**AP Biology: Cell Specialization Activity**

**Part 1**

1. A common saying in Biology is “form follows function”. Describe what you think this means in your own words or examples.
2. Visit the PBS site <http://www.pbslearningmedia.org/resource/2e77e757-1566-4496-923c-14003bd7052a/understanding-tissues-cells-form-follows-function/>

Launch the presentation and watch the video **as a class.**

Go through the powerpoint “learn the lesson”. Use the information and your knowledge to complete this chart. The first one is done for you ☺

Re-create on your paper:

|  |  |  |  |
| --- | --- | --- | --- |
| **Body System** | **Function of System** | **Shape of Key Cells**  **(describe or draw)** | **Relationship between Shape and Function** |
| Nervous | Send and receive signals | Long, Branched Neurons | Antenna shape increases signal efficiency |
| Digestive |  |  |  |
| Skeletal |  |  |  |
| Muscular |  |  |  |
| Cardiovascular |  |  |  |
| Respiratory |  |  |  |

1. Thinkables!
2. Obviously the way a cell looks is different depending on the function. Do you think a cell will have differences in organelles depending on the function of that cell? Explain your answer. What organelle(s) would muscle cells need a lot of?
3. All cells have a phospholipid bilayer as a cell membrane. Thinking about the variety of shapes and sizes of cells what can you conclude about the cell membrane?
4. True/False: The nucleus of a cell contains different types of DNA depending on the structure and function of the cell for that organism. Explain your answer.
5. How/Where do you get the different cells in your body?
6. Stem Cells: Watch the video **as a class.**

Use the NIH information on Stem Cells <http://stemcells.nih.gov/info/basics/pages/basics5.aspx> to answer

the following:

1. What are potential uses of human stem cells?
2. Distinguish between: Adult Stem Cells, Embryonic Stem Cells, Pluripotent

**Cell Specialization Part 2: Neurons as an Example of Specialization**

1. Draw a neuron (nerve cell) and label: myelin sheath, node of ranvier, axon, dendrite, cell body and nucleus in the diagram.

Add to your drawing from #1 as you follow the Ted Talk.

<http://ed.ted.com/lessons/how-do-nerves-work>

1. Use class notes and the video to answer the following questions:
2. When a neuron is a rest, what is the charge of the cytoplasm inside the neuron? Outside of the neuron?
3. How does the inside of the neuron change charge?
4. What role do the ion channels play in the firing of a nerve cell? Does this require ATP energy?
5. If this is similar to an electric current moving through a wire, hypothesize the purpose of the **myelin sheath?**
6. Where in the nerve does the signal change from electrical to chemical?