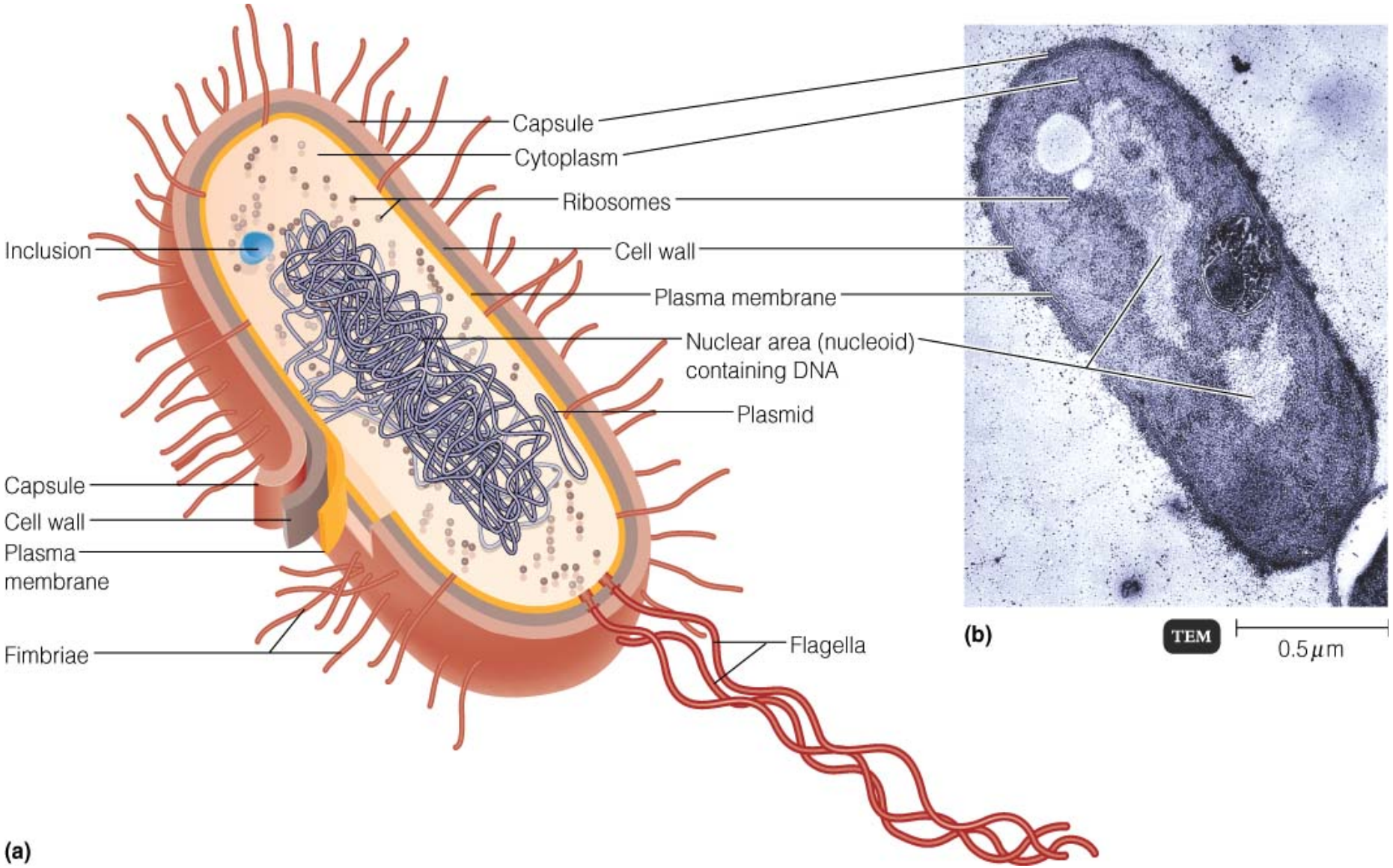
Cell:

