Plastids

Amyloplasts in the Potato Tuber

A tuber is an underground stem used for the storage of nutrients during plant dormancy. Dormancy, a period of greatly reduced metabolic activity, allows many plants to survive winter. The nutrient reserve provides the energy for new growth in the spring. Starch is the common nutrient stored by plants. Recall that the plant organelles which store things are called plastids. Starch is stored in amyloplasts, a specific type of leucoplast (any unpigmented plastid). In this exercise you will observe amyloplasts in the storage cells of the potato tuber.

Procedure

Use a sharp razor blade to slice a very thin section from the potato tuber. Do not use the "skin" portion.

A. Make a wet mount of your section using a drop of water. If your coverslip is balancing precariously on the section rather than "floating" uniformly on the surface, your section is too thick.
B. Once you have your section focused clearly with the high power objective, rotate the fine adjustment knob carefully, with low light level, to observe the internal structures of the fairly large, thin walled and loosely packed storage cells. The cells should be filled with several unpigmented egg-shaped structures. These are commonly called **starch grains**, but we botanists know they are correctly referred to as **amyloplasts.**
C. Add a drop of iodine to the edge of the coverslip. What happens to the starch grains (amyloplasts) as they absorb the iodine? This reaction is a "famous" reaction which uniquely identifies starch. It is a very useful test in botany and biology.

Chromoplasts

You have observed two different types of plastids so far in today's lab, the chlorophyll-containing chloroplasts which function in photosynthesis, and the unpigmented amyloplast, which stores starch. Now you will have an opportunity to observe a third plastid, the chromoplast which contains carotenes, the gold and orange pigments of plants.

Procedure

Obtain a small piece of carrot, red pepper or tomato. Petals of bright orange flowers, such as marigold flowers, are also excellent sources of chromoplasts.

A. Use a sharp razor blade to slice a very thin section of your chosen material.
B. Make a wet mount of your section using a drop of water. If your coverslip is balancing precariously on the section rather than "floating" uniformly on the surface, your section is too thick.
C. Once you have your section focused clearly with the high power objective, rotate the fine adjustment knob carefully, with low light level, to observe the internal structures of the cells. The cells should be filled with several tiny oval, gold—pigmented structures. These are the chromoplasts. You may have to adjust your light level to see them.

How do the chromoplasts compare to the chloroplasts and amyloplasts you observed previously? Are the chromoplasts of carrots different from those of red peppers or tomatoes?