

Safety of Genetically Engineered Foods

Comprehension Questions (for use with *Safety of Genetically Engineered Foods* report brief):

1. What are some similarities between GE and non-GE methods of genetic alteration in animals, plants, and microorganisms used for food? What are some differences?
2. The report includes examples of adverse health effects to humans that have occurred from certain plants like celery and kiwi fruit. Why do you think the NAS group that undertook this study, the Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health, decided to include these examples in their report?
3. The graph on page 2 shows the relative likelihood of unintended genetic effects of both GE and non-GE methods of plant modification. Which data in the table supports the view that the method of modification should not be the only criterion to consider when evaluating possible health risks of unintended genetic changes?
4. Why might the new “high throughput” methods of detecting unintended changes in foods potentially help scientists evaluate the health risks of both GE and non-GE foods in the future?

Comprehension Questions (for use with *Safety of Genetically Engineered Foods* report)

5. What current methods are used to identify differences between GE and non-GE foods before putting a GE food on the market? (Identify) [anno: Possible response: Comparisons of GE products with their non-modified counterparts to identify unique components and animal feeding trials.]

6. What safety assessments are not yet in place that the report recommends?

7. The report recommends that the federal government assess the possible safety risks of genetically altered foods on a case-by-case basis, whether the alteration was done through genetic engineering or not. According to the report, when should a modified food be assessed for possible health risks to the public?

8. The report recommends that federal agencies implement improved post-commercial testing and tracking of all modified foods in specific populations of consumers. What specific populations of consumers do you think should be targeted for better tracking of their reactions to modified foods? Why do you think these groups should be targeted?

Answer Key

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Comprehension Questions Answer Key (for use with *Safety of Genetically Engineered Foods* report brief):

1. What are some similarities between GE and non-GE methods of genetic alteration in animals, plants, and microorganisms used for food? What are some differences? (Compare and Contrast) [*annos: Possible responses: Similarities: both methods are used to develop new products in the food supply; both can change the genetic makeup of the plant, animal, or micro-organism; both methods may or may not result in unintended changes in the food; both may or may not increase the level of hazardous substances in the food. Differences: GE relies on intentional manipulation of targeted genes through rDNA methods, while non-GE methods rely on changes in non-targeted genes that can occur more naturally or randomly. Non-GE methods rely on manipulation at the level of breeding or propagation, whereas GE requires manipulation at the cell level to introduce new DNA not normally expressed by the organism.*]
2. The report includes examples of adverse health effects to humans that have occurred from certain plants like celery and kiwi fruit. Why do you think the NAS group that undertook this study, the Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health, decided to include these examples in their report? (Infer) [*anno: Possible response: The Committee wanted to show that even non-GE foods can cause adverse health effects. Both celery and kiwi were modified using non-GE methods of alteration--selective and conventional breeding--rather than targeted gene manipulation.*]
3. The graph on page 2 shows the relative likelihood of unintended genetic effects of both GE and non-GE methods of plant modification. Which data in the table supports the view that the method of modification should not be the only criterion to consider when evaluating possible health risks of unintended genetic changes? (Analyze) [*annos: Possible response: The data does not show that all GE methods produce more unintended changes as a whole than non-GE methods, or vice versa. Four non-GE methods produce more unintended genetic changes than the GE method of rDNA via Agrobacterium, transfer of genes from closely related species. The method that is the most genetically disruptive is induced mutagenesis, a non-GE method. NOTE: the scale and variability are arbitrary in this graph.*]

Comprehension Questions Answer Key (for use with *Safety of Genetically Engineered Foods* report brief), continued:

4. Why might the new “high throughput” methods of detecting unintended changes in foods potentially help scientists evaluate the health risks of both GE and non-GE foods in the future? (Apply) [*anno: Possible response: Possible health risks in foods depends on the nature and quantity of the compounds in the food that are changed, not how they are changed. The new methods of analyzing compounds in foods identify more data that can be assessed for unintended adverse health effects. Genomic and proteomic methods expand the scientist’s ability to analyze complex mixtures and to examine multiple parameters simultaneously in a comprehensive way. Since both GE and non-GE foods may create unintended adverse health effects, the new methods could prove useful in analyzing both kinds of foods.*]
5. What current methods are used to identify differences between GE and non-GE foods before putting a GE food on the market? (Identify) [*anno: Possible response: Comparisons of GE products with their non-modified counterparts to identify unique components and animal feeding trials.*]
6. What safety assessments are not yet in place that the report recommends? (Identify) [*anno: Possible response: Post-market surveillance to determine if the food causes any intended or unintended health effects.*]
7. The report recommends that the federal government assess the possible safety risks of genetically altered foods on a case-by-case basis, whether the alteration was done through genetic engineering or not. According to the report, when should a modified food be assessed for possible health risks to the public? (Synthesize) [*anno: Possible response: When the modified food contains a novel substance or levels of a naturally occurring substance that exceeds the range of recommended or tolerable intake.*]
8. The report recommends that federal agencies implement improved post-commercial testing and tracking of all modified foods in specific populations of consumers. What specific populations of consumers do you think should be targeted for better tracking of their reactions to modified foods? Why do you think these groups should be targeted? (Apply and Make Decisions) [*annos: Possible responses: Two groups that should be targeted for better tracking include young children and people with specific food allergies, like allergies to milk proteins or wheat. These groups are more susceptible to the potential adverse health effects that might occur from a modified food. People with food allergies already have adverse reactions to certain food groups. Infants and very young children may not have fully developed immune or digestive systems that could handle the compound changes in a modified food.*]