

CELLS AND ORGANELLES

revised 5 October 2016
Campbell 5th, pp 102-127, 7th: 100-121, Sadava, 70-93, Campbell 9th: 100-124, 10th: 92-123

Organelles [“agent of work”, “little”] perform specialized functions in the cell.
Draw the analogy of cell, its organelles and a factory:

CELL:	FACTORY:
PLASMA MEMBRANE (p 98)	Security fence, controls ingress and egress Bilaminar, phosphodiglycerides, proteins, CH ₂ O
NUCLEUS, mRNA (p 103)	Main office (with DNA chromosomes) Xerox orders (mRNA) send out to shop floor
NUCLEOLUS	Manufactures protein-making machines (ribosomes) to make product
RIBOSOMES (p 337)	Machines making "widgets" (synthesize protein) according to mRNA instructions

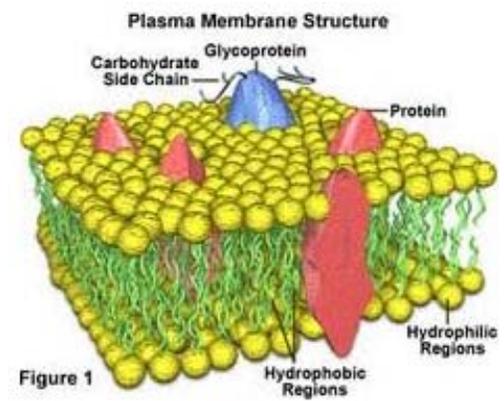
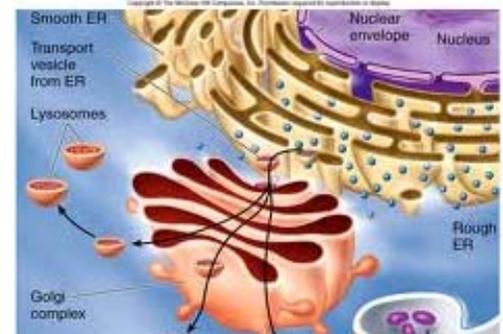


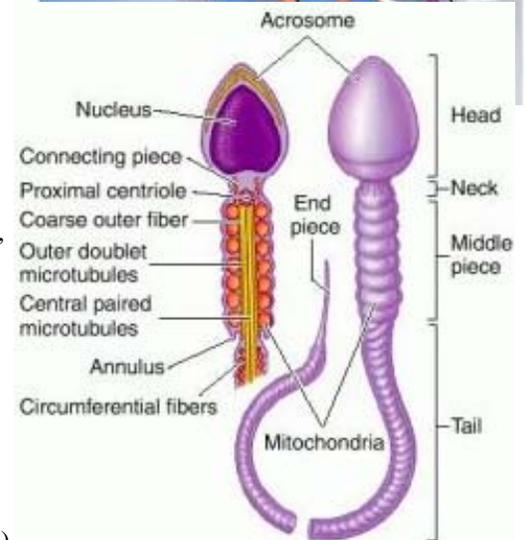
Figure 1

ENDOPLASMIC RETICULUM: System of interconnected network of membranes which compartmentalize cell (summary: 108)

ROUGH ER (p 105)	Many “machines” (ribosomes) making 'widgets'
SMOOTH ER (p 105)	Chem Lab: Toxic waste handling as in detoxification (alcoholics etc), biosynthesis of special products .
GOLGI APPARATUS (p 106)	Packaging and shipping: “widgets” are packaged and addressed
EXOCYTOSIS (p 109, 137)	packaged “widgets” are shipped out (illustrate)



LYSOSOMES (p 107)	Shop where recycling occurs, hydrolytic enzymes
MITOCHONDRIA (p 111)	Powerhouse, makes adenosine triphosphate (ATP)
CHLOROPLASTS (p 111)	Solar powered synthesis of glucose (plants)
CYTOSKELETON: (P 113)	provides structure and movement, moves organelles,
Microfilaments (p 117, 1104)	actin: shape, phagocytosis, muscle contraction
Intermediate filaments	stable scaffolding of cell for shape, resist tension
Microtubules	hollow tubes made of tubulin subunits
Cilia (p 115)	sweepers note use in respiratory tract
Centrioles (p 232)	Organize mitotic spindle, mitosis process
Flagella (p 115)	motility in sperm, centrioles form core



[Use spermatozoon to show organelles functioning for a cell's purpose: 1006]

CELL WALL (P 118) Required to support cell membrane (“support hose”)

EXTRACELLULAR MATRIX [“mother”]
(p 119) collagen, proteoglycans.
Glycocalyx [“sugar cup”]: mucopolysaccharides.
[“slime many sugars”]

PLANT VERSUS ANIMAL CELLS
contrasted (see pages 100-101):

features of cells in	Plants	vs	Animals
cell walls	yes		no
cholesterol	no		yes
chloroplasts	yes		no
cell plate on mitosis	yes		no
flagella	no		yes
central vacuole	yes		no

