Peanut Allergens: 
Ara h1 to h8

Food allergens can be grouped into major and minor allergens. Major allergens are proteins that can interact with specific IgE (Immunoglobulin E) of more than 50% of the allergic patients studied. Generally, many major food allergens belong to major food proteins. This suggests that a high dose of a particular food protein increases the chance of inducing an allergic reaction. This observation can be applied to peanut allergy since 2 major peanut allergens, Ara h1 and Ara h2, are also major peanut proteins and comprise 12% to 16% and 5.9% to 9.3% of total peanut protein content, respectively. Both major peanut allergens have a highly stable nature and more than 95% of peanut allergic individuals had specific IgE to Ara h1 or Ara h2. Other peanut allergens (Ara h3 to h8) are considered as minor allergens due to their lower sensitizing rate in peanut allergic individuals. Eight different peanut allergens have been identified, cloned, and expressed.

Future of the 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.

Special thanks to:
The team of IPRO 318 would like to extend our appreciation to the National Center For Food Safety and Technology and to anyone else who helped our group throughout the semester.

For more information please visit our website: www.iit.edu/~ipro318s08

List of Crops
Alfalfa 
Argentine canola 
Barley 
Carnation 
Chicory 
Cotton 
Creeping Bentgrass 
Flax, Linseed 
Lentil 
Maize 
Melon 
Papaya 
Plum 
Polish Canola 
Potato 
Rice 
Soybean 
Squash 
Sugar beet 
Sunflower 
Tobacco 
Tomato 
Wheat

List of Countries
Argentina 
Australia 
Brazil 
Canada 
Columbia 
China 
Czech Republic 
European Union 
France 
Honduras 
India 
Japan 
Korea 
Netherlands 
Paraguay 
Philippines 
Poland 
Portugal 
Romania 
Russia 
Spain 
South Africa 
Switzerland 
Taiwan 
United Kingdom 
United States

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**What is Genetically Modified (GM) food?**
Genetically modified crops are produced from organisms that have had their DNA altered through genetic engineering. These plants have been modified in the laboratory to enhance desired traits such as increased resistance to herbicides or improved nutritional content.

**Background of GM food**
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.

**Objective of IPRO 318**
Our goal this semester was to create a new source of information about GM products and to provide information that will answer the many questions.

Information collected towards achieving the short term goals of this IPRO will be used in the development of future IPROs that will be focused on protein engineering to reduce the severity of known allergens in peanuts and tree nuts.

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**Risks**

- Creates farmer dependency on GM food companies and patent prevents the use of these benefits without considerable payment.
- Can have unforeseen health side effects as a result of genetic variation.
- Reduces biodiversity, making crops more susceptible to epidemic.

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**Benefits**

- Allow for the development of crops that require less pesticide use, which helps the environment.
- Strong, resistant crops are less prone to damage.
- Shelf life of food can be greatly increased.
- Food with higher quality nutrients can be used to treat nutrition issues.

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Currently, GM food is a serious debate between the European Union and the United States. The European Union’s legal standards for GM food are much higher and more thorough than the United States, and the overall perception of GM food among the population is not entirely approving. The United States, on the other hand, is more comfortable with the issue. This is further hindering the progress of GM food, for good or bad.

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**Technologies**

- **Vectors**
  - Inserting the gene for yellow skin colour, from capsicum.
  - Bacteria transfers new gene into host plant.
  - “Gene Gun” transfers DNA from different organisms.
  - “Gene Gun” transfers DNA into hosts.
  - Plants with new characteristics are generated.

- **Injection**

- **Gene Splicing**

- **Biolistics (Gene Gun)**

- **Protoplast transformation**

- **Electroporation**

- **Calcium Phosphate precipitation**

- **Gene silencing**

- **Viral Vector**

- **Lipofection**

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