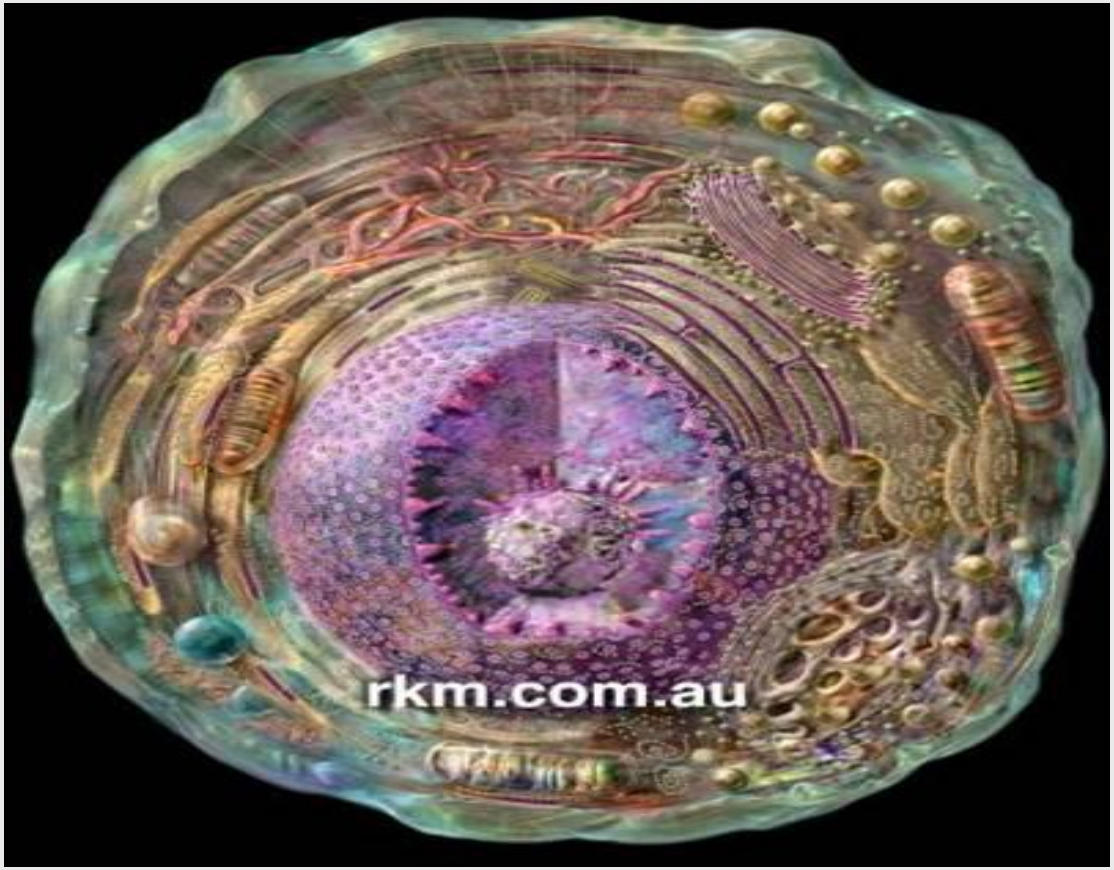
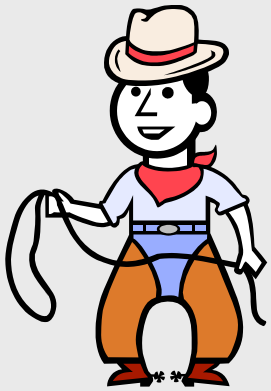
The Amazing Animal Cell!!

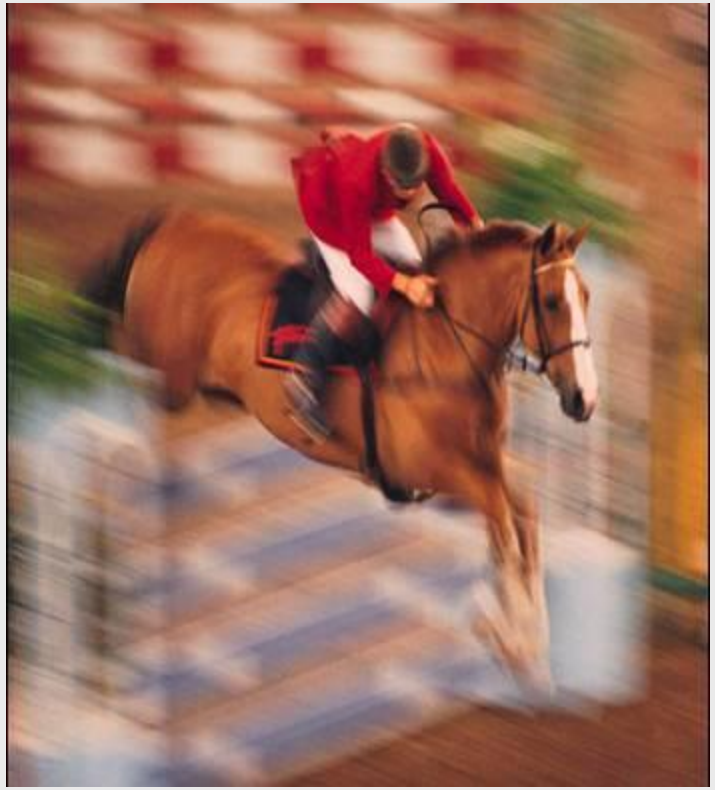




"Hey, I thought cells were just for convicted cattle rustlers and horse thieves!"

