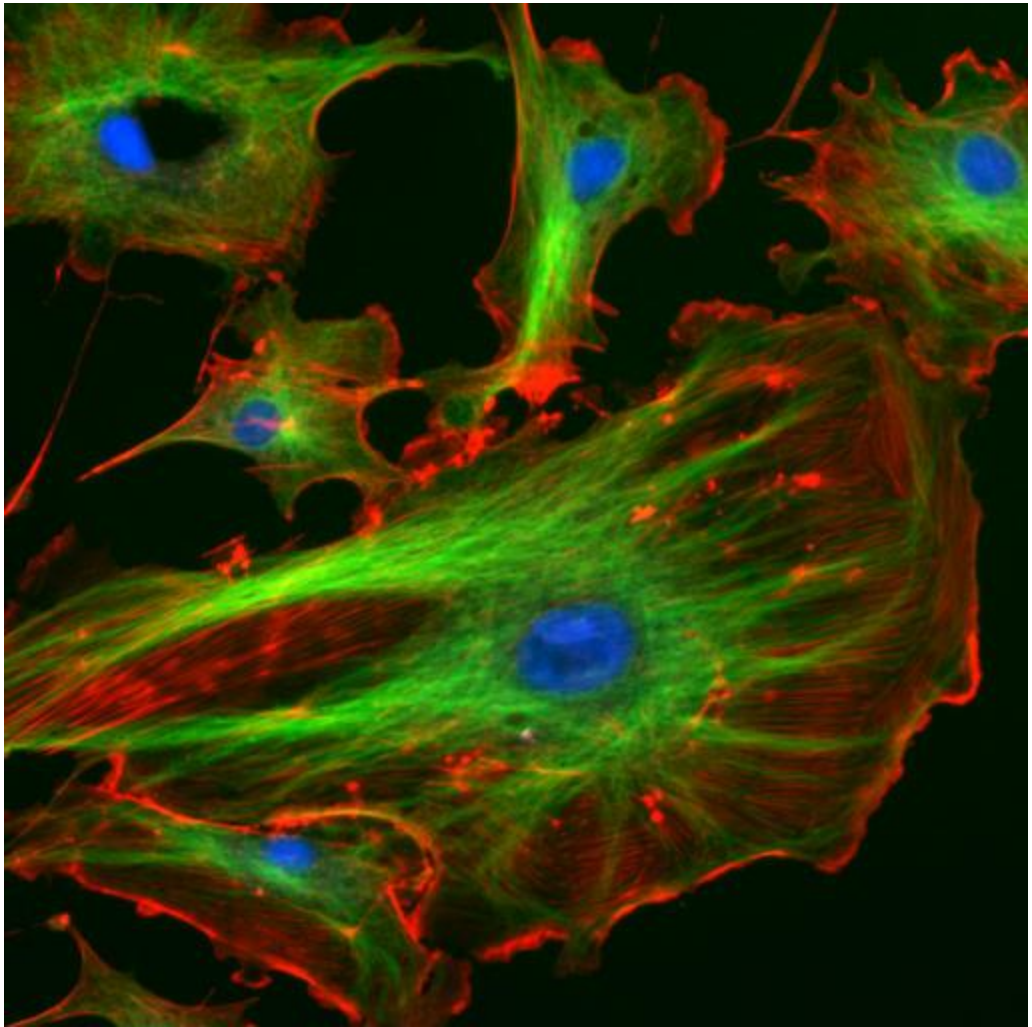
Section 1: Discovering Cells

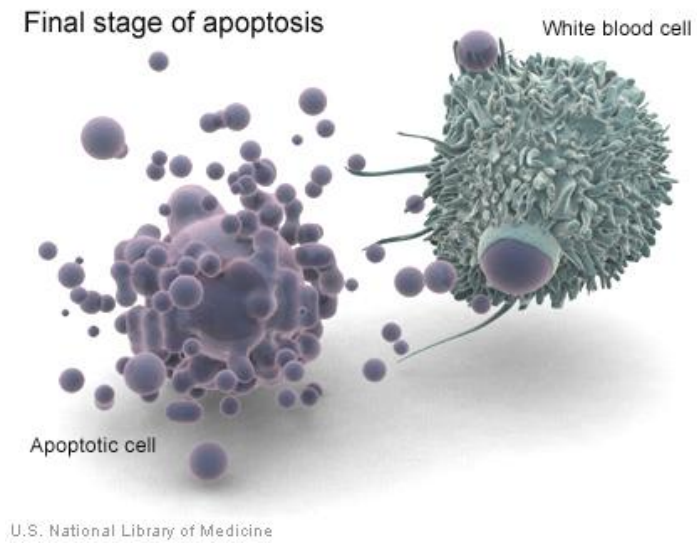


Cells

- Definition: The basic unit of structure and function in living things
- All cells have a membrane protecting them
- All cells contain DNA and RNA
- Cells die through apoptosis or necrosis
  - Necrosis-Damage due to injury
    - Cut or scrap
  - Apoptosis (Cellular Suicide)
    - Programmed cell death

