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Genetically Modified Foods Unsafe? GM Foods and Allergies

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Genetically modified (GM) foods are inherently unsafe, and current safety assessments are not competent to protect us from or even identify most dangers. Overwhelming evidence to support this conclusion is now compiled in the book Genetic Roulette: The documented health risks of genetically engineered foods, which presents an abundance of adverse findings and theoretical risks associated with GM foods.1

The book documents lab animals with damage to virtually every system studied; thousands of sick, sterile, or dead livestock; and people around the world who have traced toxic or allergic reactions to eating GM products, breathing GM pollen, or touching GM crops at harvest. It also exposes many incorrect assumptions that were used to support GM approvals. This article, excerpted from my book, summarizes some of the findings related to allergic and immune responses.

GM Soy and Allergies

Soy allergies jumped 50% in the U.K. just after GM soy was introduced.2 If GM soy was the cause, it may be due to several things. The GM protein that makes Roundup Ready Soy resistant to the herbicide does not have a history of safe use in humans and may be an allergen. In fact, sections of its amino acid sequence are identical to known allergens.3

A portion of the transgene from ingested GM soybeans, along with the promoter that switches it on, transfers into human gut bacteria during ingestion.4 The fact that the transformed bacteria survives applications of Roundup's active ingredient, glyphosate, suggests that the transgene continues to produce the Roundup Ready protein. If true, then long after people stop eating GM soy they may be constantly exposed to its potentially allergenic protein, which is being created within their gut. (This protein may be made more allergenic due to misfolding, attached molecular chains, or rearrangement of unstable transgenes, but there is insufficient data to support or rule out these possibilities.1)

Studies suggest that the GM transformation process may have increased natural allergens in soybeans. The level of one known allergen, trypsin inhibitor, was 27% higher in raw GM soy varieties. More worrisome, it was as much as sevenfold higher in cooked GM soy compared to cooked non-GM soy.5 Not only is this higher amount potentially harmful, the finding also suggests that the trypsin inhibitor in GM soy might be more heat stable and, therefore, even more allergenic than the natural variety.6

It is also possible that changes in GM soy DNA may produce new allergens. Although there has never been an exhaustive analysis of the proteins or natural products in GM soy, unpredicted changes in the DNA were discovered. A mutated section of soy DNA was found

near the transgene, which may contribute to some unpredicted effects. Moreover, between this scrambled DNA and the transgene is an extra transgene fragment, not discovered until years after soy was on the market.7 The RNA produced is completely unexpected. It combines material from all three sections: the full-length transgene, the transgene fragment, and the mutated DNA sequence. This RNA is then further processed into four different variations,8 which might lead to the production of some unknown allergen.

Another study verified that GM soybeans contain an IgE-binding allergenic protein not found in nonGM soy controls, and that one of eight subjects who showed a skin-prick allergic reaction to GM soy had no reaction to nonGM soy.9 Although the sample size is small, the implication that certain people react only to GM soy is huge.

The increased residue of Roundup herbicide in GM soy might contribute to increased allergies.10 In fact, the symptoms identified in the U.K. soy allergy study are among those related to glyphosate exposure. The allergy study identified irritable bowel syndrome, digestion problems, chronic fatigue, headaches, lethargy, and skin complaints including acne and eczema.2

Symptoms of glyphosate exposure include nausea, headaches, lethargy, skin rashes, and burning or itchy skin.11 It is also possible that glyphosate's breakdown product, AMPA, which accumulates in GM soybeans,12,13 might contribute to allergies.

Finally, mice fed GM soy had reduced levels of pancreatic enzymes.14,15 When protein-digesting enzymes are suppressed, proteins may last longer in the gut, allowing more time for an allergic reaction to take place. Any reduction in protein digestion could therefore promote allergic reactions to a wide range of proteins, not just to the GM soy.

Bt Toxin Triggers Immune Response

Bt toxin is consistently associated with immune and allergic-type responses. Although the unpredicted consequences of the GM transformation process might also contribute to allergic reactions from Bt crops, evidence suggests that the Bt toxin itself is a major factor. The Bt proteins found in most currently registered Bt-corn varieties would not pass the allergy test protocol described in the 2001 FAO/WHO report,16 because they have amino acid sections identical with known allergens17 and are too stable in simulated digestive solutions.18,19

Furthermore, immune responses are triggered by both the natural Bt toxin in spray form and Bt crops. The concentration of Bt toxin in crops, however, can be thousands of times higher than in sprays;20 and changes in its protein structure make the crop version more likely to provoke reactions in humans.21,22

Additional evidence:

- When populations were exposed to Bt spray, hundreds complained of allergic reactions; exposed farm workers also exhibited antibody responses.23–27
- Indian farm workers exposed to Bt cotton developed moderate or severe allergic reactions.28
- Bt toxin fed to mice induced a significant immune response and an increased reactivity to other substances.29-31

• Male rats fed MON 863 Bt corn had a significant increase in three types of blood cells related to the immune system: basophils, lymphocytes, and total white cell counts.32

• Thousands of consumers complained to food manufacturers about possible reactions to StarLink corn,33 and an expert panel determined that its Bt protein had a “medium likelihood” of being a human allergen.34

The consistency between the reactions related to Bt sprays and those reported by Bt-cotton workers is astounding. The Bt spray was associated with sneezing, runny nose, watery eyes, skin inflammation and irritation, rashes, itching and burning, swelling, red skin and eyes, exacerbations of asthma, facial swelling, and fever. Some people required hospitalization.23,24 Bt-cotton workers in India reported sneezing, runny nose, watery eyes, skin eruptions, itching and burning, red skin and eyes, facial swelling, and fever. Some people required hospitalization.28 The two lists are nearly identical—only “exacerbations of asthma” was on the spray list and not the other.

Asthma and breathing difficulties were reported by Filipinos who inhaled Bt-corn pollen.35 They also described swollen faces, flu-like symptoms, fever, and sneezing. Some individuals in both India and the Philippines also reported long-term effects after exposure. The list of symptoms in the Philippines, however, did contain items not reported by the other two groups. These included coughs, headache, stomachache, dizziness, diarrhea, vomiting, weakness, and numbness.36

Toxicity and Reproductive Problems

In addition, there is substantial evidence of toxicity and reproductive effects associated with GM foods. Sheep that grazed on Bt-cotton plants in India, for example, exhibited nasal discharge, reddish and erosive mouth lesions, cough, bloat, diarrhea, and occasional red-colored urine. Shepherds report that 25% of their herds died within 5–7 days. Post mortems on some of the estimated 10,000 dead sheep in the region indicated toxic reactions.37 Rats fed Bt corn showed toxicity in their livers and kidneys.38 And farmers link Bt corn with deaths among cows,39 water buffalo, horses, and chickens,36 as well as sterility in thousands of pigs or cows.1 Animal feeding studies with Roundup Ready soy indicated toxic livers,40 altered sperm cells,41 significant changes in embryo development,42 and a fivefold increase in infant mortality, among others.43

Our understanding of DNA has progressed rapidly since genetic engineering was applied to food crops, and many key safety assumptions have been proven wrong. Perhaps some day scientists will be able to safely and predictably alter food crops for the benefit of mankind and the environment.

Until then, it is not responsible to risk the health of the entire population with this infant science or to release these crops into the ecosystem where they may self-propagate for generations. An immediate ban of GM foods and crops is more than justified.

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