Why are Animal Cells so Amazing?

CONVERT FOOD INTO ENERGY



ADAPT TO OUTSIDE STIMULI

Cells can determine:

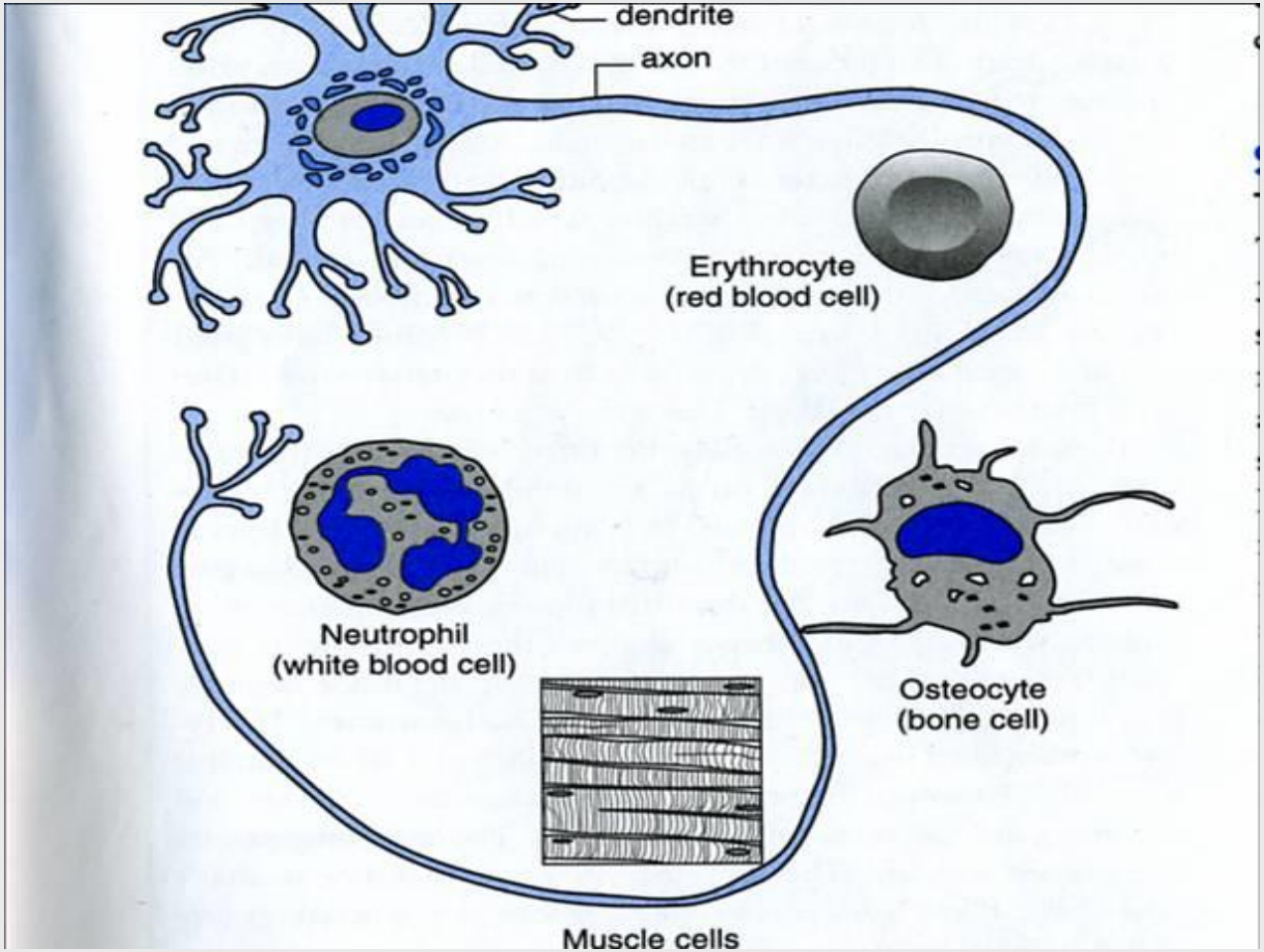
- ***How productive cattle will be.***

- ***How meat tastes!***

- ***Why animals get sick.***

CELLS CAN SPECIALIZE!!

Nerve cell



Amazing characteristics of cells!

