

Research

Objectives

1. Collect background information in an unbiased and comprehensive manner about laws and regulations regarding genetically modified crops.
2. Gather information about public opinion concerning GM crops.
3. Present facts about the processes and technologies that are used in this industry.
4. Create a database of known genetically modified crops, potential allergens, and traits in order to provide future IPROs with a foundation of knowledge concerning GM crops.

Background

Genetically modified crops have come to play an increasingly large role in our daily lives. Unfortunately these crops remain a mystery to much of the general population. For some, ideas about GM crops are exciting and represent hope for new potential in science and agriculture, they represent potential danger, and there are simply many unanswered questions.

Benefits

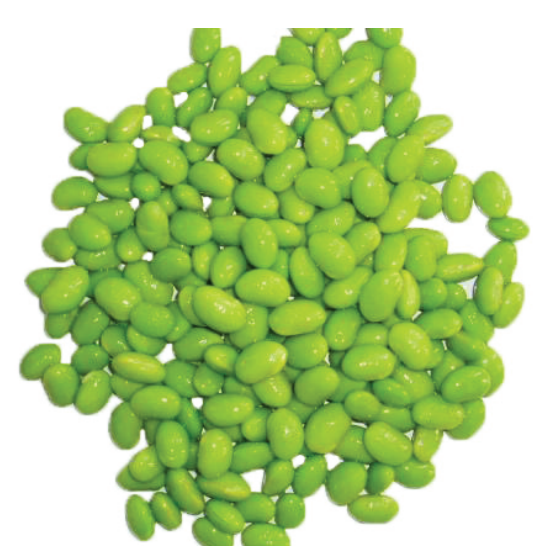
- Less Pesticide Use
- Stronger Crops
- Better Shelf Life
- Improved Nutritional Value

Risks

- Creates dependency on GM companies
- Patents Restrict the use of GM seeds by farmers
- Unforeseen health side effects
- Reduces biodiversity

Main GM Crops

- | | | |
|---------------------|---------------|------------|
| Alfalfa | Flax, Linseed | Rice |
| Argentine canola | Lentil | Soybean |
| Barley | Maize | Squash |
| Carnation | Melon | Sugar beet |
| Chicory | Papaya | Sunflower |
| Cotton | Plum | Tobacco |
| Creeping Bent-grass | Polish Canola | Potato |
| | Potato | |



