2.4 Tissue Culture

**Tissue culture**: a method for growing individual cells in a container of sterile nutrient medium to which hormones and growth substances may have been added.

The tissue sample is removed from a plant or animal and grown in glassware (in vitro) or in a bioreactor.

Growth is by mitosis and produces a cluster of identical offspring - a clone.

**Conditions necessary for Tissue growth**
- Oxygen
- Nutrients
- Growth factors and hormones
- Correct pH
- Optimum temperature
- Sterile conditions
- Freedom from competition

**Tissue Culture – Animals**

Human cells tend to grow in single layered sheets rather than clumps. Progress has been made in growing skin cells to replace burnt skin. Bone tissue and cartilage are grown for use in reconstructive surgery.

Some success in growing large quantities of cells that produce a specific chemical e.g. insulin producing cells.

- Find gene responsible for making a particular protein.
- Insert this gene into a bacterium.
- Very easy to grow large quantities of this transformed bacteria that will produce the protein.
- This process easier than trying to grow the original cells.

**Applications of tissue cultures**

**Virus reproduction**
- HeLa cells (Henrietta Lacks) used to grow and investigate viruses.

**Note**: The HeLa cell line was derived for use in cancer research. These cells proliferate rapidly. All HeLa cells are descended from a biopsy taken from the same tumour cells of a visible lesion on the cervix of Mrs. Lacks as part of the diagnosis of her cancer.

**Micro propagation of plants**
- Produces exact copies
- Quickly produces mature plants
- Doesn’t need pollinators or seeds
- Producing plants that are disease resistant and virus free

**Growing human tissue for organ transplants**
- Skin cells
- Liver cell
- Pancreas cells

**Producing biotechnology products**
- Insulin
- Interferon
- Pregnancy testing kits
- Drug testing kits
- Cancer testing kits