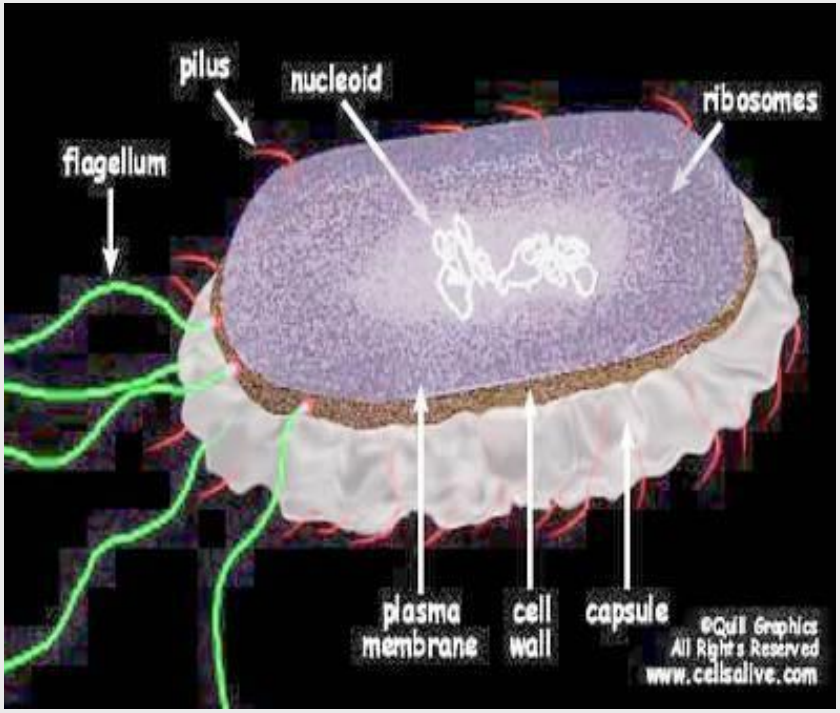
a. **They are the smallest unit of a <u>living</u> system.**
b. **They all hold the blueprints of how an animal is put together.**
c. **They are vital to all life functions.**
d. **They can reproduce!!**
e. **They can change the physical form of an animal. Good traits and bad.**

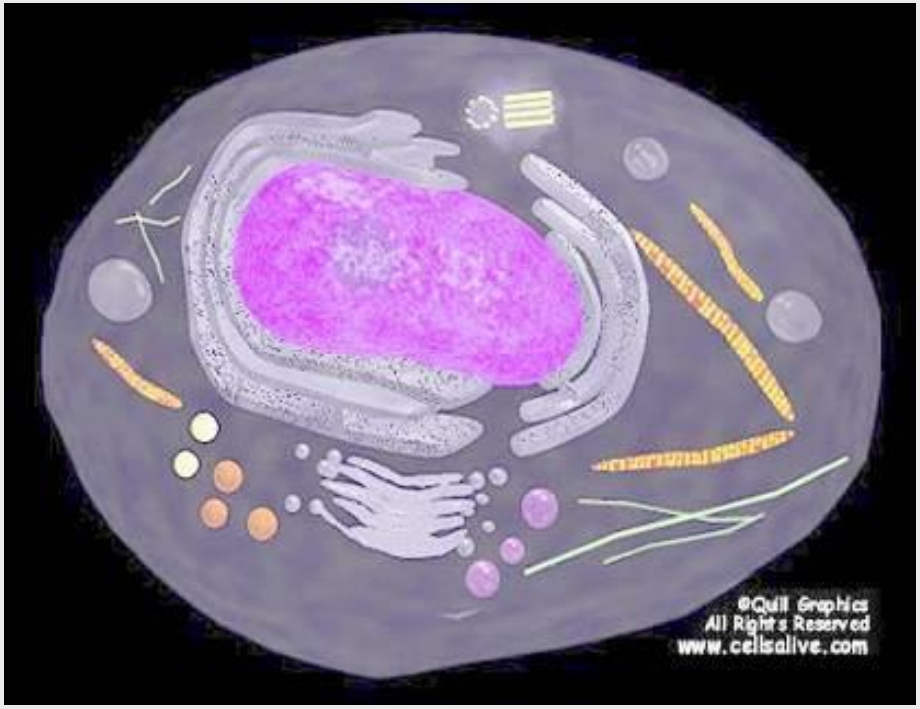
There are basically two cell types

Prokaryotic cells

(before nucleus)

- Eukaryotic cells
- (membrane bound)