Cell Death

- Necrosis-Damage due to injury
  - Cut or scrap
  - Causes inflammation
  - Inflammation (Body security)
    - WBC's rush into area of damage
- Apoptosis (Cellular Suicide)
  - Programmed cell death
  - Signals special cells to eat and recycle them
  - Cancer



First sightings of cells

- Cells are really small ☺
  - In one square cm there are over 100,000 cells
- Microscope-an instrument that makes small objects larger
  - Invented in 1590
  - Cells could not discovered until then

  - http://htwins.net/scale2/

Types of Microscopes

- Hand Lens-Magnifying Glass

- Compound Microscopes
  - Many lenses for ease of use

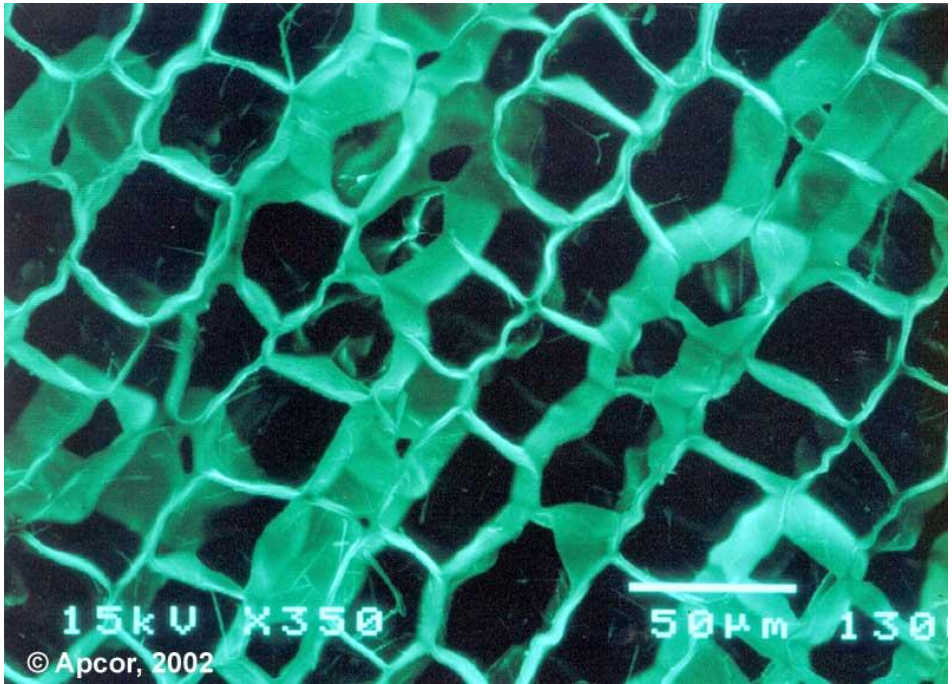
- Electron Microscopes
  - Use electricity not light

Mr Hooke

- English Scientist
  - 1663-he studied a thin slice of cork through a microscope

The first look at cells

- Hooke described the pores of cork as “Cells”
  - And yes that’s where the term is coined
  - He calculated 1,200,000,000 cells in one square inch



Anton van Leeuwenhoek

- Dutch Businessman who made his own microscope lenses
- Also happened to enjoy building simple microscopes

- Then…he checked out some pond SKUM ;)
- Guess what? He saw little unicellular organisms just like you did!
- He called them “animalcules”
  - Little animals
- He then scraped his teeth and was the first person to discover bacteria…ever
- HOW COOL IS THAT?

