Genetic Engineering

•Biotechnology – the use of cells or cell products for specific applications

- •Ex. Cheese, drug making, waste management

•Genetic Engineering – manipulations of DNA

•Recombinant DNA – combining DNA, usu. from different species

•Transgenic – an organism that has been genetically modified (GMO)

- –Ex. Corn, soy beans, tomatoes, pigs

•Procedure for producing recombinant DNA

- (1) cut out specific DNA fragment using restriction enzymes,
- (2) join this fragment with a vector
- (3)transfer the recombinant DNA molecule to a host cell
- •1. A restriction enzyme cuts DNA at a specific sequence
  - • single stranded ends are called sticky ends
  - •Use Restriction enzymes to cut out the piece of DNA that you want to insert
  - •And cut the place open where you want to insert it.
- •2. Put the DNA into a vector
  - • Vectors are carrier DNA molecules that put the DNA into the intended host.
  - •Ex. Plasmids – Extra loops of DNA found in bacteria
  - •Ex. Bacteriophages - Viruses
  - • Ligases rejoin cut fragments
- •3. Put the Vector into the intended Host
  - •Place a plasmid into the bacteria or let the virus infect it.
- •Check for gene expression

•Insulin

- •First Recombinant Drug
- •Pre 1982 – from cows
- •Inserted into E. coli

•Other methods of Gene Transfer

- •Particle Bombardment – Gene Gun – shoot DNA into cells on little gold bullets

•Genetic Engineering has a low success rate.

•Pharming – using animals to produce, usually in their milk, drugs or other useful products

•Knock-out Genes – an inactivated gene

–engineering to take out the normal gene, put in a Knock-out gene, and find the effects that the original gene caused