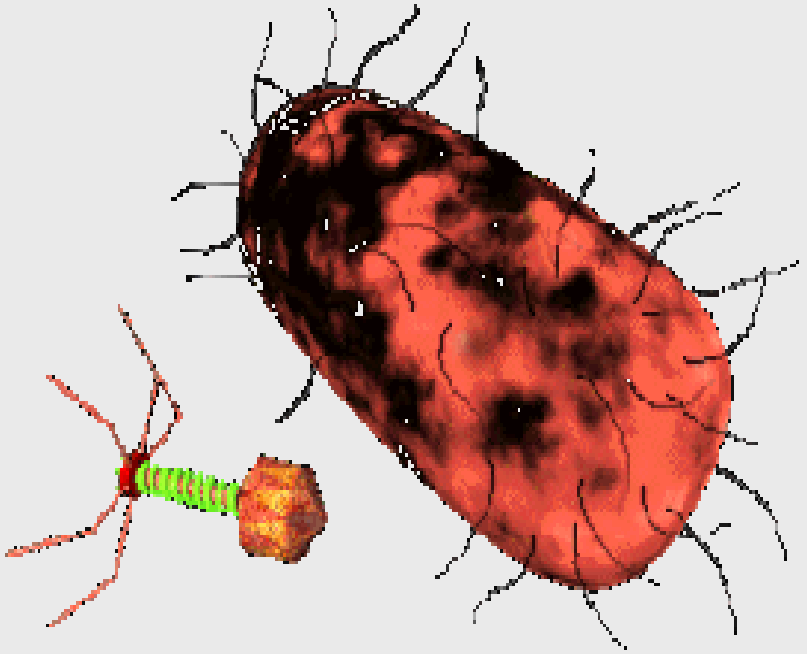




A Prokaryote Cell

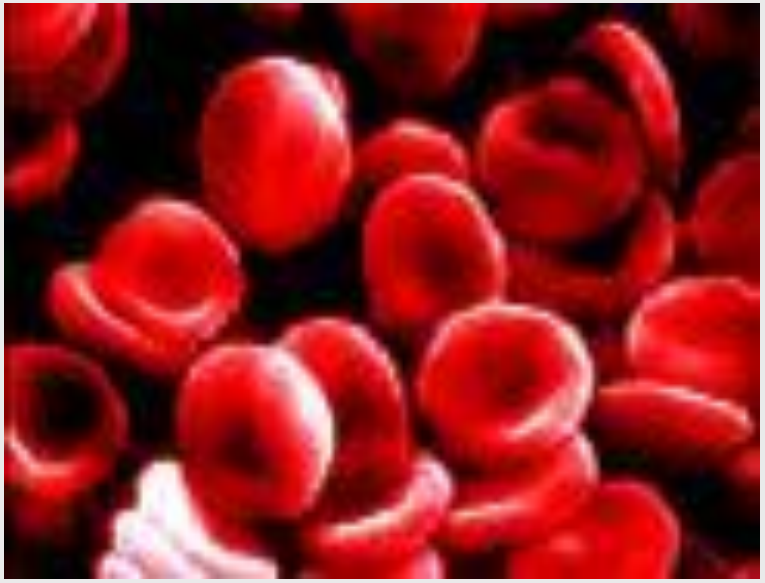
- Single-celled organisms
- Lacks internal structures

- Example: **Bacteria**



A Eukaryote Cell

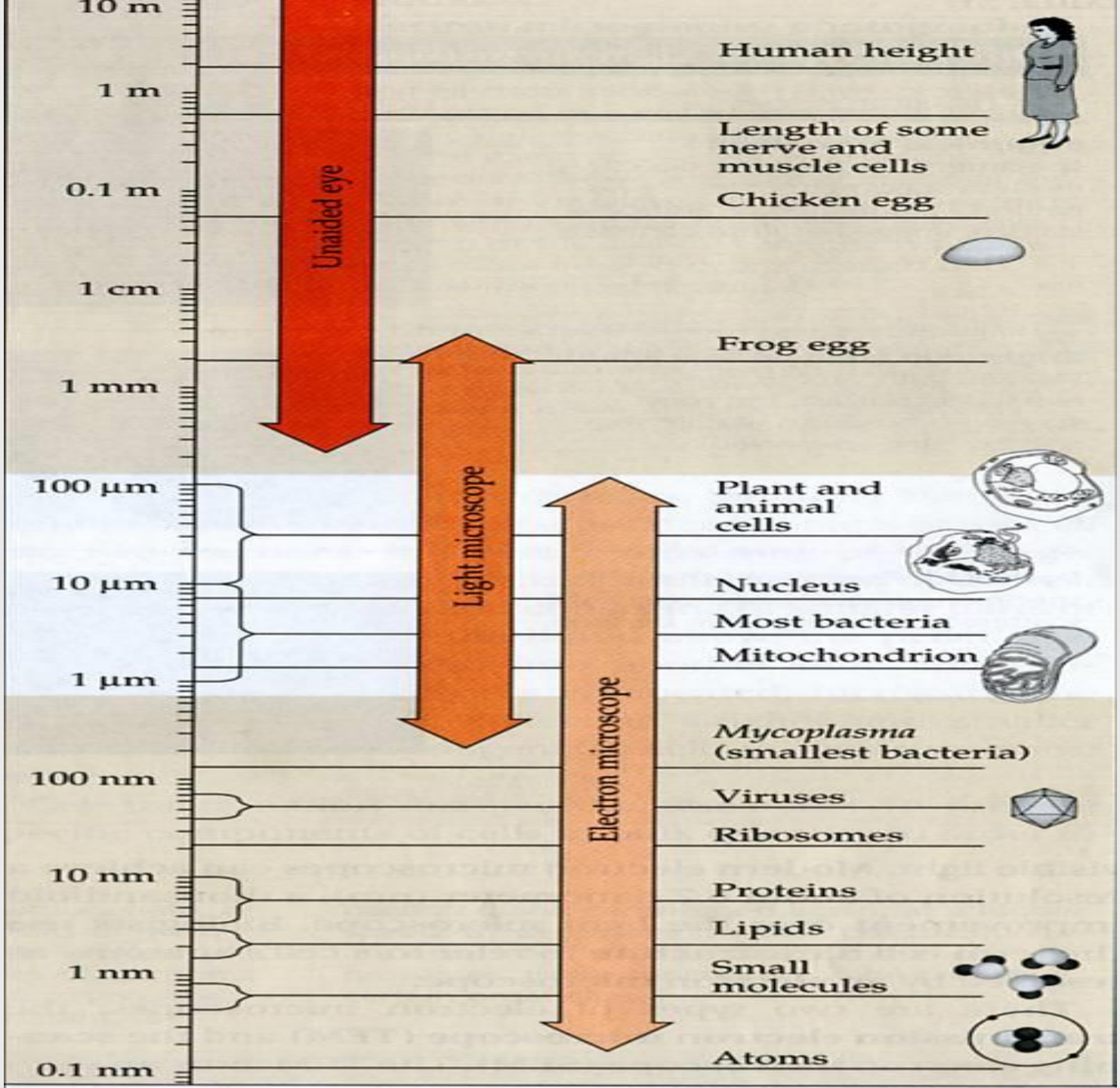
- Has internal membrane-bound structures called organelles. The largest organelle is the **Nucleus,** which contains the cell's DNA.
- May be made of one or many cells.
- Makes up most of all living cells.



