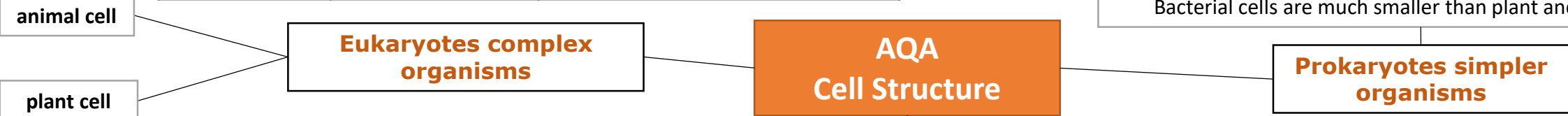


cytoplasm	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
nucleus	<i>contains genetic material</i>	controls the activities of the cell and codes for proteins
cell membrane	<i>semi permeable</i>	controls the movement of substances in and out of the cell
ribosome	<i>site of protein synthesis</i>	mRNA is translated to an amino acid chain
mitochondrion	<i>site of respiration</i>	where energy is released for the cell to function

animal cell

cell membrane	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
bacterial DNA	<i>not in nucleus floats in the cytoplasm</i>	controls the function of the cell
cell wall	NOT made of cellulose	supports and strengthens the cell
plasmid	<i>small rings of DNA</i>	contain additional genes
cytoplasm	<i>semi permeable</i>	controls the movement of substances in and out of the cell

Bacterial cells are much smaller than plant and animal cells



contains all the parts of animal cells plus extras

permanent vacuole	<i>contains cell sap</i>	keeps cell turgid, contains sugars and salts in solution
cell wall	<i>made of cellulose</i>	supports and strengthens the cell
chloroplast	<i>site of photosynthesis</i>	contains chlorophyll, absorbs light energy

how a cell changes and becomes **specialised**
Undifferentiated cells are called **STEM** cells

animal cell differentiation

early stages of development only for repair and replacement

plant cell differentiation

all stages of life cycle the stem cells are grouped together in meristems

Cell differentiation

Microscopy

magnification $M = \frac{\text{size of image}}{\text{real size of the object}}$

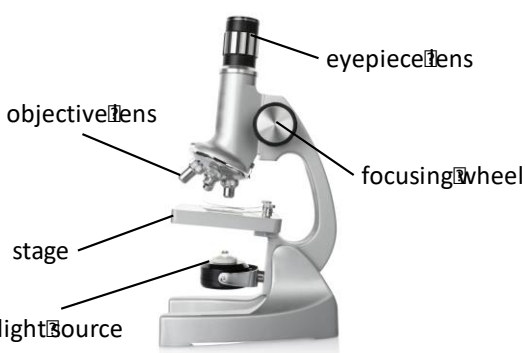
Specialised cells

specialised animal cells

nerve		<i>carry electrical signals</i>	long branched connections and insulating sheath
sperm		<i>fertilise an egg</i>	streamlined with a long tail acrosome containing enzymes large number of mitochondria
muscle		<i>contract to allow movement</i>	contains a large number of mitochondria long

specialised plant cells

root hair		<i>absorb water and minerals from soil</i>	hair like projections to increase the surface area
xylem		<i>carry water and minerals</i>	TRANSPIRATION - dead cells cell walls toughened by lignin flows in one direction
phloem		<i>carry glucose</i>	TRANSLOCATION - living cells cells have end plates with holes flows in both directions



Feature	Light (optical) microscope	Electron microscope
Radiation used	Light rays	Electron beams
Max magnification	~ 1500 times	~ 2 000 000 times
Resolution	200nm	0.2nm
Size of microscope	Small and portable	Very large and not portable
Cost	~£100 for a school one	Several £100,000 to £1 million plus

PREFIXES		
Prefix	Multiple	Standard form
centi (cm)	1 cm = 0.01 m	$\times 10^{-2}$
milli (mm)	1 mm = 0.001 m	$\times 10^{-3}$
micro (µm)	1 µm = 0.000 001 m	$\times 10^{-6}$
nano (nm)	1nm = 0.000 000 001 m	$\times 10^{-9}$