

Survey of Biology

wk 6

Thripp
Survey

Wed, 2009-10-07, 8:45 AM MARKER: 8:05 AM Pg. 1

molecule	monomer	begins	ends
starch	glucose	saliva	sm. int.
protein	amino acid	stomach	"
fats	glycerol	sm. int.	"
DNA/RNA	nucleotide	"	"

Everything is digested in small intestine

Starch & protein get started earlier (mouth & stomach).

— END Chapter 22 —

— BEGIN Chapter 4 —

Cells give us life. All your body is made of cells,
including your skin, heart & brain.

In every eukaryotic cell there is a nucleus w/ DNA.

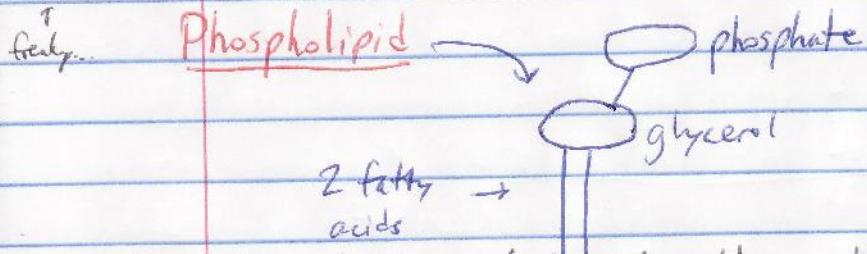
Cells work together and can repair themselves.

Cells die constantly and are replaced by mitosis (splitting).

① 8000 cell membranes = thickness of book page

Every second 2 million red blood cells in your body die
& are replaced.

② Cell walls must be small to be fast



The cell wall is outside ~~the~~ the cell. — makes order

But we call it part of the cell, even though it's
outside the cell membrane

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Plant cell walls are OUTSIDE the cell—same for Pg. 2
our cell membranes and all other animals.

Cell membranes are made of lipids & proteins.

They have phospholipid bilayers.

→ outside cell
cell mem- { } one hydrophilic head
brane { } two hydrophobic tails (fatty acids)
{ } same Hydrophobic proteins embed themselves
→ cytoplasm in cell in the phospholipid bilayer picture
left.

Cell membrane proteins signal other cells. Also they do these:
enzymatic activities.

transport (move an a , a glucose, etc.)

intercellular joining

cell-cell recognition — recognize what is "me" and what is
not "me", i.e. a bacteria or virus

This fails in rheumatoid (foreign invader)

arthritis — white blood cells attack your own cells.

Fluid Mosaic Model: phospholipids + proteins move side
to side in the cell membrane because they are not glued to
each other. Fluidity (movement) of proteins in the cell
membrane = Fluid Mosaic Model.

Cell membranes have selective permeability → (to the cell through
the cell membrane)

Some molecules & ions can't get in w/out a transport
proteins * charged ions i.e. sodium
* glucose & amino acids (they are large)

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Some substances don't need a transport protein.

They can freely cross the cell membrane. Examples:

oxygen, CO₂, nitrogen, H₂O (small & uncharged)

ethanol (hydrophobic) — found in beer, wine, whiskey, etc.

CO₂ = carbon dioxide

Nitrogen: be careful not to get the Benz (sp?) SCUBA diving

H₂O = water

Ethanol can kill brain cells directly!

Cell Theory: 1) The cell is the smallest unit of life.

2) All living things are made of cells.

3) All cells form from previously existing cells.

(It takes a cell to make a cell.)

protein size \approx 7 nanometers nanometer = one-billionth

atoms \approx 0.1 nanometers of a meter

There are

Prokaryotic

Bacteria & Archaea

Two major types of cells! before nucleus

3 DOMAINS?

Eukaryotic

Eukarya

true nucleus

DNA in nucleoid in prokaryotic cells. (aka, cell membrane)

DNA in nucleus in eukaryotic cells. more vague

Prokaryotic cells have DNA in nucleoid & area of the cytoplasm in the cell membrane

Organelles = membrane bound structures. Cytoplasm = liquid portion

Centriole helps make cilia & flagella. not in most large pollinated plants, but in lower plants with flagellated sperm

Lysosomes = intra cellular digestive enzymes.

