

Lab 4 Respiration

Name _____

Seat number ____

Objectives:

- A. Cells and organelles
- B. Brief background on respiration
- C. Anaerobic respiration experiment
- D. Skeletal muscle and tendon
- E. Questions

A. Cells and organelles

Fill in the blanks with the numbers of the correct organelles, as seen in the picture on the left

Picture	Organelle name	#
	Plasma membrane	—
	Smooth ER	—
	Rough ER	—
	Lysosome	—
	Nuclear envelope	—
	Nucleolus	—
	Centrioles in centrosome	—
	Golgi	—
	Mitochondria	—

Lab 4 Respiration

Match the organelle on the left with its function on the right

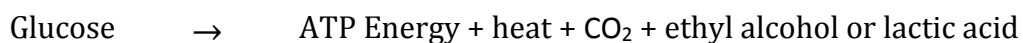
- | | | |
|---------------------|-----|---|
| 1. Rough ER | ___ | makes cholesterol for sex hormones and detoxifies |
| 2. Centrioles | ___ | packages proteins for transport out of cell |
| 3. Mitochondria | ___ | makes proteins for export out of cell |
| 4. Smooth ER | ___ | recycles cellular material |
| 5. Plasma membrane | ___ | converts food into ATP |
| 6. Nucleolus | ___ | membrane around nucleus |
| 7. Golgi | ___ | membrane around entire cell |
| 8. Lysosomes | ___ | makes ribosomes |
| 9. Nuclear envelope | ___ | separates dividing chromosomes |

B. Brief background on respiration

In cellular respiration, a glucose sugar molecule is broken down into a form of energy called ATP. This reaction also releases heat energy, and carbon dioxide gas (CO₂). If oxygen (O₂) is present, it is called aerobic respiration and a lot more ATP can be formed. See the equation below



When oxygen is not used in the breakdown of glucose, a type of respiration occurs that is called anaerobic respiration (or fermentation). In this reaction, some ATP energy is released, as well as carbon dioxide gas (CO₂), and waste products. These waste products are either ethyl alcohol which occurs if it is yeast breaking down glucose, or lactic acid, which occurs in skeletal muscles of our body. See the second equation below.



Lab 4 Respiration

C. Anaerobic respiration experiment

1. Fill 1 test tube halfway with water and 1 test tube halfway with juice. Work with 1 to 3 partners if you wish. Put your test tubes into a wire rack.
2. Add 2 full scoops of yeast to each tube. Cover the opening of each test tube with your thumb & shake gently until the contents are mixed. The tube with water is the control group.
3. Blow air into balloons and stretch them out a bit. Place balloons over the openings to both test tubes. This reaction takes about 30 minutes. You can speed up the reaction by warming the tubes with light. If you have on, put a desk lamp close to your test tubes to speed the rate at which yeast converts sugar into energy.
4. Wait.
While you wait, draw your 2 test tube setup.
Label the grape juice, the water, the yeast, the control group, and the experimental group (grape juice)
5. After 30 minutes or more, *draw* and *label* the results of your experiment.
Label the yeast, and the carbon dioxide bubbles.
Add any other information you wish.
6. Use a bottlebrush to clean your test-tube.
Re-rack your clean test-tube and cleanup your work area.

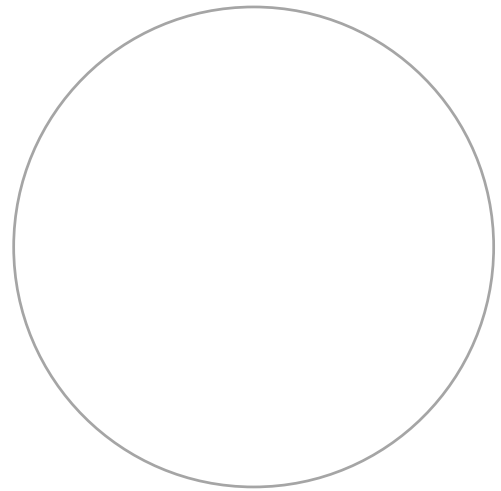
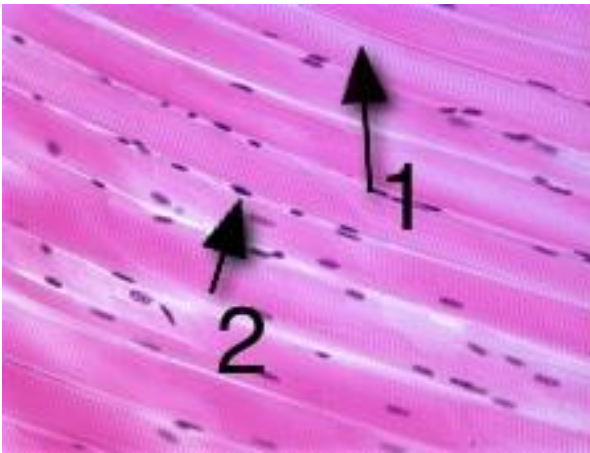


Lab 4 Respiration

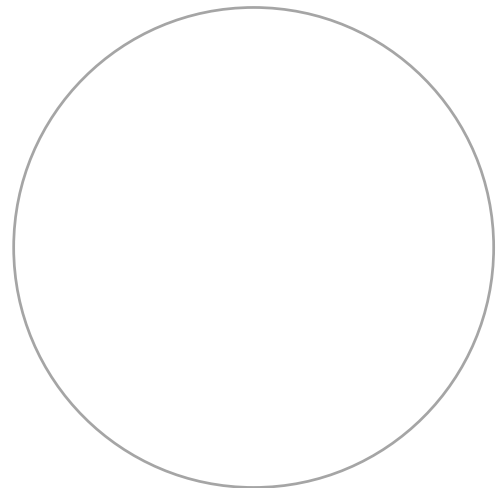
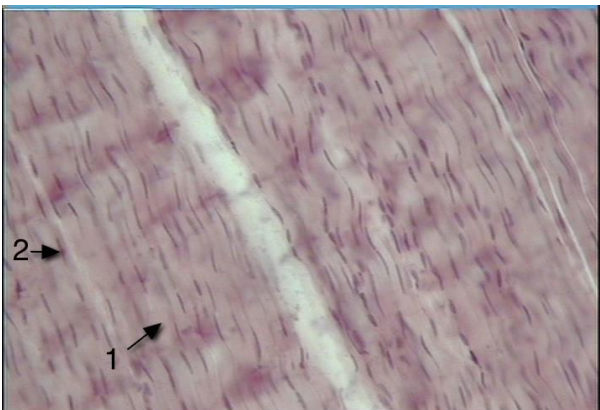
D. Skeletal muscle and tendon

1. Draw a section of skeletal muscle on a prepared slide. Each rectangular stripe of pink tissue is a skeletal muscle fiber (cell).

Label the **striations** (perpendicular stripes in muscle fibers), the **nucleus** and the **skeletal muscle fiber**



2. Draw a section of a tendon on a prepared slide. Label the collagen fibers and the nucleus



Lab 4 Respiration

E. Questions:

- 1) Anaerobic respiration occurs only when this gas is not used: _____
- 2) In animals such as humans, list 4 products of the anaerobic respiration reaction:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
- 3) Lactic acid (lactate) forms in what tissue in our body when we are in oxygen debt?

- 4) What can yeast make that humans CANNOT make? _____

Put last minute notes to students here