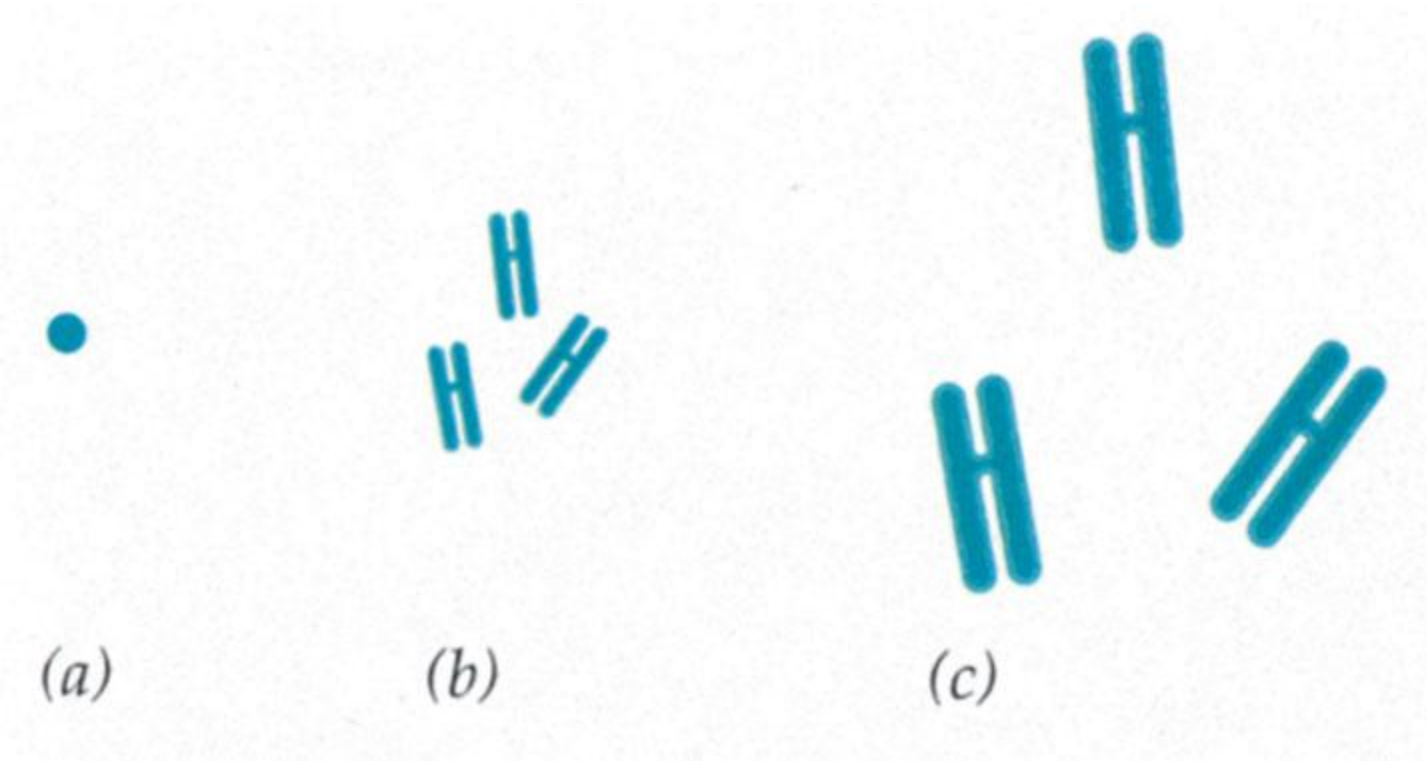
Cheek Scraping Activity

Light Microscopy

- Light Microscopy works on two principles
  - Magnification
  - Resolution

Magnification

- The ability to make an object look bigger then it actually is…
- Controlled by objectives on microscope



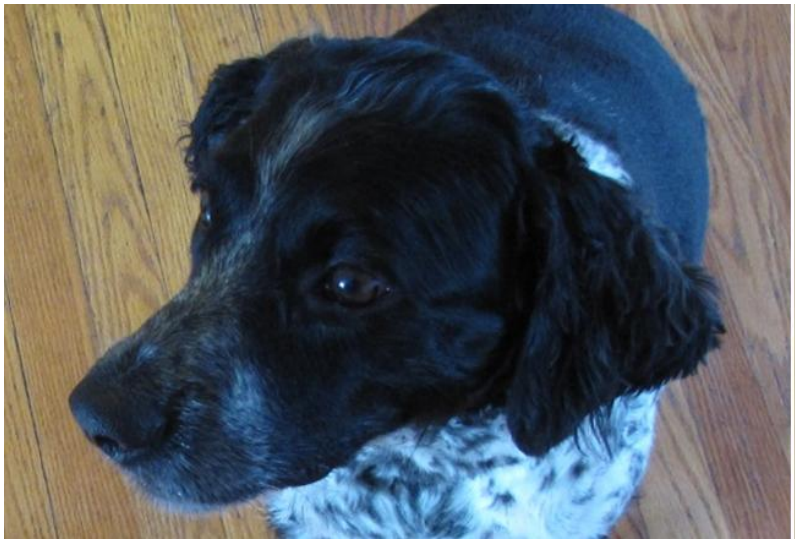
Magnification Problems

- Multiply your magnification
- If I have 2 lenses that work together on a microscope…one is 10x magnification…and the other is 40x magnification…what is my total magnification?

Resolution

- Being able to distinguish different parts of an object
- Controlled by fine and course focus

- Good Resolution Vs. Bad Resolution



Good Microscopy

- Needs both good resolution and good magnification
- Newspaper activity

- If you had good resolution but poor magnification what do you see?
- If you had poor resolution but good magnification what do you see?
- If you have good resolution and good magnification what do you see?

Theory of Spontaneous Generation

- Before microscopes…people thought that living things came from nonliving matter.

- Examples: Plants growing from nowhere
- Microscopy wasn’t around until later…today we take it for granted

Cell Theory

- Eventually microscopes improved
- 1838-Scientists concluded that all plants were made of cells
- 1839-Scientists concluded that all animals were made of cells
- 1855-Scientists concluded that cells came from other cells
  - They could see cells multiply
  - This debunked the theory of spontaneous generation

Cell Theory Today

- All the evidence later pointed to what is now known as cell theory.
  - All living things are made of cells
  - All cells are produced from other cells
  - Cells are the basic unit of structure and function of living things.