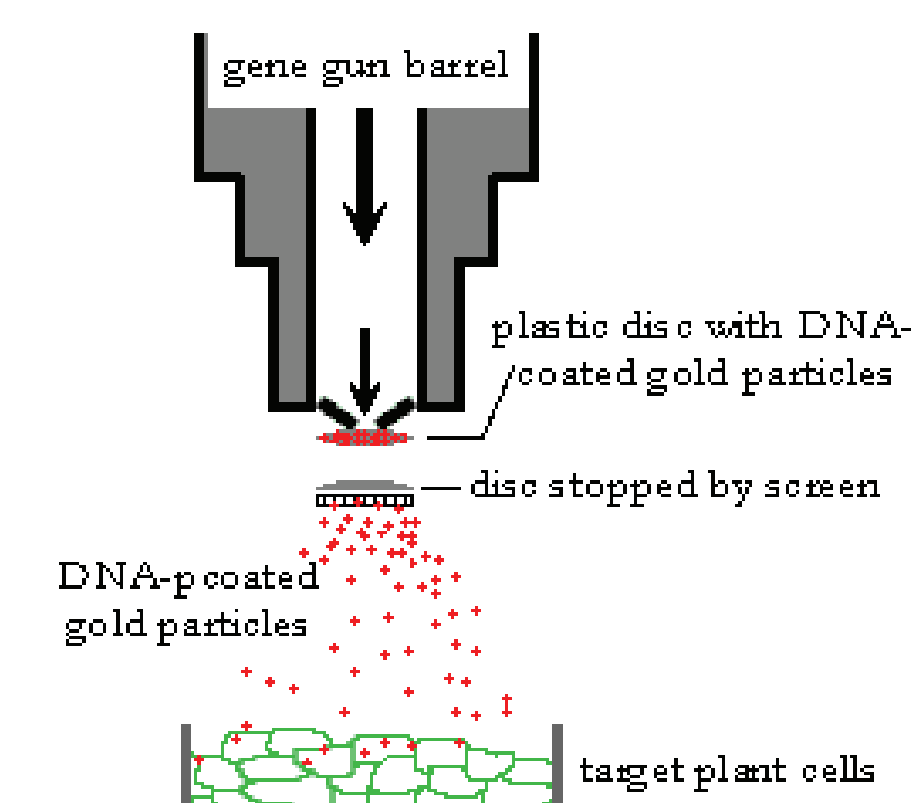
Technologies

▪ Biolistics

Genes are inserted into the host through use of a gene gun

Microscopic particles of gold or titanium are coated with the DNA

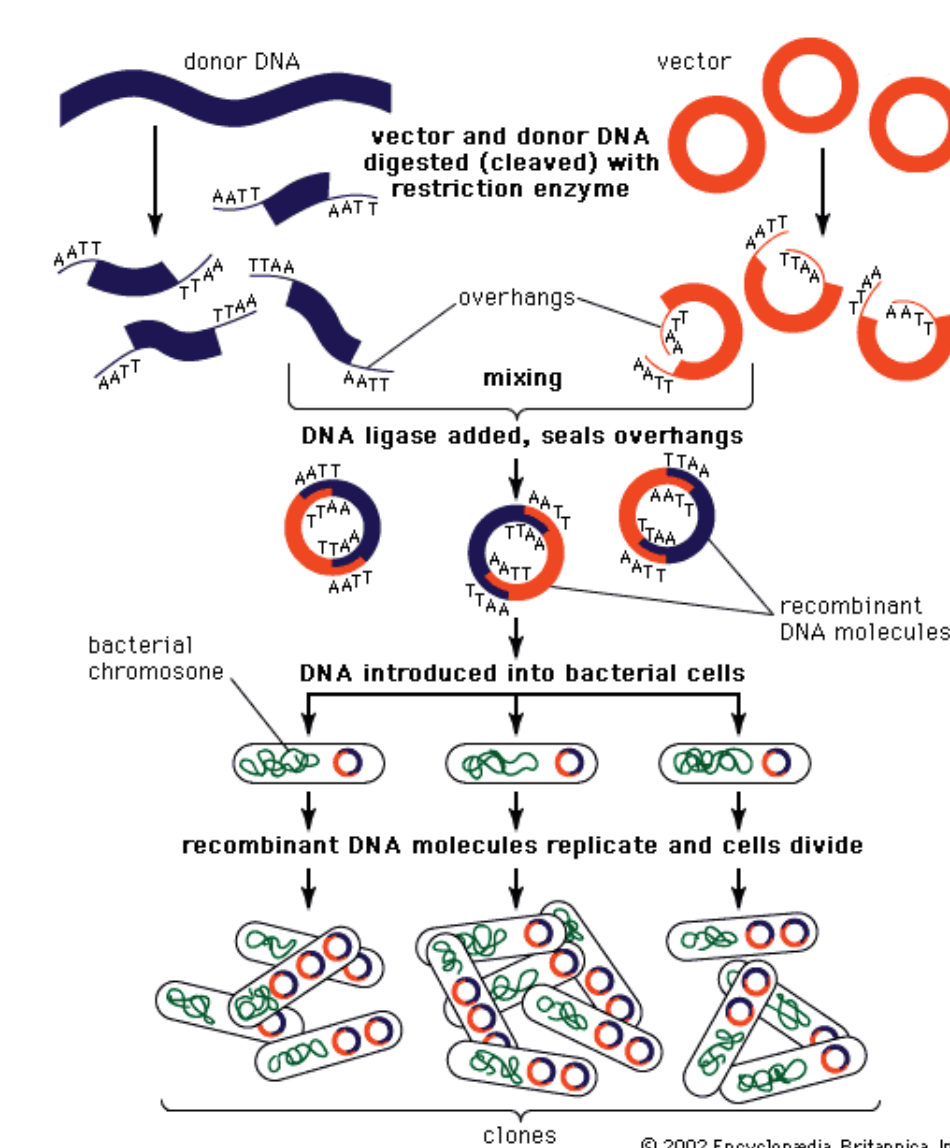
particles are then loaded into the gene gun and fired at the plant cells.



