Making Your Own Cell

Lab Partners: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Introduction:**

Cells are usually viewed using a microscope. We see them one plane at a time. It is easy to lose sight of the fact that cells are three-dimensional. Building a 3-D model of a cell can reinforce this concept.

**Concepts:**

* Cell structure/function \* Cell organelles

**Background:**

In the 17th century Robert Hooke used a microscope to examine shreds or cork. He marveled when he saw an internal structure within the cork pieces – little box-like units that appeared to be empty. At the thinnest areas of the cork he could see right through the box-like units. He called these structures cells.

Since Robert Hooke, many people have marveled at the “little boxes” when looking through a microscope. The size, shape, and variety of living cells is mind-boggling. Cells, though very small, are very complex. They have mechanisms for obtaining and using energy, reproducing, transporting materials, as well as a myriad of cellular processes.

Living cells can be separated into two groups – prokaryotes and eukaryotes – based upon their distinctive cellular structure. Prokaryotes – the bacteria – represent the simplest of living cells. Eukaryotic cells are larger, more complex, and more specialized than prokaryotic cells. Plants, animals, and other multicellular organisms are composed of eukaryotic cells. A eukaryotic cell will be modeled in this activity.

A key feature of eukaryotic cells is the structural division of the cell into smaller functional parts called organelles. Any part of a cell that has its own structure and function can be considered to an organelle. Consult a cell model and/or your biology text and learn the general structural appearance of each of the following organelles as well as more details about their functions.

**Plasma Membrane:**

Function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Cytoplasm:**

Function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Nucleus:**

Function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lysosome:**

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**Mitochondria:**

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**Rough ER:**

Function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Smooth ER:**

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**Golgi Apparatus:**

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**Vesicles:**

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**Vacuole:**

Function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Microtubules:**

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**Safety Precautions!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!**

***The melted Cellgel material is extremely hot and can cause severe burns. Be extremely careful when pouring the gel and while it is cooling. Wash hands before leaving the laboratory. Wear chemical splash goggles, heat-resistant gloves and a chemical-resistant apron.***

**Procedure:**

1. Be sure cell structures and their functions have been studied and reviewed before building a model. Mrs. Heath will review these topics prior to the model building.
2. As a cell-building team, you have collected possible materials to represent the organelles in your cell model. Your cell will only be about 250 mL in volume, so small items will be the best to represent the organelles. Examine all of the materials and discuss the relative merits of each item for representing a specific organelle. The Cellgel will be extremely hot when poured into the cell mold, so items that melt at low temperatures cannot be used. Food items will probably not work.
3. When the model is made, the Cellgel representing the cytoplasm of the cell must be melted. Mrs. Heath will provide directions on how to melt and handle your gel. Be very careful at this stage of the activity since the melted gel can cause severe burns.
4. Pour the melted gel into your cell mold and let it cool. As it cools, it will become thick and less liquid-like. Place your nucleus and other organelles into the gel, where appropriate, using forceps. If an organelle-object float to the top instead of staying lower in the cell, wait until the gel cools to a thick consistency, and then “sink” the object by pushing it down into the gel with a dissecting needle. Items can be maneuvered in the gel until it sets completely. Avoid moving items quickly and creating air bubbles in the gel.
5. Allow the entire gel to cool until the gel hardens completely and then let it sit undisturbed overnight.
6. Take the cell out of the mold. How does the cell look? Draw a picture of your cell model and label each part of the cell.
7. Store your cell model in the mold or in a plastic zipper-lock bas directed by Mrs. Heath.

Labeled Cell Diagram