Name _____ Date _____

Cell Organelles and Their Functions

Directions: For the questions about the amoeba, use the passage and the table. Answer the other questions using what you know about organelles.

One Cell, Many Jobs

Use the passage and the table to answer these questions.

An amoeba is a living thing made of just one cell. It lives in ponds and creeps along by pushing out parts of its body. Since it is only one cell, its organelles, the tiny structures inside it, must do every job that keeps it alive.

When an amoeba meets a smaller living thing, it flows around it and traps it in a bubble of membrane called a food vacuole. Lysosomes are small sacs filled with digestive chemicals. They join the food vacuole and break the food down. Mitochondria then release the energy stored in the food so the cell can use it.

Pond water keeps seeping into the amoeba. A contractile vacuole fills with this extra water and then squeezes shut to push the water back out. Without it, the cell could swell and burst.

All of this work depends on the nucleus. The nucleus holds DNA, the instructions for building the proteins a cell needs. Ribosomes use copies of those instructions to build the proteins.

Scientists tested what happens to an amoeba without its nucleus. They used a fine glass needle to cut 20 amoebas in two. One half of each amoeba kept the nucleus, and the other half did not, but both halves kept some of the other organelles, such as mitochondria and vacuoles. Each half went into its own dish of the same pond water, at the same temperature, with the same food. Every 5 days, the scientists counted the dishes that still held living amoebas. Every half with a nucleus grew and divided, but no half without a nucleus ever did.

Dishes that still held living amoebas (20 dishes of each kind)

Day	Halves with a nucleus (dishes with living amoebas)	Halves without a nucleus (dishes with living amoebas)
0	20	20
5	20	20
10	20	17
15	20	6
20	20	0

1. Match each organelle to its job.

Write the letter of the matching answer on each line.

1. _____ Nucleus
2. _____ Ribosomes
3. _____ Mitochondria
4. _____ Lysosomes
5. _____ Contractile vacuole

A. Releasing the energy stored in food

B. Pushing extra water out of the cell

C. Breaking down food with digestive chemicals

D. Building proteins from the DNA instructions

E. Capturing light energy to make sugar

F. Storing the DNA instructions for the cell

2. Based on how the passage describes it, why is the contractile vacuole called contractile?

A. It traps food inside a bubble of membrane.

B. It squeezes shut to push water out of the cell.

C. It captures light to make food.

D. It contains the cell's DNA instructions.

3. In the experiment, what did the scientists change on purpose between the two kinds of halves?

A. The food each half was given

B. The number of dishes that held living amoebas

C. Whether the half had a nucleus

D. The pond water each half lived in

4. How many halves without a nucleus died between day 10 and day 15?

_____ halves

5. Which claim does the evidence from this experiment support?

A. All cells die within 20 days if their nucleus is removed.

B. In this experiment, amoeba halves needed a nucleus to grow, divide and stay alive.

C. In this experiment, the halves without a nucleus died as soon as they were cut.

D. The nucleus is the only organelle an amoeba needs to stay alive.

6. The halves without a nucleus still had mitochondria and vacuoles. Which choice uses what the passage says about the nucleus to explain why they did not survive?

A. They had no nucleus to supply DNA instructions, so they could not keep building the proteins they needed.

B. They had no vacuoles, so they could not trap food.

C. The pond water in their dishes was different.

D. They had no mitochondria, so they could not release any energy.

7. Suppose an amoeba is moved into water with salt dissolved in it, so much less water seeps into the cell. What would its contractile vacuole most likely do?

A. Turn into a food vacuole, because it is no longer needed

B. Fill and empty less often, because there is less extra water to push out

C. Start building proteins, because it has less water to move

D. Fill and empty more often, because salt makes the cell need more water

8. Heart muscle cells work without stopping, day and night, and use a lot of energy. Which organelle would you expect to find in large numbers in these cells?

A. Mitochondria

B. Chloroplasts

C. Lysosomes

D. Contractile vacuoles

9. A white blood cell traps a bacterium inside a bubble of membrane. Which organelles would join that bubble and break the bacterium down?

A. Contractile vacuoles

B. Lysosomes

C. Mitochondria

D. Ribosomes

10. Some cells in the pancreas build large amounts of protein that help digest food in the intestine. Which organelle would these cells need in large numbers?

A. Lysosomes

B. Contractile vacuoles

C. Chloroplasts

D. Ribosomes