<http://arts1.wustl.edu/~anthro/blurb/Background.html>

▪ Vectors

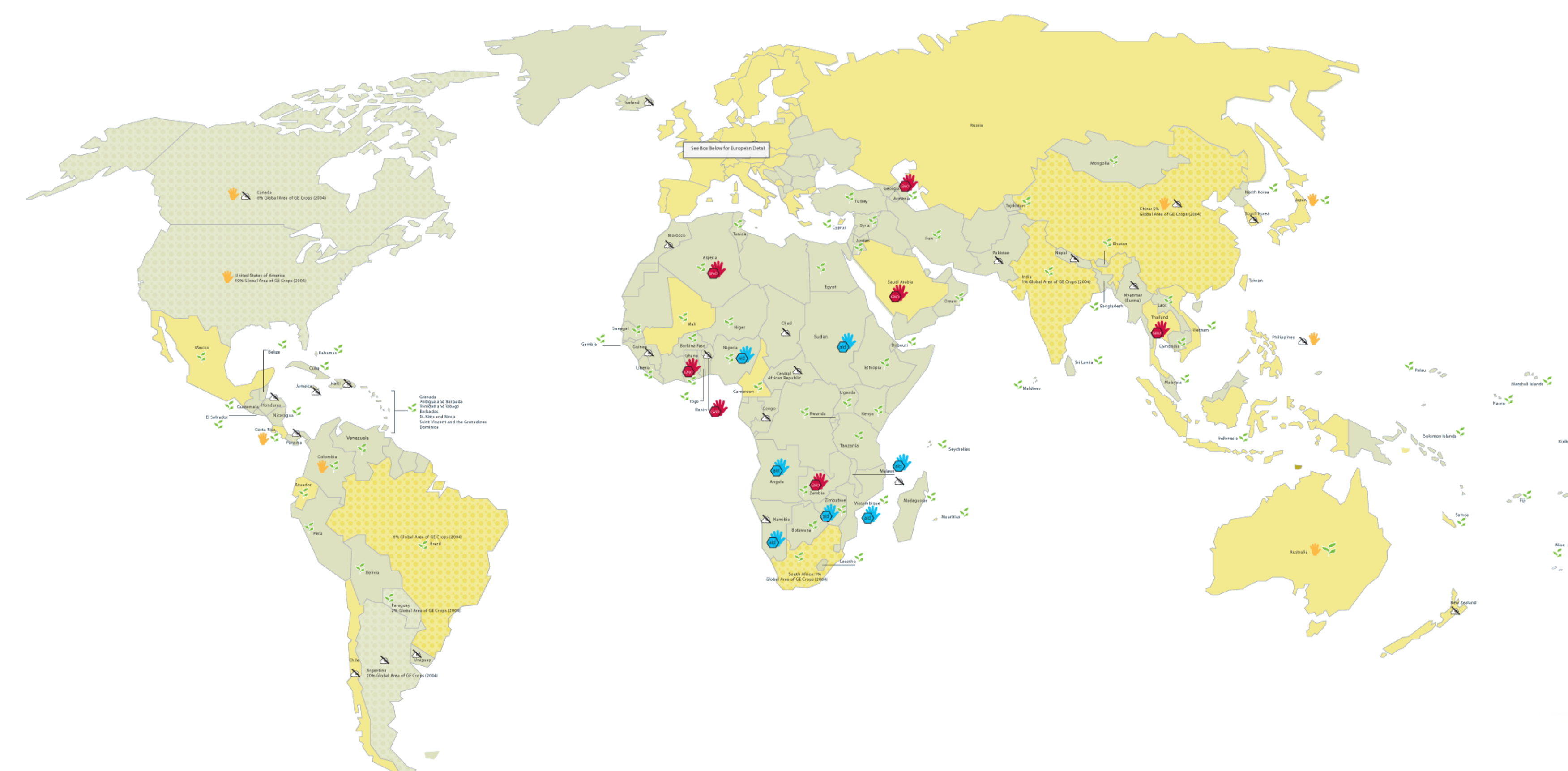
Viral Carrier is the use of a virus to transmit a gene of interest into the target cells.