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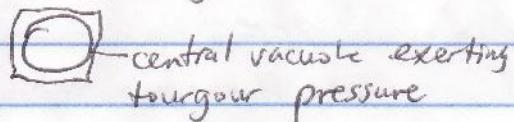
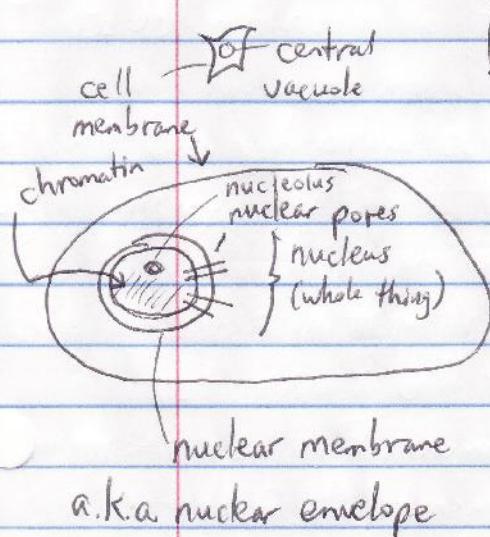
In Plants But NOT in Animals:

Central Vacuole: fills w/ water creating turgor pressure

Cell wall: rigid, supports plant against cell wall

Chloroplast: converts light energy into chemical energy, (glucose!) LIKE A BALLOON

Cell



chromatin is made of DNA & protein

nucleolus is where ribosomes are assembled. They come out through the nuclear pores.

DNA / Genes code for proteins.

Proteins are linearly sequenced amino acids.
Sequence determines folding.

DNA goes to mRNA (messenger RNA)

mRNA determines primary structure of proteins (the linear sequence of amino acids) SER makes no proteins

Think of an architect sending blueprints to a builder - detoxifies
Nucleus sending DNA to mRNA

Chromatin: relaxed chromosomes DNA + protein

Ribosomes have ribosomal RNA (rRNA) & proteins.
→ site of protein synthesis

Ribosome is a part of a cell! It is NOT an organelle because it has no membrane

Acknowledges
psoriasis (sp?)
of liver
SER becomes
fatter

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- Free ribosomes make proteins in the cytoplasm and for the cytoplasm, nucleus, & everywhere not RER.

RER: rough endoplasmic reticulum

Ribosomes are attached to RER. They make proteins for endomembrane system

Thu. 2009-10-08 9:30-10:50 AM Supplemental (some lecture)

Cells send messages & they work for the body different section)

Muscle cells in heart survive our whole life, but other cells get replaced by mitosis frequently. → sp?

① "wee little beasties" found by Leeuwenhoek circa 1700

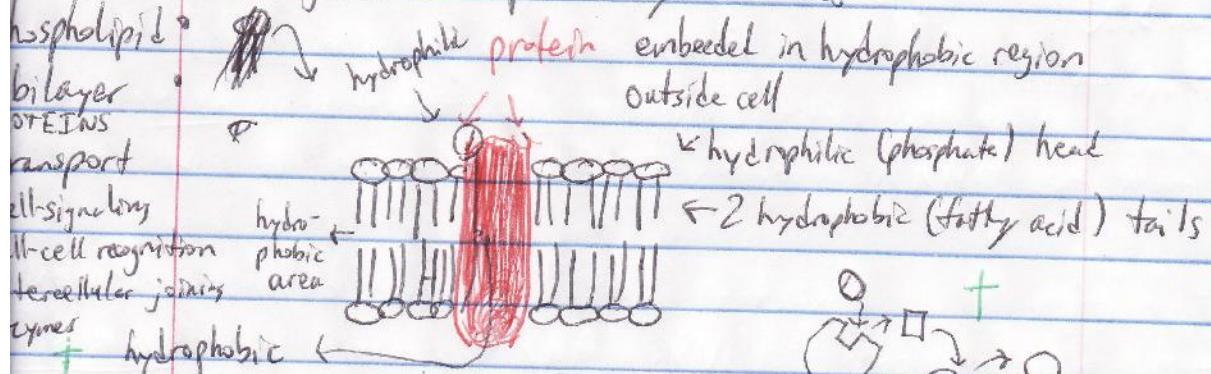
② Robert Hooke: 1665, coined term "cell"

③ Cells must be small for efficiency

④ A basketball-sized cell could not work

Plant cell walls and calcium phosphate of bones are OUTSIDE the cells technically. The cell membrane is the outer part of the cell.

