Eukaryotes and Prokaryotes

Eukaryotic cells	from eukaryotes that have a cell membrane, ctyoplasm, and genetic material enclosed in a nucleus
Prokar-yotic cells	from prokaryotic organisms have a cytoplasm surrounded by a cell membrane,. a cell wall Mat does not contain cellulose genetic material is a DNA loop that is free in the cytoplasm end not enclosed by a nucleus. Sometimes there are one or more small rings of DNA called plasmids.

Cell Specialisation in Animal Cells Key points

As an organism develops, cells differentiate to form different types of cells.

As an animal cell differentiates to form a specialised cell it acquires different sub-ce-llular structures to enable it to carry Out a certain function.

Examples of specialised animal cells are nerve cells, muscle cells, and sperm cells

Animal cells may be specialised to function within a tissue. an organ. organ systems. or whole organisms.

Cell specialisation in Animal cells - detailed

Nerve Cells	carry electrical impulses
Muscle Cells	contract and relax + striated muscle cells work together
Sperm Cells	has genetic info from male + get to egg

with adaptations

Nerve Cells	1)Long axon that carries nerve impulses 2) lots of dendrites to make connections 3)synapse passes impulses using special transmitter chemicals

with adaptations (cont)

Muscle Cells	1)Special sliding proteins making fibres contract 2)contain mitoch-ondria required for chemical reactions 3)stores glycogen-used by mitochondria to transfer energy
Sperm Cells	1)Long tail for movement 2)middle section has mitoch-ondria (energy) for the tail to work 3)Acrosome has digestive enzymes for breaking egg's outer-shell 4)Large nucleus with genetic info

Cloning Plants

In the right conditions, a plant cell will become unspecialised and will undergo mitosis many times. Each of these undiff-erentiated, recently made ells will produce more cells by mitosis.

In different conditions, these will then differ-entiate to form tissues such as xylem, phloem, and root hair cells that are needed to form a small new plant. This new plant will be identical to the original parent.

It's difficult to clone animals because most animal cells differentiate permanently early in embryo development and the cells cannot change back.

Animal and Plant cells

Key Points	Animal cell features common to all cells — a nucleus, cytoplasm, cell membrane, mitochondria, and ribosomes.
	Plant and algal cells contain all the structures seen in animal cells as well as a cellulose cell wall. Many plant cells also contain chloro-plasts and a permanent vacuole filled with sap.

Cell Specialisation in Plant cells Key points

Plant cells may be specialised to carry out a particular function.

Examples of specialised plant cells are root hair cells, photosynthetic cells, xylem cells, and phloem cells

Plant cells may be specialised to function within tissues, organs, organ systems, or whole organisms.

Cell Specialisation in Plant cells detailed

Root hair cells	takes up water and mineral ions
Xylem cells	is non-living and carries water from roots to leaves and shoots
Phloem cells	is living and carries dissolved food both ways

with adaptations

Root hair cells	1)Large surface area for water absorption 2)Large permanent vacuole to speed up water movement by osmosis 3)Many mitochondria (energy) for active transport
Xylem cells	1)Are initially alive but lignin forms and cells die, forming long hollow tubes 2)The spirals of lignin make tubes strong
Phloem cells	1)Cell walls break down to form sieve plates to allow water carrying dissolved food move 2)Supported by companion cells bcos internal structures and mitochondria in CC transfer energy

Cell differentiation in Animal cells

In the early stages of animal and plant embryos, the cells are unspecialised. Any cell (stem cells) can become any cell required.

By birth, most cells are specialised to carry out a specific job, such as nerve cells, skin cells, or muscle cells. They have then been differentiated.

Most specialised cells can divide by mitosis, but only form the same type of cell (e.g Muscle cells divide to produce more muscle cells).

However, some differentiated cells such as RBC or skin cells cannot divide and so adult stem cells replace dead or damaged cells. (Nerve cells are not usually replaced)

Organelles and functions

nucleus	controls all the activities of the cell and is surrounded by the nuclear membrane. Contains genes on chromosomes with instructions for making proteins needed for new cells/organisms
cytoplasm	liquid gel in which the organelles are suspended and where most of the chemical reactions needed for life take place
cell membrane	regulates what enters and leaves the cell e.g glucose and mineral ions (in)
mitoch-ondria	structures in the cytoplasm where aerobic respiration takes place, releasing energy for the cell
ribosomes	where protein synthesis takes place, making all the proteins needed in the cell
cell wall	is made of cellulose and strengthens the cell and gives it support

Organelles and functions (cont)

chloroplast	where photosynthesis takes place. It contains chlorophyll - the green pigment in plants which absorbs the light
permanent vacuole	the space in the cytoplasm filled with cell sap. The vacuole also provides the cell with structural support, food/water storage, waste disposal, protection, and growth.

Cell differentiation Key points

In plant cells, mitosis takes place throughout life in the meristems found in the shoot and root tips.

Cells produced by mitosis are genetically identical to the parent cell

Many types of plants cells retain the ability to differentiate throughout life

Most types of animal cells differentiate at an early stage of development.

In mature animals, cell division is mainly restricted to repair and replacement. As a cell differentiates it acquires different sub-cellular structures to enable it to carry out a certain function. It has become a specia-lised cell.

Cell differentiation in Plant cells

Most plant cells are able to differentiate all through their lives. Undifferentiated cells are formed in meristems in stems and roots. In the meristems, mitosis is constantly occurring.

Plants keep growing throughout their lives at ‘growing points’. The plant cells produced don;t differentiate until they are in their final position in the plat. Even then, the different-iation isn’t permanent and plant cells can switch plants, re-differentiate and become a new type of cell.

Microscopy

An electron microscope has much higher magnification and resolving power than a light microscope. This means that it can be used to study cells in much finer detail. This has enabled biologists to see and understand many more sub-cellular struct-ures.

size of image = magnification / size of real object

Culturing microorganisms (aseptic techniques)

pre:washed hands, disinfected tray, Bunsen burner, agar in water bath, lab coat

during:flaming the neck of bottles, palming technique for opening lids, pre-sterilised syringe and spreader, only open petri dish slightly, flaming tweezers

after:taped petri dish lid on to stop stuff going out and in, incubated petri dish @ 25 °C so any other micro’s from growing, wash benches and hands again

In conclusion, the best antiseptic is bleach because it is more alkali than the others, this is shown by its average area and diameter of the clear zone.