Regulations

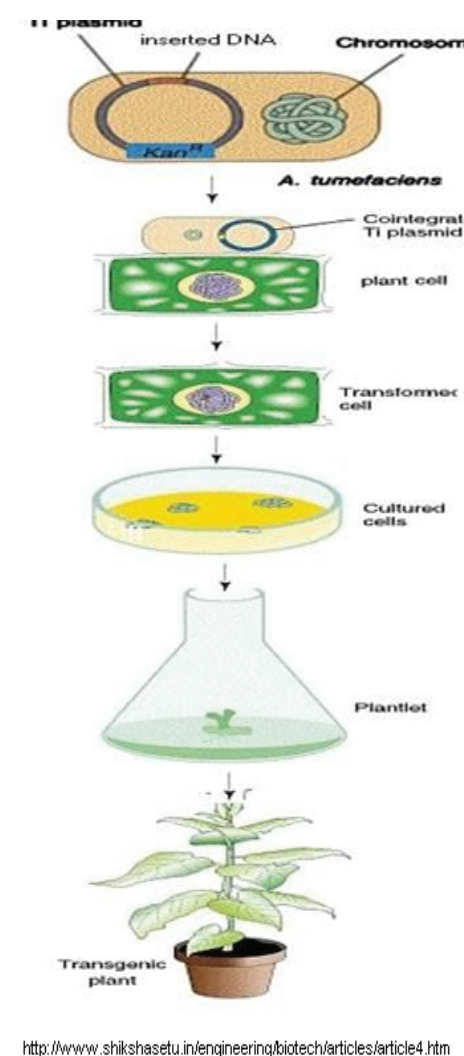
Currently regulations on genetically modified foods vary greatly from country to country, and in the United States these regulations vary on a state by state basis. Countries throughout the European Union have much stricter guidelines for labeling of Genetically modified foods than United States.

GENETICALLY MODIFIED [GM] CROPS AND FOODS
Worldwide Regulation, Prohibition and Production



