

Active Transport in Yeast Cells

For substances that are present in low concentrations in their environment, cells must use energy to accumulate those substances. The process of active transport consumes energy to move substances across the cell membrane from an area where they are at a low concentration to an area where they are at a higher concentration. Remember that this direction is opposite to the passive processes of diffusion and osmosis. The end result, of course, is a greater concentration of the desired substance on one side of the membrane than on the other.

Materials

0.2 % yeast suspension	eye droppers
2% congo red dye	hotplate
10 mL test tubes	microscope slides
250 mL beaker	test tube holders

Procedure

1. Label one test tube “boiled” and the other “normal.”
2. Add 5 mL of freshly prepared yeast suspension to each tube.
3. Place the tube labeled “boiled” into a hot water bath at 100°C for 10 minutes. Let it cool afterward.
4. Add 6 drops of congo red dye to each tube.
5. Vortex the tubes gently to mix the contents.
6. Add a drop of the “boiled” sample to a glass slide and observe under high power. Record your observations.
7. Using a clean dropper, repeat for the “normal” sample.

Questions

1. Why did you use a clean dropper for each sample?
2. What is the effect of heat on the living yeast cells?
3. Did any yeast cells not contain dye? Explain.
4. Does congo red move into yeast cells by diffusion or active transport? How do you know?
5. What is the advantage to cells to be able to move molecules with the concentration gradient?
6. What is the advantage to cells to be able to move molecules against the concentration gradient? What is the cost to cells to move molecules against the concentration gradient?