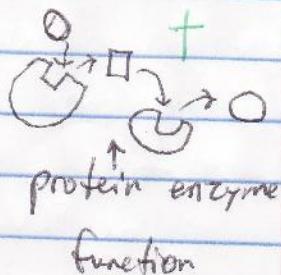
Cell wall is considered part of the cell because every cell has one, even though it is exported by the cell.



→ ribosomes make the RER

rough. None on SER

smooth endoplasmic reticulum shape (form) → function



SUPPLEMENTAL

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Thu, 2009-10-08 9:30-10:50 AM

- * White blood cells are programmed from birth to recognize your cells vs. foreign invaders. This goes wrong sometimes: rheumatoid arthritis.
 - * Phospholipids move side-to-side in the cell membrane. tiles
 - * Fluid Mosaic Membrane: movement of proteins like mosaic tiles in cell membrane — freely.
 - could be organelle membrane
- Small & charged ions or large molecules (aa's, $C_6H_{12}O_6$) cannot pass through the cell membrane w/out a transport protein
→ special transport proteins for specific aa's (amino acids)
partial charge

Water, CO_2 , H_2O , oxygen, ethanol, nitrogen can pass through cell membrane freely.

- * Think of a screen door. Small stuff like air + water can go through, bugs cannot.
- $\text{ethanol} = \text{alcohol} = \text{found in beers}$
 wine

Ethanol can go straight through cell membranes...

→ Alcoholism kills brain cells.

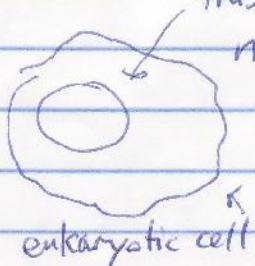
The cell theory has just 3 parts (see pg. 3)

There are prokaryotic & eukaryotic cells

Bacteria & archaea are prokaryotic

DNA in nucleoid — NO nucleus

→ cytoplasm area



this thing!
nucleus!

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- * If there is no membrane, it's not an organelle.
Book makes mistakes.

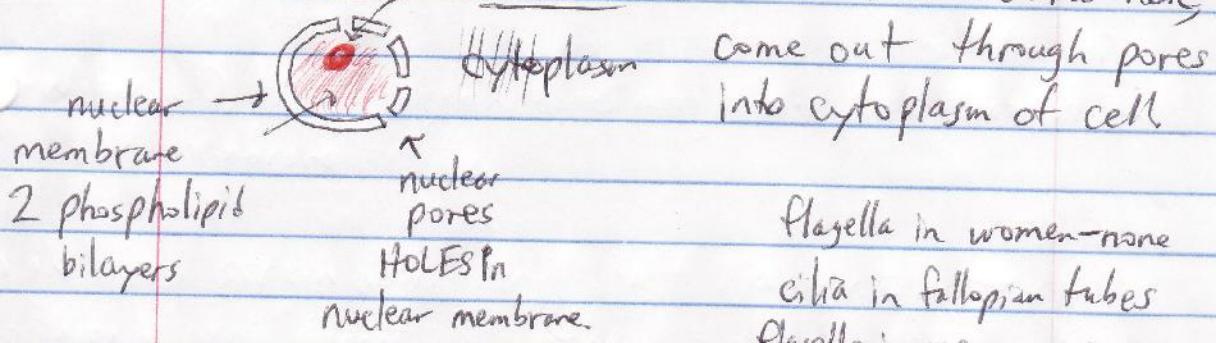
A ribosome is not an organelle because it has no membrane surrounding it. It is just a part of a cell *

FOR TEST 2, NO PLANTS

Cytoplasm = liquid part of a cell. → have centrioles, cilia, flagella, & lysosomes — ONLY ANIMALS.

