

CHAPTER 30

In the last chapter, you learned about the difference between prokaryotic cells (bacteria) and eukaryotic cells (all other living organisms). This week... let's take a closer look at what makes a eukaryotic cell work!

I'm certain you have seen all kinds of plants and animals in your life.

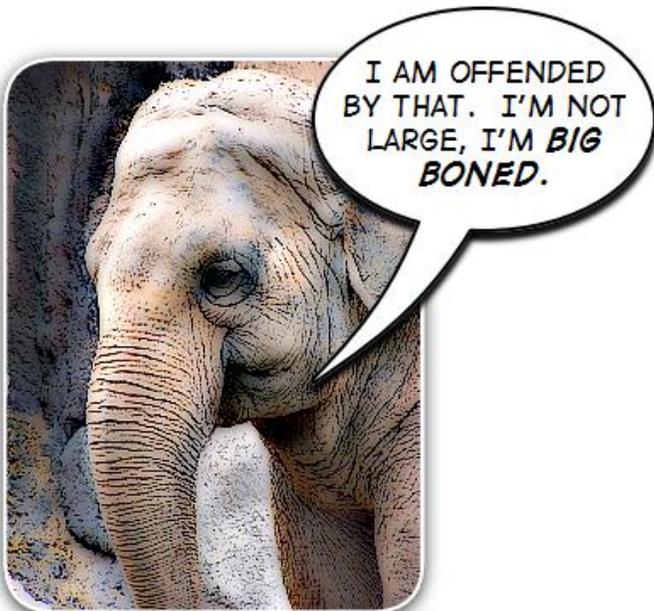
Some of these organisms can be very small, like a blade of grass...

**...while others can be very large,
like an elephant!**

Both the grass and the elephant are made up of cells that work together to keep them alive!

As you learned from the last chapter, all organisms in the plant and animal kingdoms are eukaryotic. Because of this, each of their cells contains organelles.

Remember that organelles are small structures inside of cells that have a specific job. In eukaryotic cells, there are at least a dozen different organelles each working to keep the cell alive! In this chapter, you are not going to have to learn all of them! But there are a few that you really need to know...



Here is a list of the organelles you are going to learn today:

Nucleus ("new-klee-us")

Ribosomes ("ri-bow-sowm")

"ER" (the real name for this organelle is really long. So instead just say the two letters...E and R.)

Mitochondria ("might-o-con-dree-ah")

I know some of the words are long, but keep practicing!
You are going to see these words a lot in this unit!

First, let's take a look at the **nucleus**...

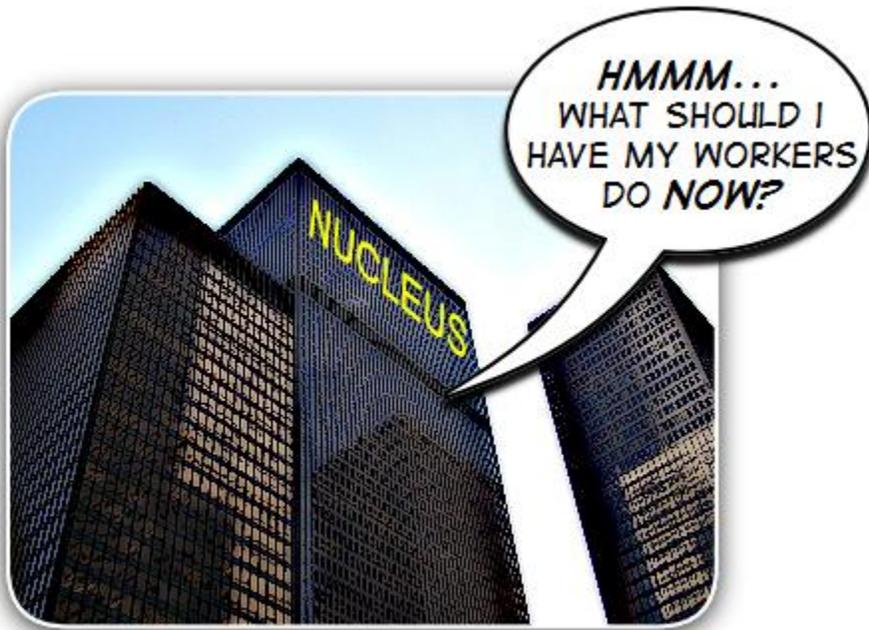
The nucleus is the largest organelle in a plant or animal cell. Like most organelles, the nucleus floats inside the **cytoplasm** of the cell.

(Remember that cytoplasm is a gooey fluid that fills up the inside of a cell, just like a water balloon!)

The most important job that the nucleus has is to hold onto **DNA**. Think of the nucleus as the office of a building. In reality, DNA is a group of chemicals that contain all of the instructions for making all the structures and materials the organism needs to survive!



