

Feeding *Paramecia*

Introduction

Look through the transparent cell membrane of a one-celled organism, *Paramecium*, as it ingests yeast cells. You'll be amazed at what you see!

Concepts

- Ingestion
- Digestion
- Cilia movement
- Food vacuole
- pH indicator

Background

Paramecia are ciliated, one-cell organisms. They can be slowed with the use of methyl cellulose solution to allow careful observation of internal cellular activities. Stained yeast cells will enter a *Paramecium* through its oral groove. The stained cells can then be viewed as they circulate throughout the cell. The red stained yeast cells (inside the formed food vacuole) will likely be seen turning blue in color as pH changes occur during digestion. Congo red is red at pH 5 and is various shades of blue at lower pHs. An idealized path of the stained food vacuole might look like those in Figure 1.

Materials

- Methyl cellulose solution, 3%
- Paramecium* culture
- Stained yeast culture
- Microscope
- Microscope slides
- Slide coverslips

Safety Precautions

This laboratory activity is considered nonhazardous. Follow all laboratory safety guidelines.

Procedure

1. Place a ring of methyl cellulose on a clean microscope slide.
2. Place a small drop of *Paramecia* culture in the center of the methyl cellulose ring.
3. Add a small drop of stained yeast suspension to the *Paramecia* drop.
4. Cover with a clean coverslip and immediately observe with a microscope.
5. Locate a *Paramecium* and observe what happens to the stained yeast cells. The *Paramecia* will ingest some of the yeast cells very quickly, perhaps within 10 seconds of adding the yeast.
6. Study the food vacuole formed inside a *Paramecium* and watch it for at least 10 minutes. *Hint:* You will have to continuously focus up and down “through” the *Paramecium* and regulate the light carefully.

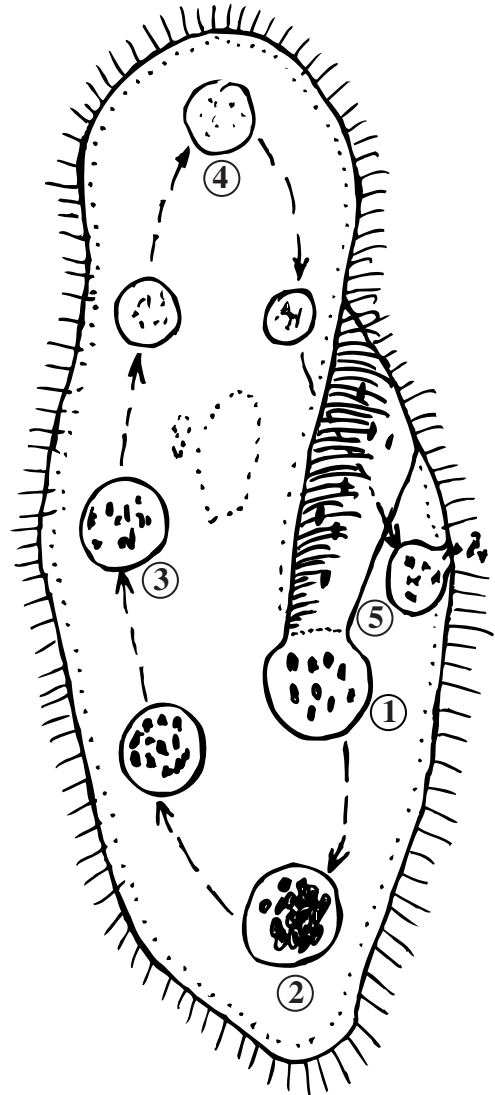


Figure 1. Food vacuole in a *Paramecium*

1) Yeast cells are ingested and a food vacuole is formed. 2) The food vacuole is initially red in color from the red stained yeast cells. 3) The vacuole will turn a bluish color as digestion occurs and the pH drops. 4) Yeast cells are digested. 5) Waste materials are eventually released from the cell.

Feeding *Paramecia* *continued*

7. Draw an outline sketch of the *Paramecium* and show the path of the ingested yeast. Note any other changes at various locations within the *Paramecium*.
8. Answer the following questions
 - a. What color and shape were the yeast cells initially?
 - b. How did the yeast cells get to the inside of the *Paramecium*?
 - c. What changes were observed in the yeast cells after ingestion? How are these changes explained?

Disposal

Please consult your current *Flinn Scientific Catalog/Reference Manual* for general guidelines and specific procedures, and review all federal, state and local regulations that may apply, before proceeding. Dispose of slide/culture materials with ample amounts of water down the drain following Flinn Suggested Disposal Method #26b.

Tips

- To make the stained yeast suspension, prepare a thick suspension of yeast that has been mixed with water. Add a small amount of congo red to the yeast suspension. It should be a bright red color. Bring the yeast/congo red suspension to a gentle boil for 5 minutes. Allow the suspension to cool before using in the experiment.
- Methyl cellulose solution can be purchased or made by adding 3 g of methyl cellulose to 100 mL of distilled or deionized water.
- A rich culture of *Paramecia* will guarantee that students will witness a *Paramecium* feeding. Good microscope focusing technique and light regulation will be required for this lab. Review these techniques with students prior to the lab.

Connecting to the National Standards

This laboratory activity relates to the following National Science Education Standards (1996):

Unifying Concepts and Processes: Grades K–12

Systems, order, and organization
Form and function

Content Standards: Grades 5–8

Content Standard C: Life Science, structure and function in living systems, diversity and adaptations of organisms

Content Standards: Grades 9–12

Content Standard C: Life Science, interdependence of organisms; matter, energy, and organization in living systems, behavior of organisms

Materials for *Feeding Paramecia* are available from Flinn Scientific, Inc.

Catalog No.	Description
LM1076	<i>Paramecium caudatum</i> , Class 30
M0155	Methyl cellulose solution, 3%
C0120	Congo Red
Y0008	Yeast

Consult your *Flinn Scientific Catalog/Reference Manual* for current prices.