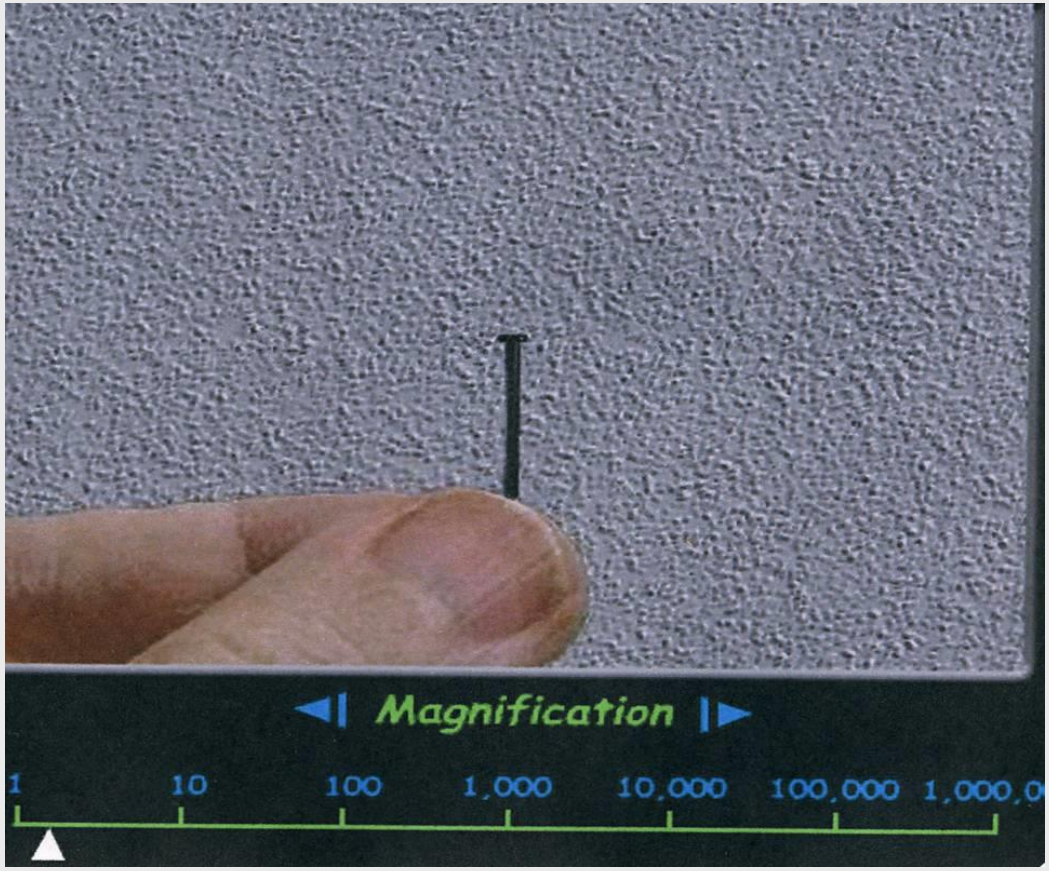
Red blood cell

How big are animal cells?