The Centriole is only in non-pollen plants.. makes cilia + flagella.

NUCLEUS — nucleolus: ribosomes manufactured here,



come out through pores
into cytoplasm of cell

Flagella in women—none
cilia in fallopian tubes
Flagella in men—sperm

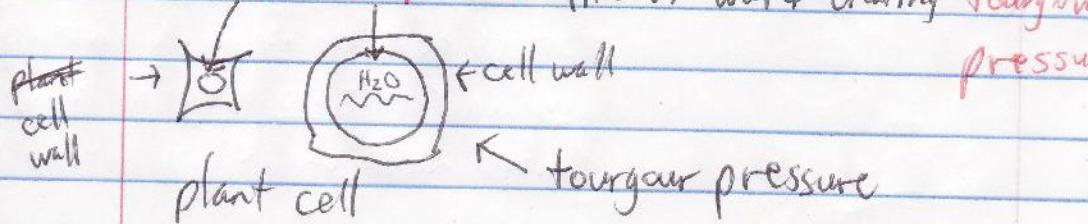
Ribosomes make protein: factory site = ribosomes — for movement
→ contain rRNA: ribosomal RNA

Lysosomes are intercellular digestive organisms.

IN PLANTS: . 3 Things: Rigid cell wall for support

NOT IN ANIMALS: Chloroplasts to make energy by photosynthesis.

Central Vacuole fills w/ water creating turgour pressure



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- * Nuclear envelope = double membrane = 2 phospholipid bilayers
a.k.a. (membrane)
 - * Chromatin: relaxed chromosomes (made of DNA + protein)
 - * Nucleolus: where ribosomes are assembled
 - * ALL in nucleus ~~Golgi~~ Golgi sorts RER's proteins to distribute to: lysosomes, cell membrane, or outside cell
- Ribosomes make PROTEINS... using Ribosomal RNA rRNA

messenger RNA (mRNA) determine primary structure of proteins RER makes proteins SER makes lipids
Together they make new cell membranes

DNA = master blueprint by architect
mRNA = builder's copy — could have coffee spilled on it
i.e. not be perfect

Nuclear pores must be large enough for ribosomes to pass through.
Nucleolus is filled w/ rRNA... ribosomal RNA because

~~Red~~ it is ~~the~~ where ribosomes are made.

Anywhere there is no ribosomes there is no protein synthesis.
including nucleolus!

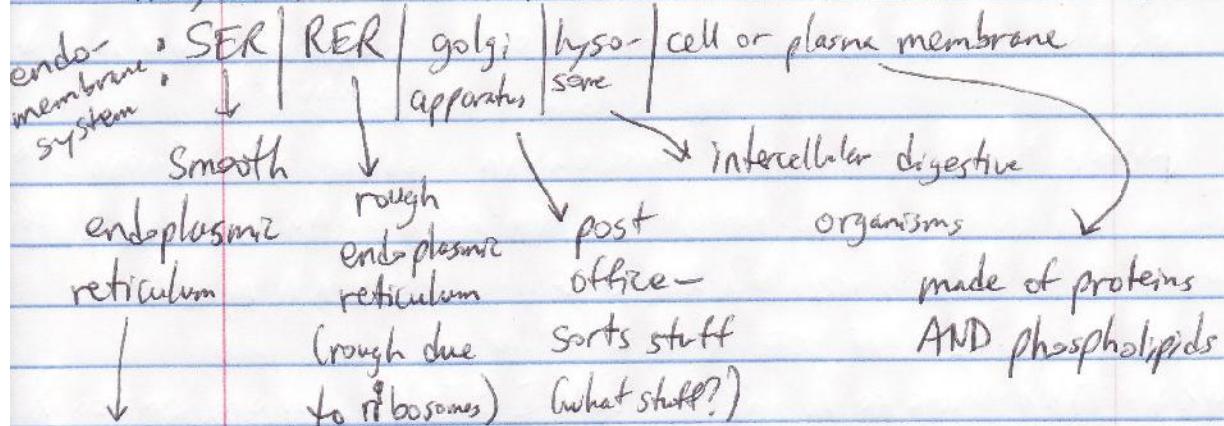
FREE RIBOSOMES: move freely in cytoplasm — not on RER (rough endoplasmic reticulum) — make proteins for inside cell