Think of DNA as **"the boss"**. The DNA tells the rest of the cell what to do and when to do it! DNA is always sending out "messages" to the cell. These "messages" are called **"RNA"**. Once the RNA is made, it is sent out of the nucleus to float around in the cytoplasm.



These messages can only be read by our next organelle...
ribosomes!

The job for each ribosome is to read the RNA... since no other organelle can

read these messages! Once this message is read, the ribosome sends out new messages that the other organelles can read. These new messages are called **proteins!**

Think of a ribosome as **"the decoder"** since its job is to read the special code of the RNA. After reading the RNA, it then makes new messages that the other organelles can read.

You learned in chapter 28 that Proteins are the most important part of the food that you eat. These proteins are digested by your body, broken down into small pieces and recycled!!! These smaller pieces are reused by the organelles in your cells... like the ribosomes!

Remember!

The DNA (**the boss**) wants to send out messages but it cannot leave its office (**the nucleus**). So it makes RNA (**the message**) and sends it out into the cytoplasm for the ribosomes (**the decoders**) to read. The ribosomes read the message (**RNA**) and make new messages (**proteins**) that can be read by the other organelles. These new messages will tell the organelles what to do and when to do it.

These proteins can float around in the cytoplasm for a long time before they reach an organelle. There is a way to get the proteins to the organelles faster! If you want this to happen, you have to use another organelle, called "**ER**".



Think of the "ER" as **"the highway"** that helps to deliver the messages throughout the cell faster.

So... just to be certain that you are understanding how this works:

The DNA (**the boss**) wants to send out messages but it cannot leave its office (**the nucleus**). So it makes RNA (**the message**) and sends it out into the cytoplasm for the ribosomes (**the decoders**) to read. The ribosomes read the message (**RNA**) and make new messages (**proteins**) that can be read by the other organelles. These new messages will tell the organelles what to do and when to do it.

Sometimes, these messages (**proteins**) are delivered faster by traveling on the "ER" (**the highway**).

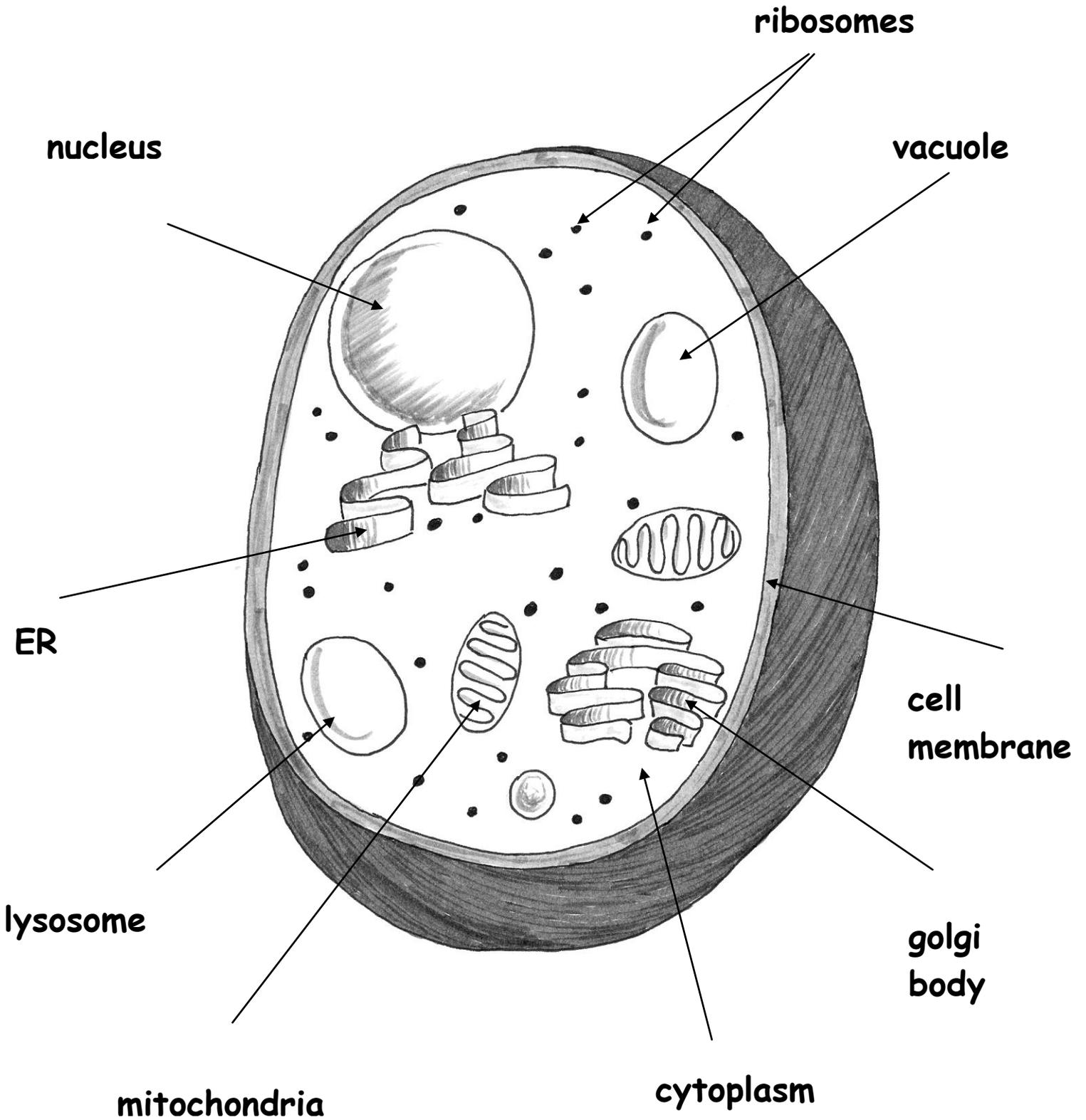
What if your cell needs more energy to breathe, grow or to reproduce?

