

Guided Inquiry 4.3

Ingestion and Digestion of Food

All organisms take in food and excrete waste. Large animals such as humans have specialized organs for ingesting, digesting, and excreting the food they eat. How do smaller organisms ingest and digest food?

Paramecium (Figure 4.26) is a single-celled microorganism that is commonly found in freshwater ponds. Because it is not capable of photosynthesis, it must eat to live. *Paramecium* provides a simple model of how organisms ingest and digest food. How does this tiny creature capture food, take it in, and transport food throughout its body? In this Inquiry, you will observe *Paramecium* as it feeds on yeast cells that have been dyed red.



Figure 4.26

A *Paramecium* cell

MATERIALS

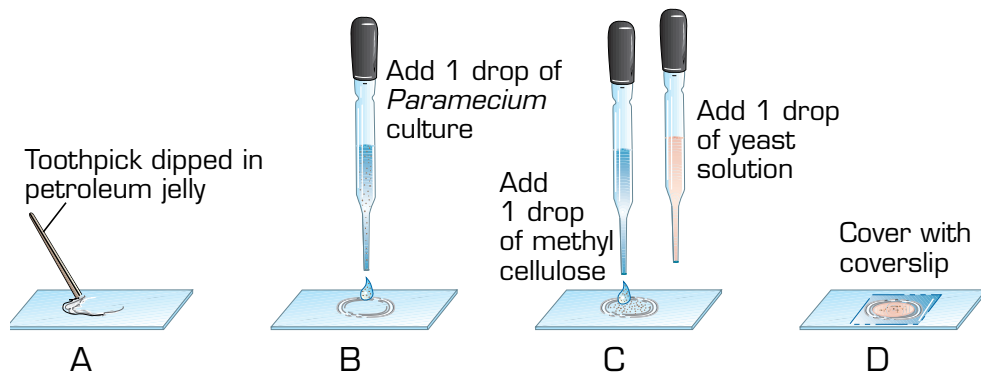
- Petroleum jelly
- Slides and coverslips
- A dropper
- *Paramecium* culture
- Methyl cellulose solution
- Stained yeast solution
- A microscope

Procedure: Day 1

1. Make a circle (about 1 centimeter in diameter) of petroleum jelly on the slide to contain a drop of liquid.
2. With a dropper, place one drop of the *Paramecium* culture on the slide in the middle of the circle (Figure 4.27). Add one drop of

Figure 4.27

Place one drop of the *Paramecium* culture on the slide in the middle of the circle.



methyl cellulose. This helps to slow the movement of the organisms and makes them easier to observe.

3. Add one drop of stained yeast solution to the culture drop on the slide. Gently add a coverslip to the slide.
4. Look at the slide under low power. Locate a slow-moving *Paramecium*, and observe it under high power. Continue observing that organism until it ingests a yeast cell. There may already be yeast cells inside the organism.
5. Draw a sketch of the *Paramecium*. Include any parts that are involved in the ingestion of food, and draw any other parts you can find.
6. Refer to Figure 4.28 for help in identifying the parts of the *Paramecium* that you observed and drew. Try to determine the following:
 - a. How does *Paramecium* use its cilia?
 - b. Through what parts of the *Paramecium* does food travel?
 - c. How is food prepared for digestion?
 - d. How are digestive wastes excreted?

Procedure: Day 2

1. Repeat steps 1 through 5 from the Day 1 procedure.
2. Observe a single food vacuole as it forms, and follow its movement within the organism. Note any changes that occur inside the vacuole as it moves.
3. Observe a different vacuole as it forms, and follow its movement. Compare the movement of this second vacuole to the movement of the first one that you observed.

Interpretations: Respond to the following in your *Log*:

1. Why did you stain the yeast cells?
2. How can you distinguish between the most recently formed food vacuole and one that was formed earlier?

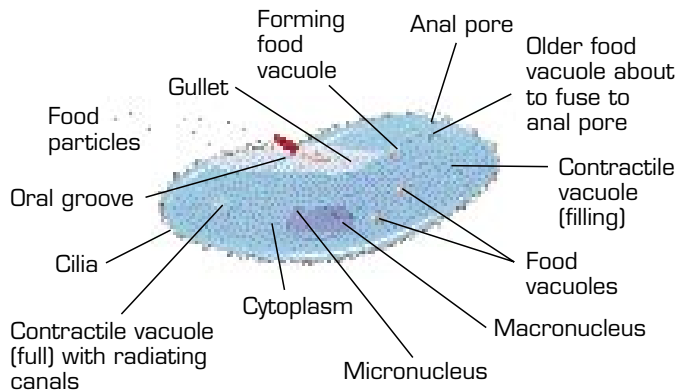


Figure 4.28

Internal structures of a Paramecium cell