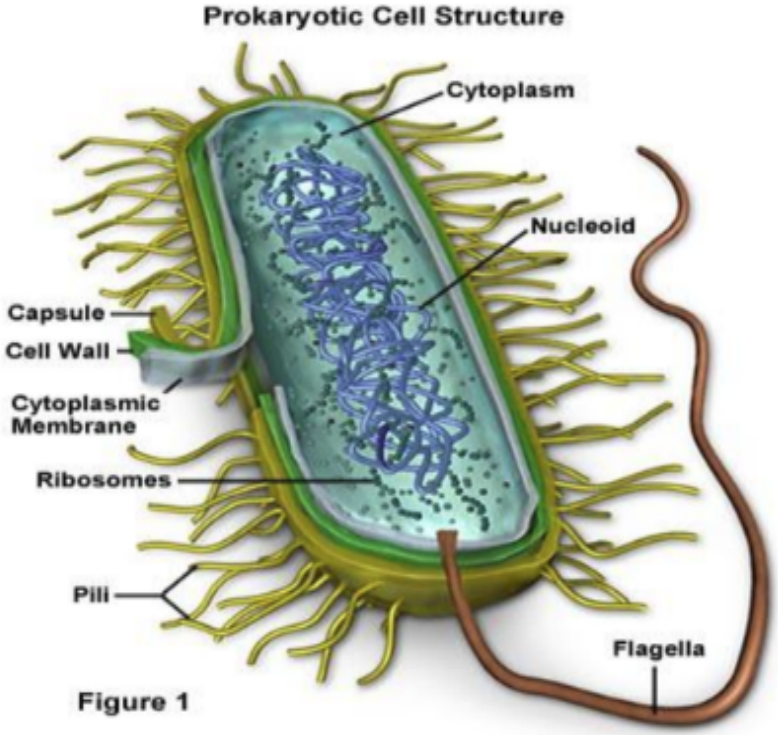
- Small, membrane-enclosed unit
- Filled with a concentrated aqueous solution of chemicals
- Ability to create copies of themselves by growing and dividing in two.

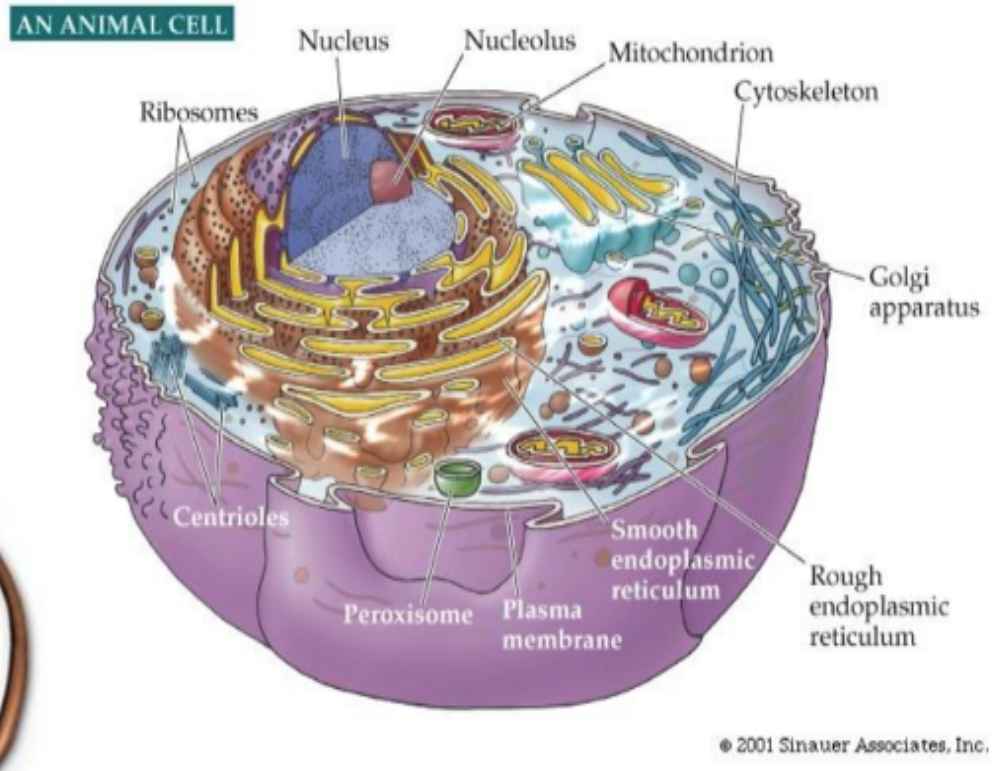
- The simplest forms of life

Feature	**Procaryiotes**	**Eukaryotes**
Size	1-10µm	5-100µm
Nucleus	no	yes
DNA size	10^6	10^7-10^9
DNA organization	circular	linear, histons
Cell division	plasmamembrane dependent	microtubulus-dependent
inner membranes	no	yes
skeleton	external	internal 3 types
connections	no	yes
Differentiation	no	yes
Semiautomic organelles	no	chloroplastis, mitochondria
Apoptosis	not sure	yes


Capsule
Cytoplasm
Ribosomes
Inclusion
Cell wall
Plasma membrane
Nuclear area (nucleoid) containing DNA
Plasmid
Capsule
Cell wall
Plasma membrane
Fimbriae
Flagella
(a)
(b)
TEM
0.5 μm