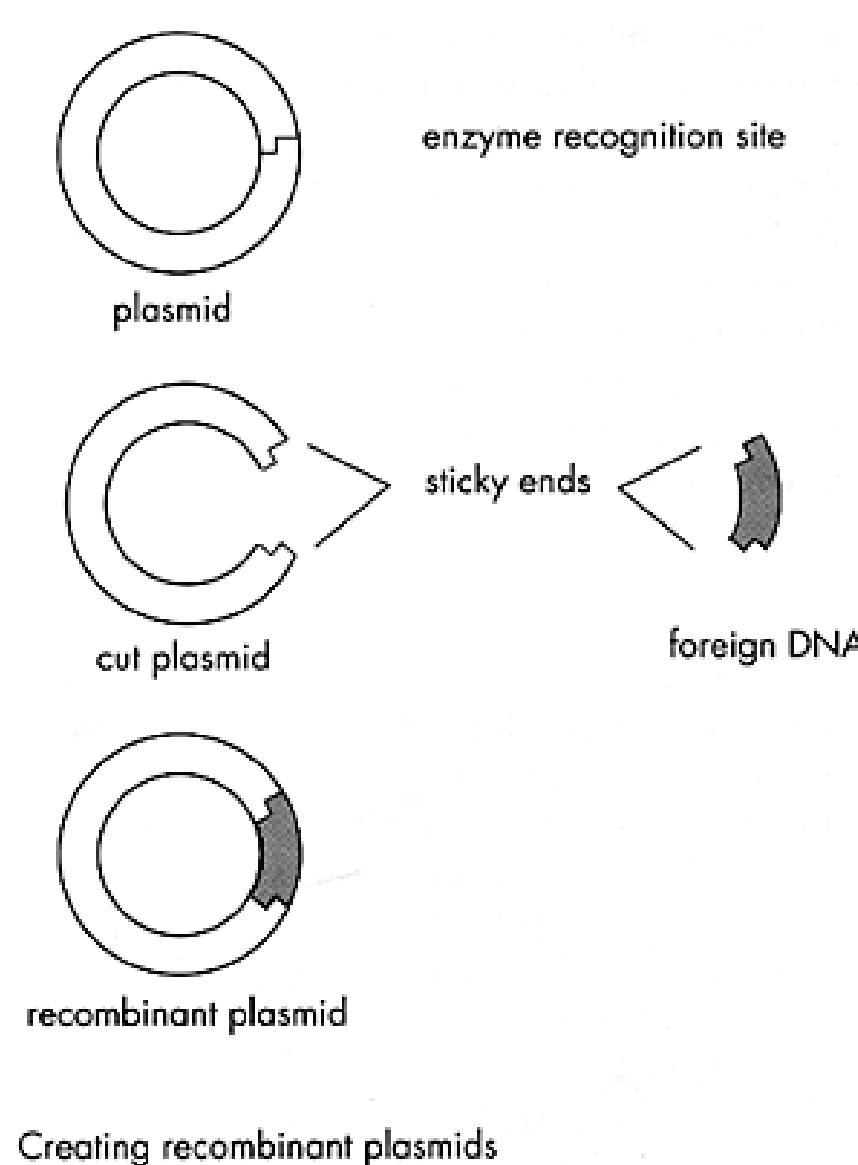
▪ Protoplast transformation

Enzymes are used to dissolve the cellulose of a plant. This will expose the protoplast. DNA can then be added to the protoplast.



▪ Gene Splicing

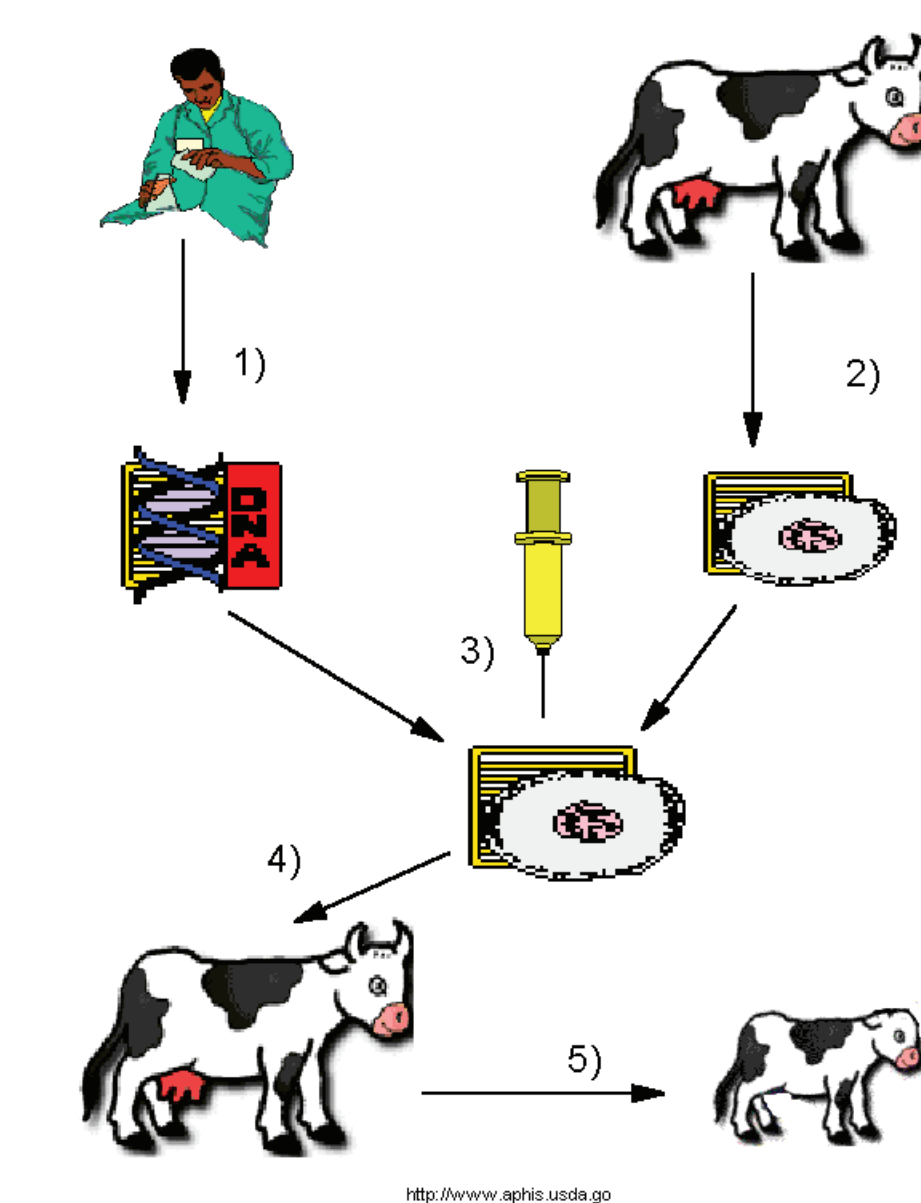
The process of fusing a gene of interest into the target cell's DNA using restriction enzymes and the ligase enzymes.