1 centimeter = 10 millimeters
1 millimeter = 1,000 micrometers

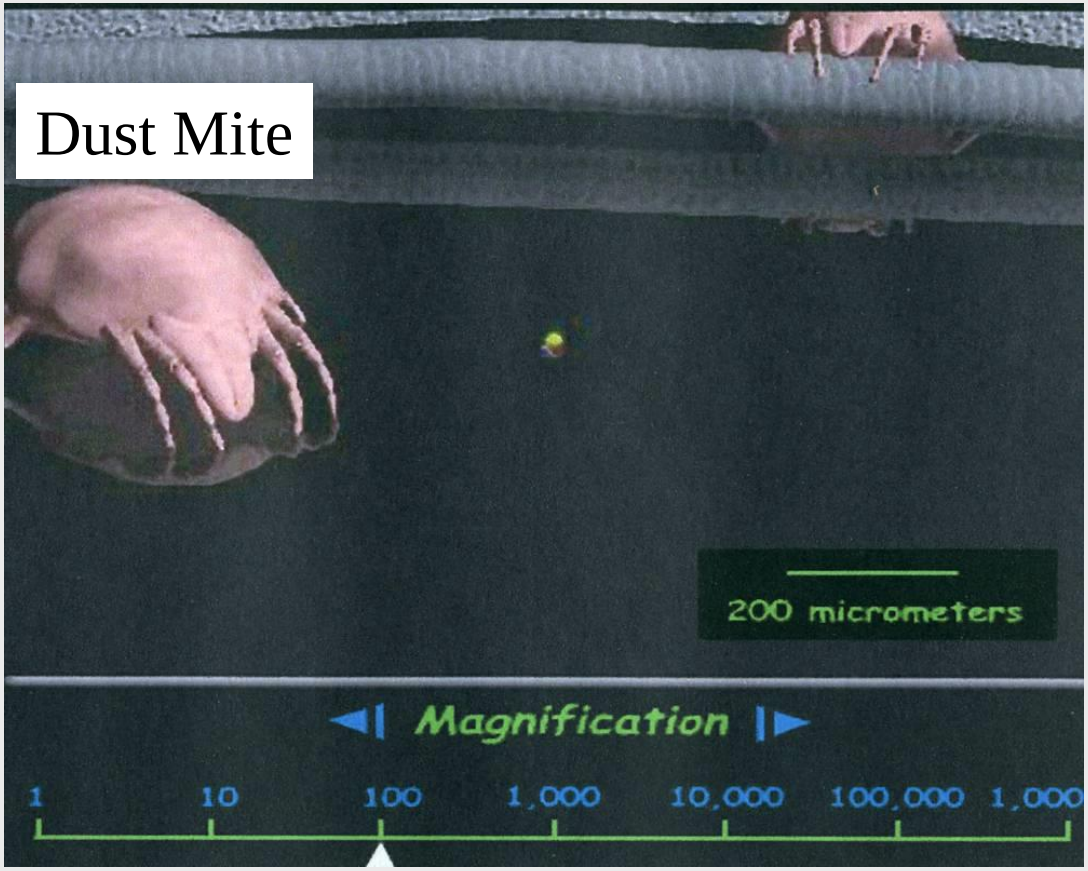

10 m
1 m
0.1 m
1 cm
1 mm
100 µm
10 µm
1 µm
100 nm
10 nm
1 nm
0.1 nm
Unaided eye
Light microscope
Electron microscope
Human height
Length of some nerve and muscle cells
Chicken egg
Frog egg
Plant and animal cells
Nucleus
Most bacteria
Mitochondrion
Mycoplasma (smallest bacteria)
Viruses
Ribosomes
Proteins
Lipids
Small molecules
Atoms