Prokaryotic vs Eukaryotic Cells

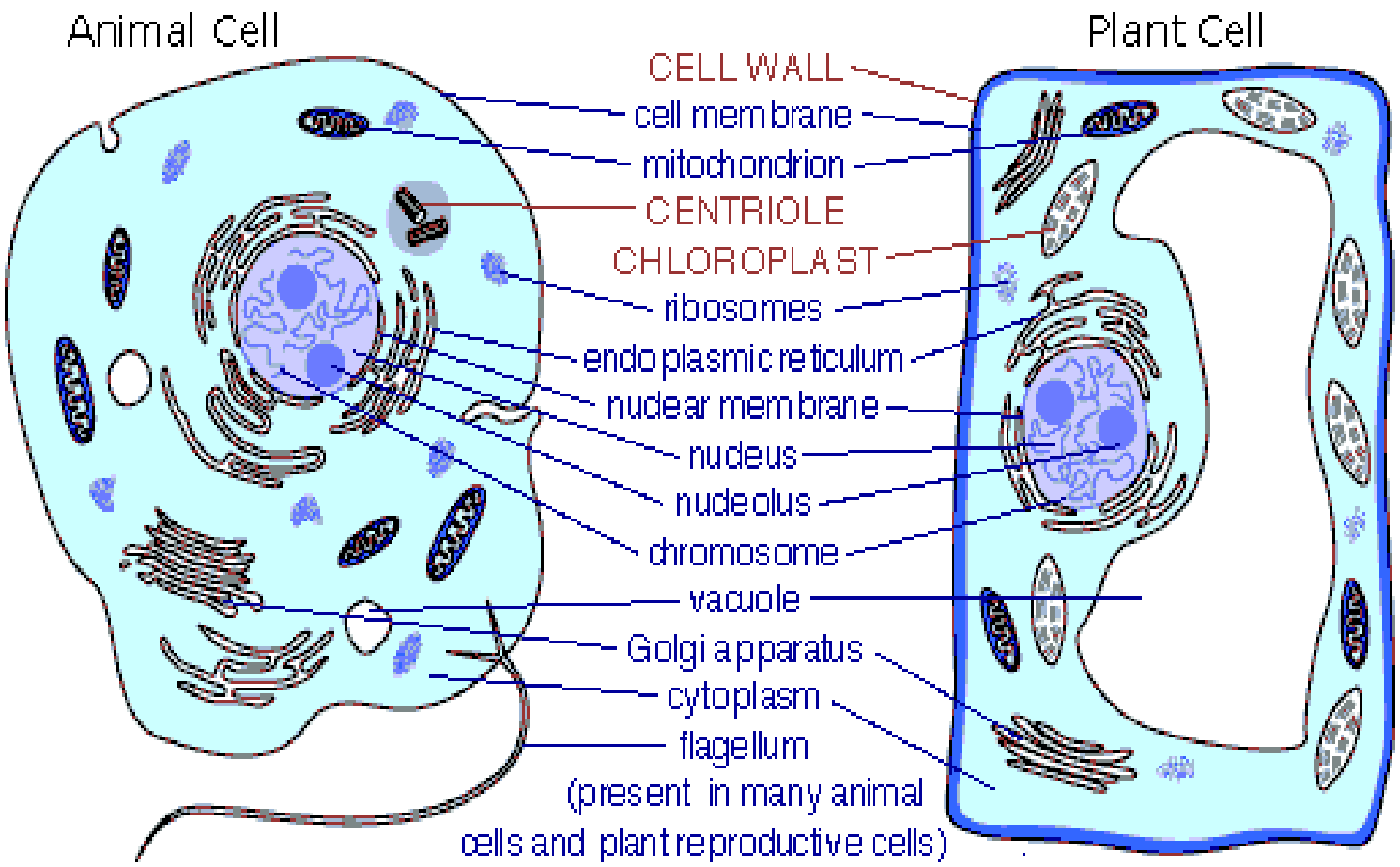




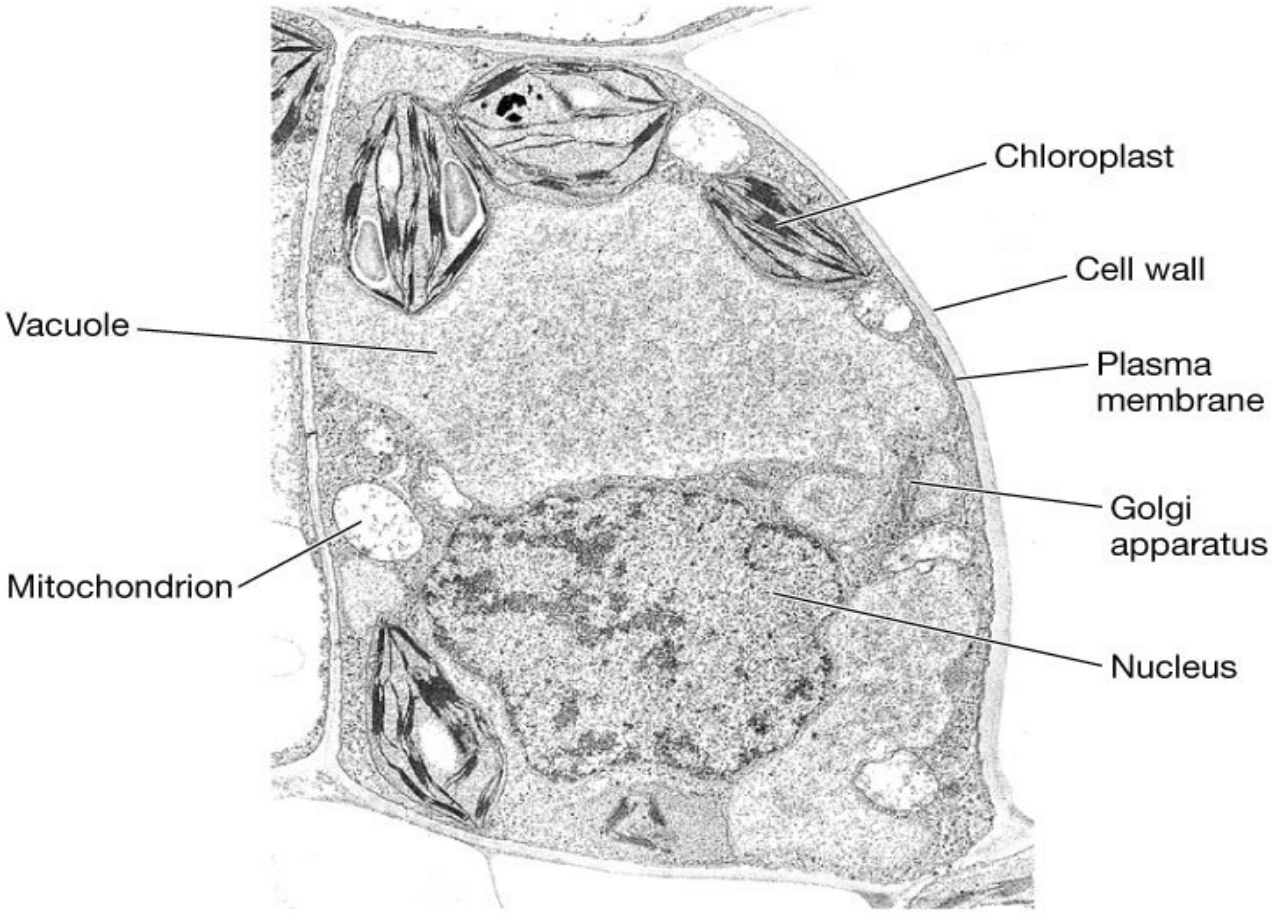
Plant and animal cells:

Organellum	Plant cell	Animal cell
Plasmamembrane	cellmembrane+wall	cellmembrane
Nucleus	yes	
Cytoplasma	yes	
Endoplasmatic Reticulum	RER and SER	
Ribosoma	Free and RER-assotiated	
Mitocondrium	ATP production	
Golgi apparatus	Synthesis of membrane proteins secretory proteins, polysaccharids	
Vacuolum	Central: water, turgor pressure, similar function to animal lisosomes	One or a few: water, ions unused compounds
Cytosceleton	Microtubuli intermedier filaments, microfilaments	

Organellum	**Plant cell**	**Animal cell**
Centrosoma	no	yes
Plastis	yes	no
Lisosoma	rarely	yes
Peroxisoma	Fatty acids to glucose helps photorespiration	Protection of the cells from free radicals
Secretory vesuculi	From Golgi	
flagella	yes	
Cilia	rare	typical


Animal Cell
Plant Cell
CELL WALL
cell membrane
mitochondrion
CENTRIOLE
CHLOROPLAST
ribosomes
endoplasmic reticulum
nuclear membrane
nucleus
nucleolus
chromosome
vacuole
Golgi apparatus
cytoplasm
flagellum
(present in many animal
cells and plant reproductive cells)

Electronmicroscipic picture of a plant cell



http://www.oncoursesystems.com/school/webpage/10845583/788307

Chemical bonds:

- **covalent bond:**

it is formed when two atoms share a pair of electrons

- **ionic bond:**

it is formed when electrons are donated by one atom to another

Weak chemical bonds:

short-range attractive forces

- van der Waals attractions,
- electrostatic attractions,
- hydrogen bonds:

  H atom is “sandwiched” between two electron-attracting atoms

Chemical composition:

Membranes: fatty acids

phospholipides, cholesterol:

Cell surface compounds, stored nutrients: carbohydrates:

monosaccharides, polysaccharides

Enzymes, secretory materials, cytosceleton: proteins:

amino acids

Genome: DNA

Protein synthesis, regulation: RNA

Energy storage: ATP nucleotide phosphates