CELLS

Discovery of the microscope has lead to an understanding of life based on cells.

Cell Theory:

1. all living things are made from cells
2. cells are the fundamental unit of structure and function for all living things
3. the activity of a living thing depends on the activity of its cells
4. all cells come from previously existing cells

Prokaryotic vs Eukaryotic Cells:

Prokaryotic Cells are simple cells (bacteria). Evolved first on planet earth. Eukaryotic cells contain membrane bound organelles, in particular a nucleus (all plants and animals). These cells evolved from prokaryotic cells are much more specialized.

Plant vs Animal

Plants	Animals
nucleus	nucleus
cytoplasm	cytoplasm
cell membrane	cell membrane
cell wall	
mitochondria*	mitochondria*
chloroplasts**	

*mitochondria – release chemical energy

**chloroplasts – make chemical energy

Cell Structure (Basic):

Nucleus: – control centre, ``brain``, selectively reads and carries out instructions encoded in the DNA

Cytoplasm: – basic cell jelly, place for cell activities and organelles

Cell Membrane: – flexible outer layer, holds the cell together, regulates flow of material in and out of the cell (semi-permeable membrane)

Cell Wall: – tough rigid structure produced in plants only that is outside of the

cell membrane. Non-living, made of cellulose (wood). Provides structure.

Nucleus In Detail:

- control centre of cell
- reads instructions found encoded in DNA (deoxyribonucleic acid)
- chromosomes ➜ chromatin ➜ genes ➜ DNA
- held together by a porous nuclear membrane
- contains nucleoli (singular is nucleolus), a small structure that reads DNA and helps to translate the information into proteins

Cell Organelles:

- small structures found in the cytoplasm, not discovered until the electron microscope became available

  Vacuoles: storage and regulation of food, water and waste

  Lysosomes: like a vacuole except it also contains strong digestive enzymes (cell stomach) – thicker wall than a vacuole

  Mitochondria: double walled complex structure able to transform food energy (glucose) to usable cell energy (ATP), power house of the

cell

Chloroplasts: found in plants and photosynthetic bacteria only, contain chlorophyll, convert solar energy to stored food energy (glucose)

Endoplasmic Reticulum: a series of canal like structures that aid in transportation throughout the cell, an attachment site for ribosomes

Ribosomes: attach to endoplasmic reticulum or are free floating in the cytoplasm, receive instructions from the DNA via the nucleolus and use these instructions to build proteins

Golgi Bodies: collect and package useful materials for export outside of the cell