

Laboratory 4

Cell Structure and Function

Student Tip Sheet

Prokaryotic and Eukaryotic Cells

There is much current research being published concerning the classification of the primitive life-forms. Extremophiles and other newly investigated organisms are among the “hot topics” of biological research. Some of these organisms exist in the hottest, coldest, and most chemically adverse conditions that our planet has to offer – such as on the polar caps, in volcanoes, or in gas vents in the ocean depths. If this study of classification and evolutionary domains piques your interest, check out the following web sites for additional information and great electron micrographs. (phylogeny.arizona.edu **or** trishul.sci.gu.edu.au)

If you are having problems focusing on these small organisms do not hesitate to ask for assistance.

Observation: Eukaryotic Cell

The motion of an *Amoeba sp.* is truly amazing to watch. Please take the time to focus carefully and give the *Amoeba* a chance to slowly move about your field of view. An *Amoeba* will appear as a fairly large, black grainy blob, 75 – 100 micrometers, in your field of view. It can be easily mistaken for a bit of trash, so make certain that you are looking at the correct image. It will extend its pseudopods in any direction as it moves about. If you are lucky, you may be able to see it surround a bit of food and completely engulf the small “prey.” The contractile vacuoles that you see as bubbles inside the *Amoeba* are pockets of waste that will periodically move to the edge of the membrane and burst, releasing metabolic fluid waste from the *Amoeba*. Try to watch the action of a contractile vacuole.

Observation: Elodea (Anacharis)

Always try to use the freshest *Elodea* possible. Use only one small leaf to make a wet mount slide. As you focus, you will find that the leaf is more than one cell thick. Using the fine adjustment on high power, focus on the layer that has the most chloroplasts. These plant organelles will appear as green beads in the cytoplasm. If photosynthesis is occurring the chloroplasts will move to the edge of the cell wall and travel around the perimeter. If photosynthesis is not occurring the chloroplasts will be scattered throughout the cytoplasm. However, sometimes patience pays off and apparently the light from the microscope can stimulate photosynthesis to begin and thus trigger the chloroplasts to move. If your chloroplasts are moving, share with your neighbor!

Membrane Transport Processes

Membrane transport can be a difficult concept for beginning biology students. Therefore, to avoid confusion, please review your lecture material before you begin your lab activities. Remember that diffusion is a simple understanding that molecules move from an area of high concentration to low concentration. The scent of strong perfume will gradually travel from one side of the room to the other. Likewise, molecular particles will move across porous cell membranes as long as the particles are small enough to fit through the pores. The osmosis exercises in your lab manual are used to illustrate what happens when water moves across the cell membrane because the particles involved are too large and cannot pass through. Follow your directions very carefully and make precise measurements.