Creating recombinant plasmids

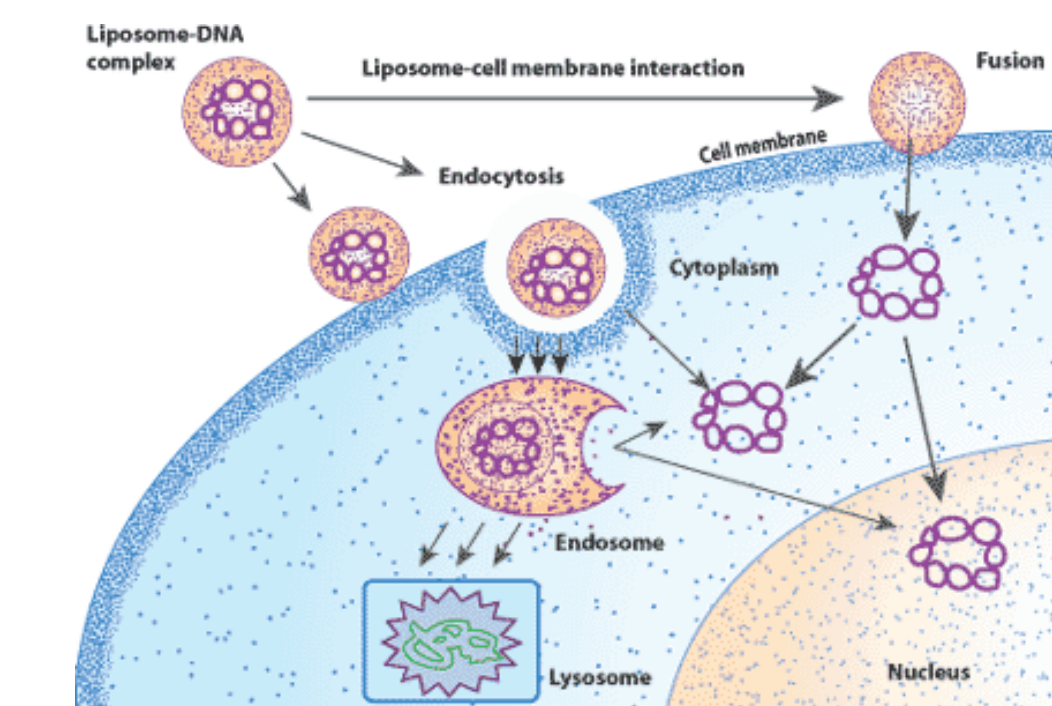
▪ Injection

DNA is injected into the nucleus of a single cell (Typically a fertilized egg)



▪ Lipofection

Uses liposome DNA to deliver a gene or genes of interest into the target cells.