Cytoplasm
ATTACHED RIBOSOMES are on RER
make proteins for endomembrane system

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Thu, 2009-10-08 9:30-10:50 AM

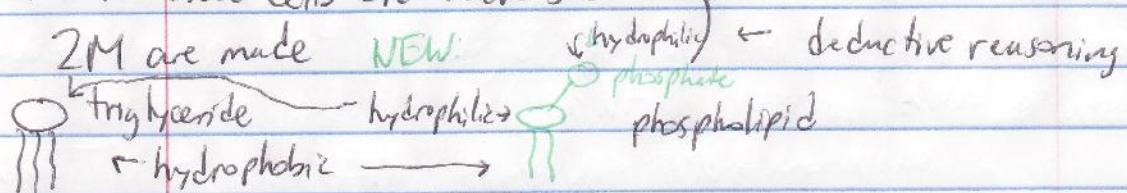


- SER:
 - * makes lipids (including steroids — i.e. testosterone in testicals)
 - * NO protein synthesis — no ribosomes
 - * detoxifies drugs, alcohol, toxins, etc
 - * Lots of SER in liver — takes care of alcohol, etc

RER & cytoplasm: 2 places for ribosomes

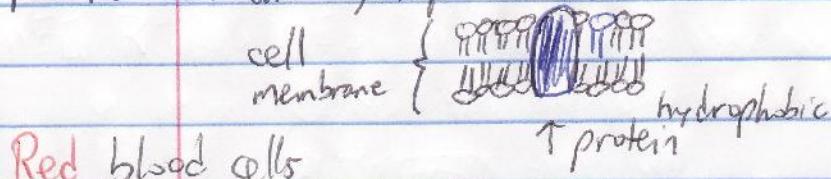
Thu, 2009-10-08 12:30-1:50 PM.

2M red blood cells die Each Second }



Membranes of cells are made of **lipids** and **proteins**.

proteins that are hydrophobic retreat to the cell membrane



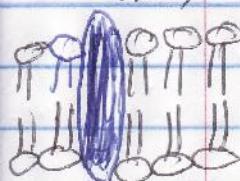
must be united. Some cells are tied together by proteins

White blood cells sometimes go haywire: ~~allergies~~ allergies for example.

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← these phospholipids can move: they are fluid
 proteins move,
 heads stay static

Fluid Mosaic Model

↑ protein in membrane
 sliding along = MOSAIC
 and FLUID

cell membrane is like a screen door — if you throw a water bucket at a screen door, water doesn't rush in but some gets through — SAME w/ cell membrane

hypothesis — now proven
 one scientist said there are no proteins in the cell membrane — he has been proven wrong
 SLIDE 56: phospholipids AND proteins are fluid (can move side to side)

The nucleus is the DEFINITIVE organelle of the Eukaryotic domain.

[nuclear pores] in membrane —
 [stay open] → like a railroad!

→ no gate (selective permeability)

Nucleoids are not in plants or animals — only prokaryotes.

* IN ANIMALS ONLY

- * Centrioles
- * Cilia & Flagella
- * Lysosomes

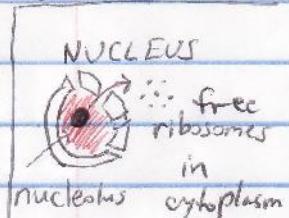
Some plants have flagellated sperm (lower plants) but this does not matter on test 2

* IN PLANTS ONLY

- * Cell wall
- * Chloroplasts
- * Central Vacuole

must know for test 2

if I contradicted this earlier, sorry



central vacuole exerting turgour pressure
 "large water vacuole" (formerly known as)