Ch 6.1

**Robert Hooke** was the first person to observe a cell in 1665.

**Anton van Leeuwenhoek** was the first person to observe a living organism. He was only able to observe them with “wonderfully” crafted lenses.

In a **light microscope** light passes through a specimen then through the glass lenses. The lenses then refract the light in such a way that the image of the specimen is magnified as it is projected into the eye.

**Magnification** is the ratio of an objects image to its real size.

* EX: Light microscopes magnify effectively to about 1000 times the actual size

**Resolution** is a measure of the clarity of the image; it is the minimum distance between 2 points can be separated and be distinguished as separate points.

* EX: A light microscope can’t resolve detail finer than about 0.2 micrometers or 200 nanometers

**Contrast** is the difference in brightness between light and dark areas.

**Organelles** are the membrane-enclosed structures within eukaryotic cells.

**Electron Microscopes** focus a beam of electrons through the specimen or onto its surface.

* Note: The resolution of an electron microscope is inversely related to the wavelength of the light (electrons). Modern microscopes can theoretically achieve a resolution of 0.002 nm, though in practice they usually can’t get better than 2 nm with is 100-fold what light microscopes can achieve.
* Note 2: Electron microscopes can’t look at living things without killing them.

**SEMs** or **Scanning Electron Microscopes** are useful for detailed study of the topography.

**TEMs** or **Transmission Electron Microscopes** profile a thin section of a specimen. These are used to study the internal structure of a cell. It aims an electron beam through a very thin section of a specimen.

**Cell Fractionation** which takes cells apart and separates major organelles and other subcellular structures from one another.

A **Centrifuge** spins test tubes holding mixtures of disrupted cells at a series of increasing speeds. At each speed the resulting force causes a subset of cell compounds to settle at the bottom forming a pellet.

* Note: The higher the speed the smaller the compounds found at the bottom.
* EX: If spun at 1000Gs for 10 minutes you will find nuclei and cellular debris at the bottom.