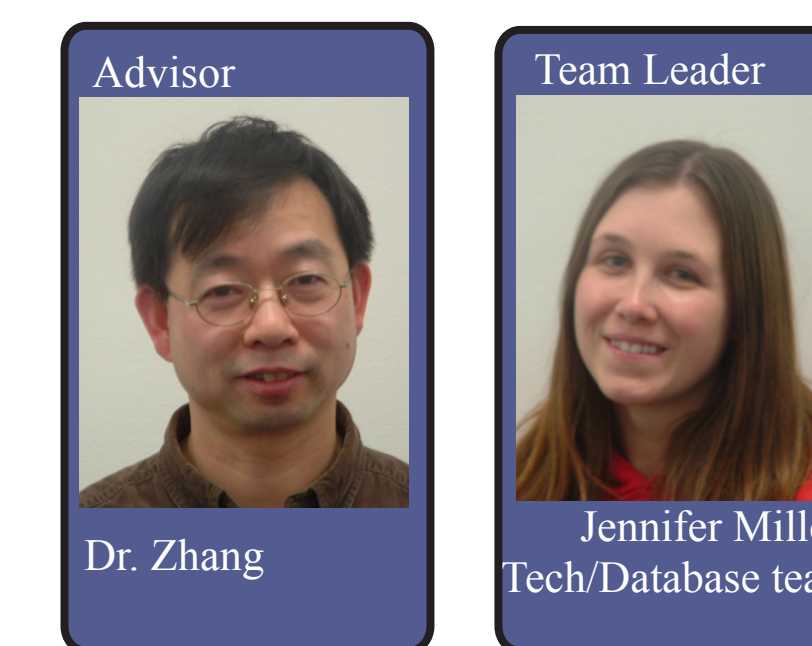


- Electroporation
- Calcium Phosphate precipitation
- Gene Silencing

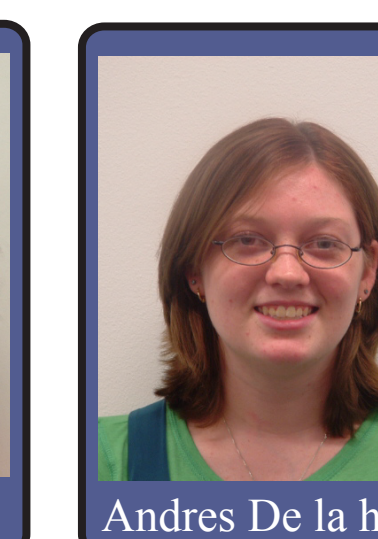
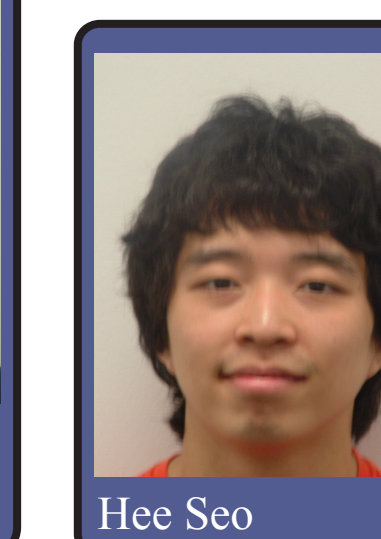
Group Members



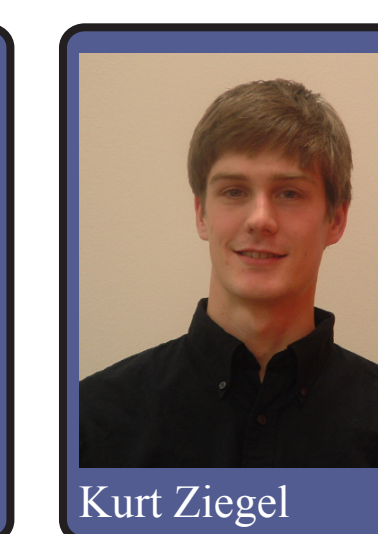
Leaders



Technology & Database



Web site and Background



Future IPRO

- Establish a database of known allergens.
- Utilize the information collected this semester to look into the isolation of specific proteins which causes allergens in peanuts and tree nuts

MAP LEGEND

- Ban or Moratorium on GMOs. Country has declared itself GE free, with either a national ban or declaration of a moratorium.
- Indicates the presence of a regional ban or declaration opposing GM crop cultivation or food. For more information, please refer to "Genetically Engineered Crops and Foods: Regional Regulation and Prohibition" posted at www.centerforfoodsafety.org/genetical5.cfm.
- Country has rejected, or has policy to reject, unmilled GM grain as food aid.
- Biosafety Protocol - Signed: The Biosafety Protocol, part of the Convention on Biodiversity, was initiated at the UN Earth Summit - Rio de Janeiro - in 1992. The Protocol aims to ensure adequate safety in the cross border movement and use of genetically modified organisms (GMOs) that may have adverse effects on the planet's biological diversity, ecosystems, and human health. The Protocol was signed by more than 130 countries in January 2000, each pledging to bring the agreement before its government for ratification.
- Biosafety Protocol - Ratified: The Biosafety Protocol has been ratified by governments of fifty countries (the minimum number of countries required) and thus is the first legally binding international agreement governing the movement of GMOs across national borders.
- Required Labeling of GM Foods: Country has adopted regulations requiring labeling of GM products.
- Countries Cultivating GE Crops
Global Area of GE Crops (2004): USA 59%, Argentina 20%, Canada 6%, Brazil 6%, China 5%, Paraguay 2%, India 1%, South Africa 1%