1 Cells

1.1 Cell structure and function

An animal cell is composed of the following organelles:

1. Cell membrane: A **partially permeable** membrane that lets certain substances but not others. It seperates the contents of the cell from its surroundings.

2. Cytoplasm: A clear jelly-like substance, composed of mainly water and dissolved substancese (proteins). **Metabolic reactions**, which are chemical reactions of life take place in the cytoplasm.

3. Nucleus: The site of storage of genetic information, kept on **chromosomes** which are made of **DNA** (deoxyribonucleic acid).

4. Mitochondria: Mitochondria are the site of **aerobic respiration**, the process through which energy is released from glucose.

5. Ribosomes: The site of protein manufacture. They do so by reading the instructions off of DNA, linking chains of amino acids, forming proteins.

6. Vesicles or small vacuoles: Small membrane bound organelle containing certain solutions.

A plant cell is composed of the following organelle:

1. Cell membrane: A **partially permeable** membrane that lets certain substances but not others. It seperates the contents of the cell from its surroundings.

2. Cell wall: A stiff protective fibrous wall, made of **cellulose**. It is **fully permeable**.

3. Cytoplasm: A clear jelly-like substance, composed of mainly water and dissolved substancese (proteins). **Metabolic reactions**, which are chemical reactions of life take place in the cytoplasm.

4. Nucleus: The site of storage of genetic information, kept on **chromosomes** which are made of **DNA** (deoxyribonucleic acid).

5. Chloroplast: Membrane-bound organelle consisting of green coloured pigment **chlorophyll**. Chlorophyll absorbs energy from sunlight, which is then used for photosynthesis. They often contain starch grains.

6. Mitochondria: Mitochondria are the site of **aerobic respiration**, the process through which energy is released from glucose.

7. Ribosome: The site of protein manufacture. They do so by reading the instructions off of DNA, linking chains of amino acids, forming proteins.

8. Vacuoles: A large **cell sap** filled membrane bound organelle.

1.2 Specialised cells, tissues and organs

Large organisms need to perform specific functions, to do so they need specific cells, such cells are called **specialised cells**.

Examples and details are listed:

- Ciliated cell: These line the trachea and the bronchci. They continuously beat upward to push up bacteria or dust particles that becocme trapped in them to prevent lung blockage.

- Neurone: They are part of the nervous system. These are of three types: sensory, relay and motor. Each is composed of two fibrous parts: dendrites (attached to the cell body) and the axon. Dendrites pick up nerve impulses, electrical signals from nearby neurones, which is passed along the cell body and the axon to possibly another neurone.

- Red blood cell: These are found in the mammalian blood. They consist of the red pigmented susbtanes **haemoglobin** which itself is a protein containing iron. Haemoglobin combines

with oxygen to form **oxyhaemoglobin**. It is through oxyhaemoglobin that oxygen is transported across the body. They lack nuclei and mitochondria, this is so to maximise space oxygen storage. They have a **biconcave** shape, to maximise surface area to volume ratio. They are small in size so that they can squeeze easily through capillaries. They are produced in very large numbers to maximise oxygen transport capabilities of the body.

- Sperm cell: The male human gamete. It is composed of three parts.