A message is sent to the **mitochondria** if you need more energy! Mitochondria ("might-o-con-dree-ah") are the "energy creators" of the cell. When your body needs energy, it turns to mitochondria to make it! This organelle uses the nutrients that organisms have in their bodies and changes it into energy. This energy can be used for the cell to breathe, to grow and to reproduce (as well as many other things!)

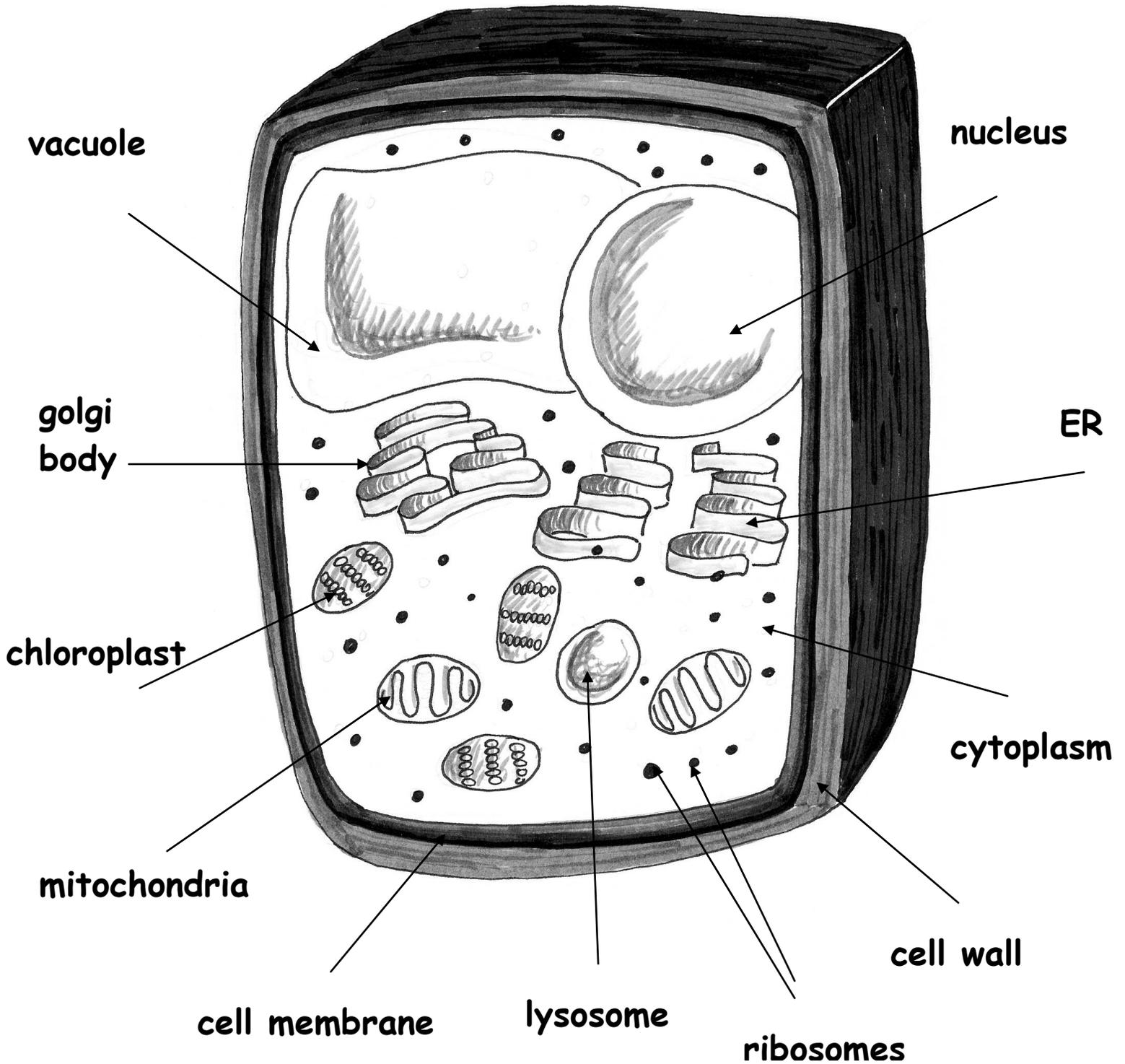


In the next chapter, you are going to learn about three other organelles that both plants and animals have in common.

Animal cell



Plant cell



The table below contains words and phrases that have been chopped in half. Find the pieces that fit together and write them in the answer area below.

