Anatomy Quiz 3 Study Guide

**What is the basic structure and function of the plasma membrane? What are its 4 specializations?**

- made of a phospho-**lipid bilayer** containing **embedded transport proteins**, covered with **glycolipids** and **glycoproteins**.

- is the boundary of the cell and lets substances in or out of the cell, or blocks them from entering.

Specializations:

* Microvilli – finger-like projections of the plasma membrane, GREATLY increase the cell’s surface area
* Junctions:
* Tight junctions: waterproof seal between cells
* Desmosomes: “spot welds” between cells; not watertight, but strong enough to keep the cells from being pulled apart
* Gap junctions: direct tunnel between adjacent cells

**Briefly classify simple and stratified epithelium types:**

Classified **by** **layers**: simple (one layer), stratified (multilayered), pseudostratified (actually a simple type)

Classified **by** **shape**: squamous, cuboidal, or columnar

***Briefly*** describe the 7 basic functional types of cells and give at least one example of each.

* Cells which connect body parts (fibroblast, RBC)
* Cells which cover and line organs (epithelium)
* Cells which move organs and body parts (muscle!)
* Cells which store nutrients (adipose/fat)
* Cells which fight disease (macrophage/WBCs)
* Cells which process info and control functions (nerves, brain)
* Cells of reproduction (sperm, ovum)

**3What 7 functional abilities do almost all cells exhibit?**

Metabolize, Digest nutrients, Dispose of wastes, Reproduce, Grow, Move, Respond to stimuli

**Complete the organelle chart.**

ribosomes make proteins

rough endoplasmic reticulum makes and packages proteins (covered with ribosomes)

smooth endoplasmic reticulum has no ribosomes, Creates and stores lipids and steroids

mitochondria converts glucose, (an energy molecule the cell CAN’T use) to ATP

(the energy molecule it CAN use.)

Golgi apparatus/bodies packages cellular products and wastes for secretion/exocytosis

lysosomes release enzymes which break down wastes, or if need be, the cell itself

peroxisomes use O2 to oxidize excess free radicals; break down chains of fatty acids

**Where is ciliated epithelium found and what role does it play?**

Cilia are hair-like projections from cell surfaces. Ciliated epithelium (full name: *psuedostratified ciliated columnar epithelium)* is found **lining the trachea** and **much of the upper respiratory tract**, and also in the **female reproductive tracts**. It the lungs it secretes mucus, traps dirt and pathogens and “sweeps” it out to where it can be expelled (coughed or hacked!) from the body. In the female reproductive tract ciliated cells propel the ovum along the fallopian tubes toward the uterus.

**How are epithelial tissues classified** *(duplicate question; see above)*

**What are the four major types of tissue.**

Epithelial, Muscular, Connective, Nervous

**Differentiate:**

***diffusion***: movement of particles from an area of high concentration to an area of lower concentration. (Note that increased temperature makes diffusion occur MUCH faster. The way a baking cake in hot oven can be smelled all over the house relatively quickly, but a cold cake must be sniffed up close to be smelled. )

- ***osmosis***: diffusion of H2O across a selectively-permeable membrane

- *solute pumping & active transport*:

**Same thing**: Let’s say inside a certain cell there is already a higher concentration of salt compared to the interstitial fluid outside, but because this cell is in a sweat gland, the cell needs *even more* salt moved into it. A LOT more! The concentration gradient moves salt *out*, but the cell needs more *in*, so certain proteins in the plasma membrane work against this gradient (pushing salt “uphill,” if you will!) to “pump” more salt into this cell—so it can do its salty job! This work against the gradient, against the natural flow, requires energy. *(see diagram on p70)*

**Exocytosis: materials released from the cell**. The membrane of a vesicle (with lipid-bilayer structure, just like the plasma membrane) containing cellular products (e.g. hormones in an endocrine cell) or waste products merges with the cell’s plasma membrane to become a sort of dimple in the cell’s surface; this dimple releases the substances into the interstitial fluid. *(see diagram at top of p71)*

**- endocytosis: materials brought *into* the cell** (the reverse of exocytosis). The plasma membrane forms a small dimple under extracellular substances; the dimple deepens and soon the substances are engulfed in a vesicle “package” which now is inside the cell, and is sent wherever it needs to go (usually via those cool walkie proteins we saw in the cellular animation video!)

**- phagocytosis: large-scale endocytosis**, where entire cells—either enemy bacteria or dead human cells—are brought inside a much larger cell—WBC!—and worked over by the lysosomes to break it down.

**- vesicles – smaller storage sacs in the cell**; pick up and transport materials within the cytoplasm, often created by the Golgi bodies

**- vacuoles – larger storage sacs in the cell**; stores nutrients or wastes. Vacuoles and vesicles are both storage sacs, the major difference is size. (NOTE: In plant cells the one enormous water vacuole dominates the cell.)

**- Cytoplasm** is everything within the membrane of the cell except the nucleus.

**- Cytosol** is the aqueous part of the cytoplasm in which organelles are suspended.

- Remember the journal question! **Protoplasm** = EVERYTHING inside the cell, nucleus included!

**How do endocrine and exocrine glands differ in structure and function.**

- **Endocrine** glands are **internal only**, have **no ducts** and **secrete** **only hormones** directly into the bloodstream.  
- **Exocrine** glands are both **internal and external**, they **have ducts** that empty to the epithelial surface. Their secretions are non-hormonal, like sweat or oil from the skin, or bile and glycogen from the liver. [Note that the pancreas is both endo- and exocrine, and is actually not a gland but a glandular *organ*, secreting the hormones insulin and glucagon. Glands that do “double duty” like this – including the liver, kidneys and sex glands – are called **mixed** glands.]

**What type of tissue are ligaments and cartilage? They are *avascular* which means:**

Connective; no direct blood supply, must rely on diffusion from surrounding tissues for O2 & nutrients