember this because the straight letters go together. C always pairs with G. You can remember this because the curved letters go together.

DNA codes for amino acids which create proteins

Proteins are long molecules made from chemical units called amino acids. The code for the amino acids in from the genetic code, these amino acids come together to create the protein. Genes contain the instructions to make the proteins. Each amino acid is coded for by its on special sequence of threes bases called a triplet.

Dominant and recessive

The **dominant** allele is always expressed in the phenotype when present in the genotype, it masks the presence of the recessive allele.

The **recessive** allele is only expressed in the phenotype when both alleles in the genotype are recessive.

Two dominant - dominant expressed One dominant and one recessive - dominant expressed Two recessive - recessive expressed

Alleles

Alleles are the different forms of a gene. For each characteristic you have two alleles. One from your biological father and one from your biological mother.

Genotype The set of genetics of a person. The entire genetic makeup of a person, specifically the combination of the alleles from your parents. The phenotype is the expression of the genotype.

Phenotype The phenotype is a set of characteristics that you can see of a person. They are formed by the genotype and the environment.

Homozygous This is where two of the same allele are in the genotype for a particular gene. This is for both dominant and recessive genes.

Heterozygous Where two different alleles are present in the genotype for a particular gene. One is dominant and one is recessive.

Protein

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Proteins have many different uses in our bodies. They repair and grow things like hair and nails

Chromosomes

Inside the nucleus are chromosomes. Chromosomes are long sections of DNA (Deoxyribonucleic acid).

Specific sections of DNA that give instructions for a specific trait are called genes.

Different species have different numbers of chromosomes. Humans have 46. We receive 23 from each of our parents, which are carried by the egg and sperm.

A **karyotype** is an image of all the chromosomes in a cell