

Be proactive instead of reactive regarding exams

groups of cell, is this all we are?

if we take away every single cells in the body, would we just disappear? NO. we will look almost like usual, because we have component outside the cell but still part of you: extracellular matrix. Extra = in addition to / outside the cells.

- construction: via fibroblast (connective cell, not muscle, not neuron, not interacting with environment, but create support component for the other cells)

1. meshwork of fibrous proteins. Protein also key component in our cell, and also outside of cells. Fibrous: long thin component, ex: hair is fibrous. fibrous protein = long thin protein, different from most protein which is sort of bundled up to each other in globule. 3 that we see in our matrix

- A. Collagen = "ropes". Tie two things together like rope, they can move relative to each other, but can't move away from each other, taut. want all cell to go together. Like train cars. collagen injection / shot = injection that people get for face to support structure component. Collagen shot = we are adding extracellular matrix. The most common protein between organism.

- B. Elastin = "elastics, rubberband". but Sometimes we want to allow them to get a little bit further apart, but then we want them to come back together. When go further = add force. remove force = come back. when people get collagen injection - they get a bit of elastin too for elasticity. but elastin sounds artificial like plastic kind of thing.

- C. Fibronectin = "connectors". To make sure we can tie everything as necessary to this matrix of fibrous protein.

if we take all cells, we can at least see this connective component. In building, if we take away all furniture in the inside, can see the building because of the structure inside, the structure is not in the room but in between.

2. Not only protein component, but we know there is fluid. Viscous water (more viscous like syrup. water = less viscous, like fluid. fluid between cells) with carbohydrate (sugar) structures within this area, provide support. ex: paracrine move in the fluid in between 2 cells.

2 support: from protein and sugar components.

- Purpose

1. Structure: "bio-glue". make sure cell does not slide out.

2. Influences cells. We have certain cells in our body that are less associated with the matrix and others that are highly associated with the matrix. ex: RBC not moving around in the blood, don't see the matrix in blood component other than fluid. Cells

need this connection with this extracellular matrix. The matrix itself exerts influences over those cells that are connected to it, so much so if we take a cell normally associated with the matrix from your body and separate them from the matrix, isolate, it really becomes unhappy, go to a process where they commit suicide and die. Cell needs the connection with the extracellular matrix to help stabilize its existence and keep them around, ensure proper growth of those cells.

A. survival component. Typical cell kept away from matrix = cell die. needs to be associated with the matrix to stay alive

B. Growth. Being associated with the matrix help set up how many cells we can have in a particular area, expansion of cells, what will it become. dictated by the matrix component.

C. Differentiation. we saw in 4 groups of primary cell types. The extracellular matrix help set up, hey, you need to go to another path to become muscle cells, or to become neuron.

Fluid compartments: water in our body

Dominant component of our body is water molecule. Ingest water, where we will find it?

3 Compartments:

1. intracellular fluid (ICF). Cells = bags of water. water inside your cell. within cells = cytosol. cytoplasm = also organelles in there, what is inside the cell. bet: majority of water in body = here. biggest compartment,  $\frac{2}{3}$ , 67% or ~28 L

2.

there is fluid outside of cells. to do indirect communication. Extracellular fluid(ECF). blood and fluid between the cells. 2 extracellular fluid component:

2. Interstitial fluid (IF). inter = between. intercellular communication = communication between cells. interstitial space = space between the cell. Paracrine, neurotransmitter move between IF (fluid between cells). Between cells, 26% or ~11 L

3. Plasma. get a vial of blood and separate =  $\frac{1}{2}$  cell component,  $\frac{1}{2}$  on top = fluid = plasma = last fluid compartment. Least likely to find water because it is the smallest compartment. circulator system, water portion of blood = smallest one, only about 7% or ~3L.

Fluid compartment Barriers. 3 distinctly different areas, slightly different composition (similar but not identical) = only happen when we have barrier, divider.

Between Intracellular fluid and Interstitial fluid, Interstitial fluid and the plasma.

Our stronger barrier = between inside the cell and outside the cell, or between interstitial fluid and plasma? Inside the cell to outside the cell because there is bigger differences between the two areas.

1. Cellular plasma membrane. What that barrier is that is so good to create this very distinctly different composition in our fluid compartment, that is our cellular plasma membrane, create these bags of water that is our cell, that allow us to keep eye level of certain things inside and outside our cells.

2. Blood vessel walls

- more specifically when we're looking that the exchange happening with our blood vessels and our smallest vessel called the capillaries, this moving from one compartment to the other happens at our **capillary walls**. Now we have this barrier, how do we get the main and how do we things from one thing to another. Ingest water, can be in any of these 3 compartment but need to pass barrier to do that. We need to understand some basics how we put things together.

Chemistry basics

Ions. Na<sup>2+</sup>, Cl<sup>-</sup>. electrons don't like to be single alone, on match.com, try to find a boyfriend. They gain and gave away their electron. To get extra electron become negative, release electron become plus / positive.

- Ions have a charge, can either gain or give electron.
- aka electrolytes = ions, ad: to buy!
- 2 categories of ions:
  1. cations: net positive. ex: Na<sup>+</sup>
  2. anions: net negative

Free radicals

- Have a single electron in outer orbit. Not an atom, but compound. Electrons don't like to be single, want to add more electron to solve problem. Free radicals grab electron from others

- Removes electron from another = Oxidation process. If this is a compound that does the oxidation, we called it oxidant. We drink things that said antioxidant.

- Antioxidant drink. Free radicals are bad, they get into our body to do bad things and we ingest thing to get rid of them, said the beverages. we can't ingest them. but we also produce free radicals.

- Our levels vary

1. Ingestion

2. Production. Our body produce free radicals. NOT ACCIDENT. that happens in few spaces, but we actually have intentional design set up to cause free radicals in your body. Intentional via immune system, causes free radical level to go up. They strip away electron, why immune system want them? Weapon that your immune system can