Nuc	Mitoch	ondria	leus
e	r	somes	Ribo

Answers:

1. _____
2. _____
3. _____
4. _____

Match the words in the first column to the best available answer in the second column.

___ Nucleus

1) makes protein for the cell

___ Ribosomes

2) quickly sends protein messages to organelles

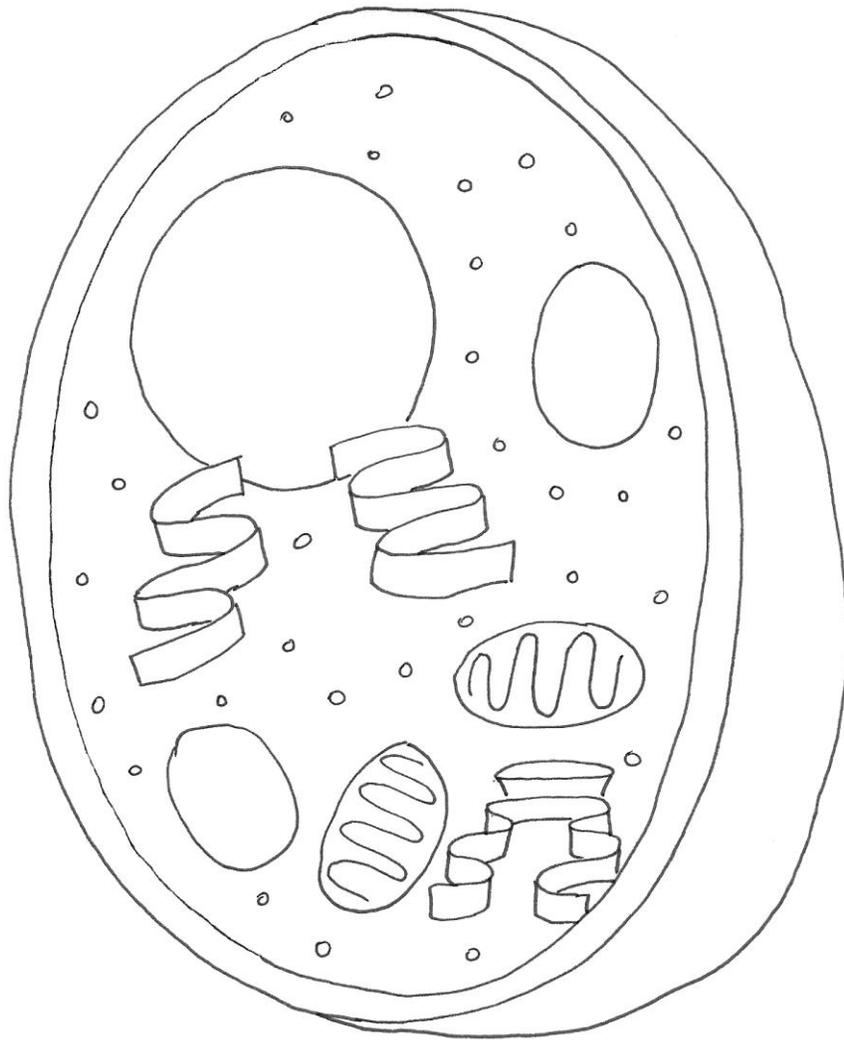
___ ER

3) an organelle that takes nutrients from plants and animals and changes it into energy for the cell

___ Mitochondria

4) the largest organelle in a plant or animal cell; contains the DNA

Color the animal cell below



Color the organelles these colors:

Nucleus - red
Ribosomes - brown
ER - blue
Vacuole - purple

Lysosome - orange
Mitochondria - yellow
Golgi body - blue