Cell sizes range from 200 micrometers…

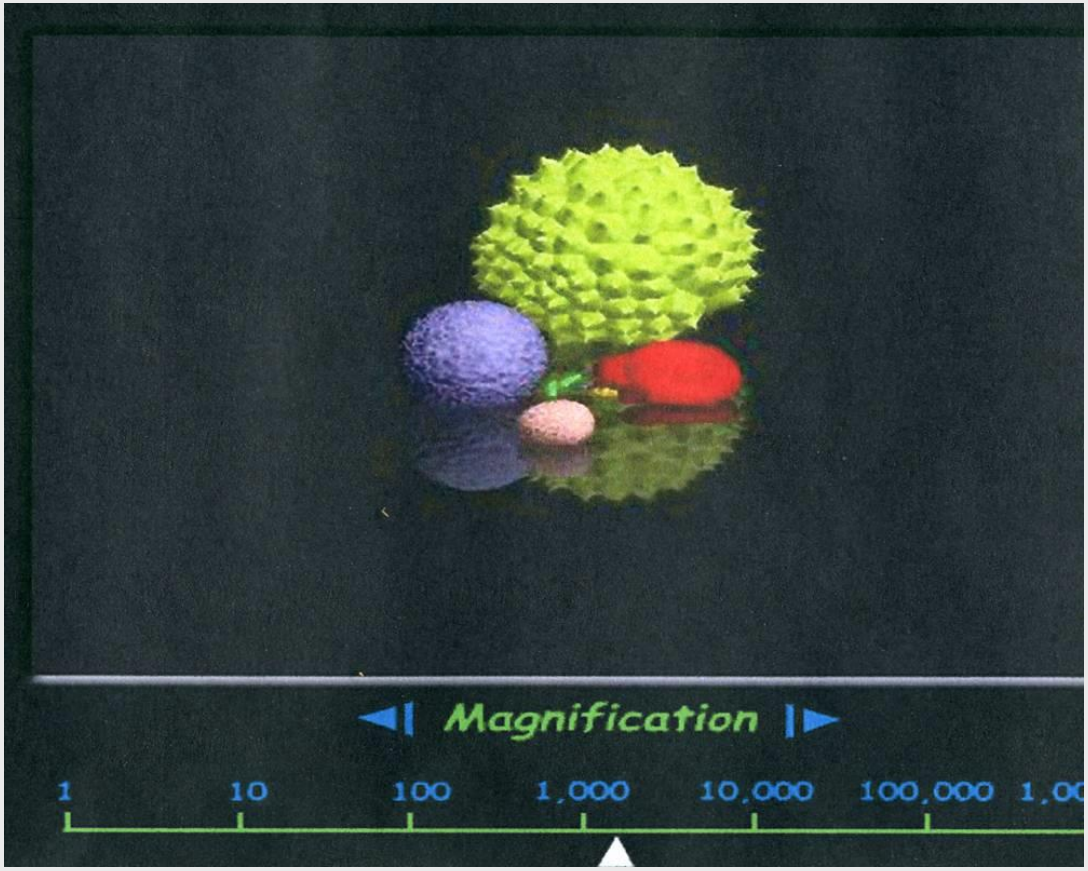


200 micrometers

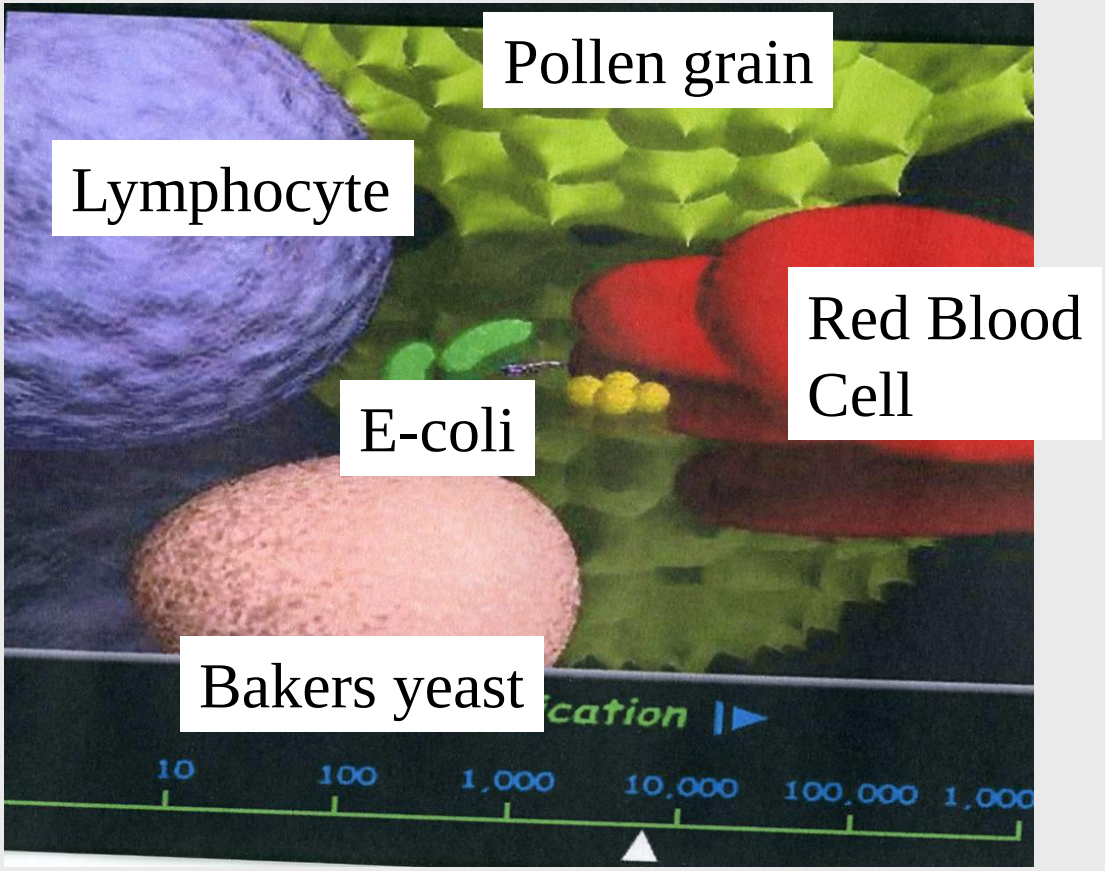
200 micrometers



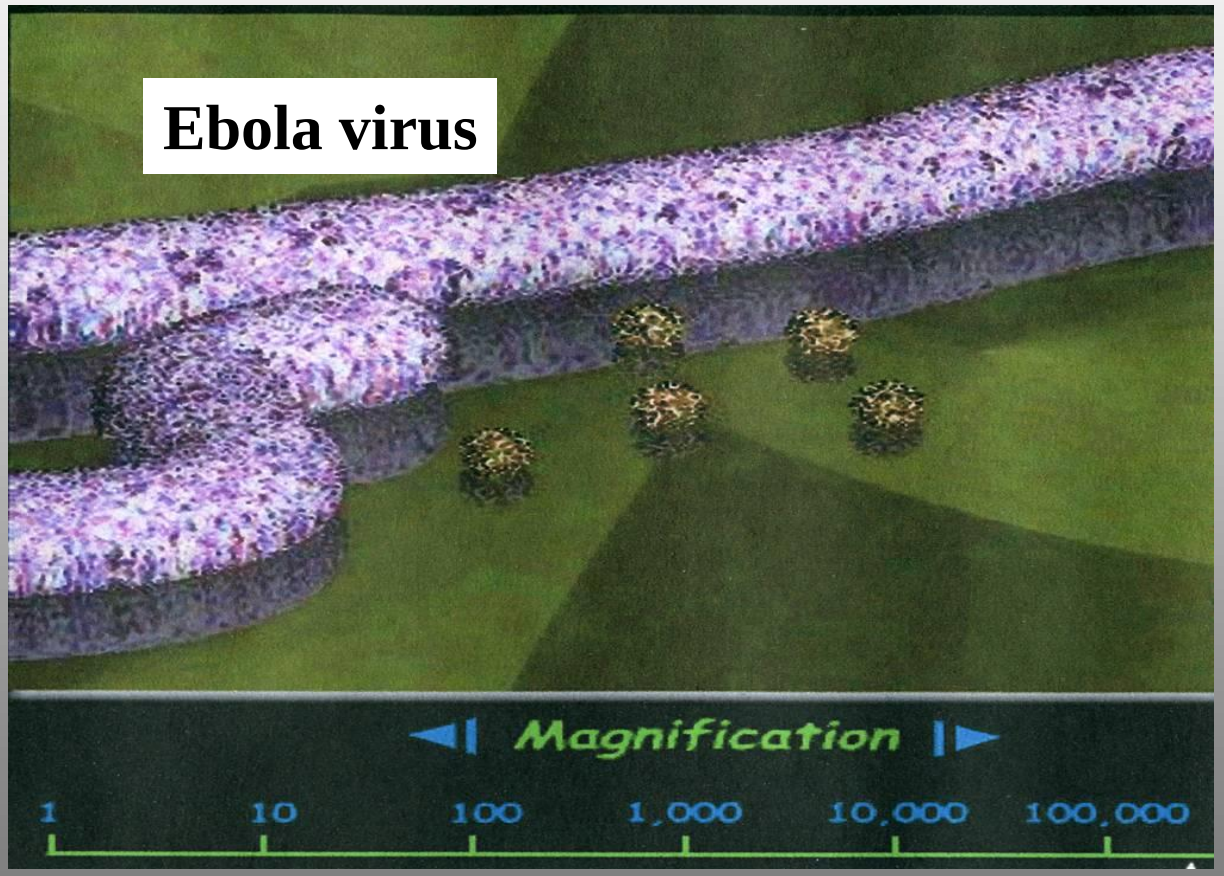
20 micrometers



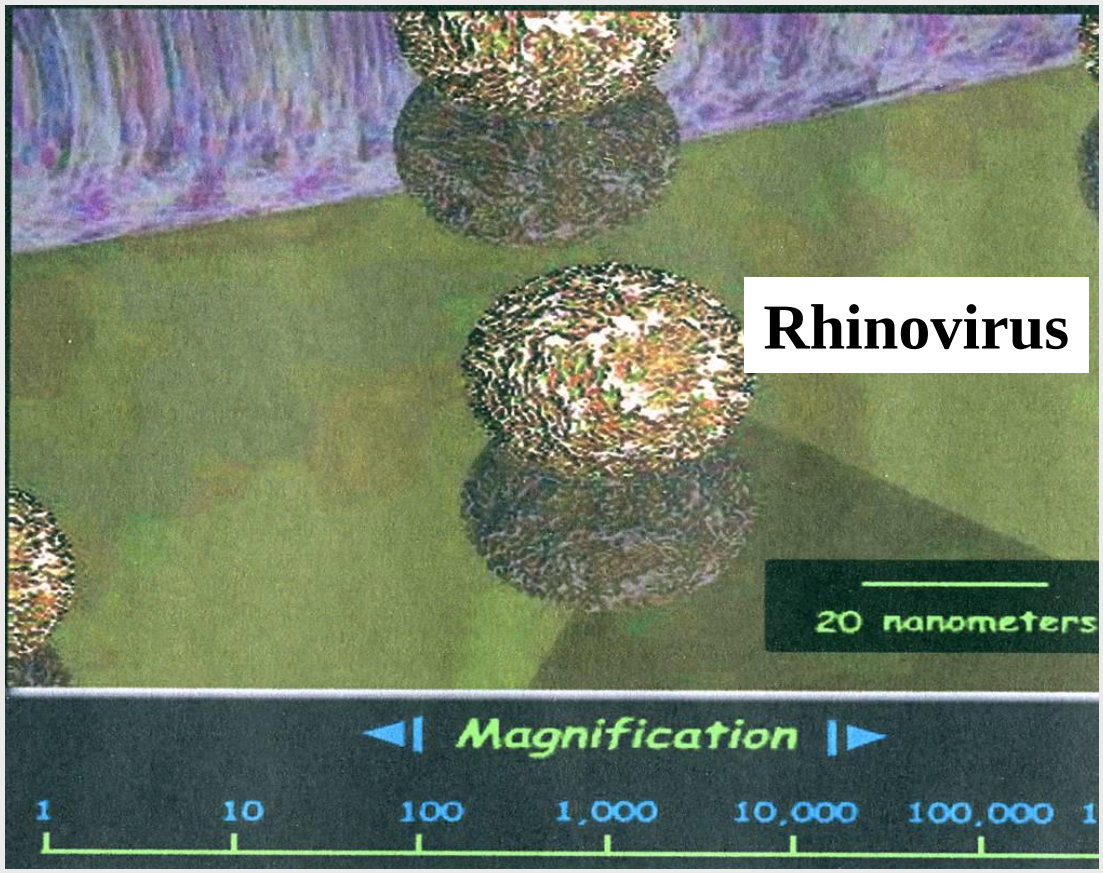
20 micrometers



200 nanometers



To 20 nanometers



How did scientists discover cells?

- Using **Microscopes!!**
  - **Instrument developed by 16th century Anton van Leeuwenhoek.**

CELL Theory states:

- ***All organisms are composed of one or more cells.***
- ***The cell is the basic unit of organization of all organisms.***
- ***All cells come from pre-existing cells.***

There Just Never Seems To Be a Typical Day...

I headed to the office with the thought of doing only cow work this day. However, the job had other plans. Shortly after I got to work, two nervous owners walked through the door with their Labrador retriever. Poor Jake had just been run over by the owner's car! Amazingly Jake was doing very well, although he was a bit excited. Besides a couple cuts on his jaw, he was ready to go home and play.

At my first farm call, the farmer wanted me to look at his dog, Millie. Millie had a grapefruit-size lump under her jaw. The lump felt like it was full of fluid. I asked him to bring Millie to the office so I could work on her there. I finished my farm calls and headed back to the small animal clinic.

Once there, I **anesthetized** Millie and made an incision into the skin. Pus flowed from the lump (Figure 1–1). I flushed the large pocket left behind and started Millie on a course of **antibiotics,** drugs that fight bacterial infections. Although I don't know why it started, I do know Millie was fighting an infection with her body's cells.

Next I had the opportunity to remove a tumor from Penny, a 12-year-old cocker spaniel. Last week I gave Penny a physical and administered blood tests.

FIGURE 1–1 Draining an abscess on the side of the face of an anesthetized cat.

The surgery went well, and I was able to remove the entire lump.

In private practice, cells affect me every day. Today I saw Millie's cells attacking the bacteria in her neck. Penny, on the other hand, had **cancer**-causing cells dividing uncontrollably. To understand how mammals work and how to treat them, I first had to learn how cells function.

Let’s go and look at some *cells!!*

Step # 1 **Teacher demonstration of microscope use.**

Step # 2 **Students begin Microscope Lab 8.1 due today!!**