Recombinant DNA is DNA taken from two different sources and fused into a single DNA molecule. Special DNA cutting enzymes, called restriction enzymes, cut the DNA at specific sites.

- Recombinant DNA technology has extensive applications in developing pharmaceuticals.
- The first drug created using recombinant DNA was human insulin.

- Need a restriction enzyme that will cleave known segments of DNA
- Restriction enzymes specific for organism
- DNA fragment migration through the gel dependent upon fragment size
- Bands do not represent genes

Diffusion
Plasma membrane structure

Fluid-mosaic model --- semi-permeable

- **Lipid bi-layer construction**
- **Integral proteins**
- **Receptors**

Diffusion through the plasma membrane
Diffusion through the plasma membrane
Diffusion through the plasma membrane
Diffusion through the plasma membrane

Functions of membrane proteins

Plasma Membranes

- **Membranes often porous to solvent (water) but not solutes**
  - **Membrane are selectively permeable to solutes**
    - **K^+, Na^+, Cl^-, proteins, etc.**
- **How are these concentrations maintained against the diffusion gradient?**
  - **Filtration**
  - **Active transport (primary and secondary)**
    - **Ex. The Na^+/K^+ pump**
  - **Vesicular**

Active transport

Taking in, and getting rid of, particles

- **Exocytosis**
  - **Removal of products**

- **Endocytosis**
  - **Absorption of products**
    - **phagocytosis: pseudopods engulf particles**
    - **bulk phase: nonselective absorption of extracellular fluids and molecules**
    - **receptor mediated: absorption of specific molecules**