

# Genetically Modified Foods: Toxins and Reproductive Failures

## By Jeffrey M. Smith

Rhetoric from the US government since the early 1990s proclaims that genetically modified (GM) foods are not significantly different from natural plant foods. This assertion is political, not scientific. In fact, FDA scientists had privately warned that splicing foreign genes into crops might produce dangerous side effects, including high levels of toxins. Their concerns have now been validated.

Nearly every independent animal feeding safety study on GM foods, as well as several industry studies, show adverse or unexplained effects. Even the first crop submitted to the FDA's voluntary review process, the FlavrSavr tomato, showed evidence of toxins. Out of 20 female rats fed the GM tomato, 7 developed stomach lesions.<sup>1</sup> According to expert Arpad Pusztai, PhD, such lesions in humans "could lead to life-endangering hemorrhage, particularly in the elderly who use aspirin to prevent [blood clots]."<sup>2</sup>

### GM diets may cause liver damage

The liver processes toxins; its state can reveal toxins in the diet. Liver cells of mice fed GM "Roundup Ready" soybeans had structural changes,<sup>3</sup> which, according to molecular geneticist Michael Antoniou, PhD, "must reflect some 'insult' on the liver by the GM soy." Antoniou, who does human gene therapy research, said that **although the long-term consequences of the GM soy diet are not known, it "could lead to liver damage and consequently general toxemia."**<sup>4</sup> In addition, rats fed GM corn had liver lesions and indications of toxicity;<sup>5</sup> rabbits fed GM Roundup Ready soy showed altered production of liver enzymes;<sup>6</sup> and the livers of rats fed Roundup Ready canola were 12%–16% heavier, possibly due to liver disease or inflammation.<sup>7</sup>

### Organ damage and higher death rates

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<sup>1</sup> Department of Veterinary Medicine, FDA, correspondence June 16, 1993. As quoted in Fred A. Hines, Memo to Dr. Linda Kahl. "Flavr Savr Tomato: . . . Pathology Branch's Evaluation of Rats with Stomach Lesions From Three Four-Week Oral (Gavage) Toxicity Studies . . . and an Expert Panel's Report," Alliance for Bio-Integrity (June 16, 1993) <http://www.biointegrity.org/FDAdocs/17/view1.html>

<sup>2</sup> Arpad Pusztai, "Genetically Modified Foods: Are They a Risk to Human/Animal Health?" June 2001 Action Bioscience [www.actionbioscience.org/biotech/pusztai.html](http://www.actionbioscience.org/biotech/pusztai.html)

<sup>3</sup> M. Malatesta, C. Caporaloni, S. Gavaudan, M. B. Rocchi, S. Serafini, C. Tiberi, G. Gazzanelli, "Ultrastructural Morphometrical and Immunocytochemical Analyses of Hepatocyte Nuclei from Mice Fed on Genetically Modified Soybean," *Cell Struct Funct.* 27 (2002): 173–180

<sup>4</sup> Jeffrey M. Smith, *Genetic Roulette: The Documented Health Risks of Genetically Engineered Foods*, Yes! Books, Fairfield, IA USA 2007

<sup>5</sup> John M. Burns, "13-Week Dietary Subchronic Comparison Study with MON 863 Corn in Rats Preceded by a 1-Week Baseline Food Consumption Determination with PMI Certified Rodent Diet #5002," December 17, 2002 [www.monsanto.com/monsanto/content/sci\\_tech/prod\\_safety/fullratstudy.pdf](http://www.monsanto.com/monsanto/content/sci_tech/prod_safety/fullratstudy.pdf)

<sup>6</sup> R. Tudisco, P. Lombardi, F. Bovera, D. d'Angelo, M. I. Cutrignelli, V. Mastellone, V. Terzi, L. Avallone, F. Infascelli, "Genetically Modified Soya Bean in Rabbit Feeding: Detection of DNA Fragments and Evaluation of Metabolic Effects by Enzymatic Analysis," *Animal Science* 82 (2006): 193–199.

<sup>7</sup> Comments to ANZFA about Applications A346, A362 and A363 from the Food Legislation and Regulation Advisory Group (FLRAG) of the Public Health Association of Australia (PHAA) on behalf of the PHAA, "Food produced from glyphosate-tolerant canola line GT73," [www.iher.org.au/](http://www.iher.org.au/)

Virtually every organ shows changes from GM food. The pancreas of mice fed Roundup Ready soy showed profound differences, including reduced digestive enzymes;<sup>8</sup> the pancreas of rats fed GM potatoes were enlarged.<sup>9</sup> In various analyses of kidneys, GM-fed animals showed lesions, toxicity, altered enzyme production, and inflammation. Enzyme production in the hearts of mice was altered by GM soy,<sup>10</sup> and GM potatoes caused slower growth in the brains, livers, and testicles<sup>11</sup> of rats as well as potentially precancerous cell growth in their stomach and intestines (see photo).<sup>12</sup> Mice fed Bt potatoes—engineered to produce the insecticide called Bt-toxin—also had proliferative cell growth in their small intestine, as well as abnormal and damaged cells.<sup>13</sup>

In the FlavrSavr tomato study, 7 of 40 rats died within two weeks and were replaced.<sup>14</sup> Chickens fed GM corn died at twice the rate of those fed natural corn.<sup>15</sup> But in these two industry-funded studies, the deaths were dismissed without adequate explanation or follow-up.

### **Reproductive failures and infant mortality**

A preliminary study by a senior researcher at the Russian National Academy of Sciences had devastating results. More than half the offspring (51.6%) from female rats fed GM soy died within three weeks, compared to 10% from the non-GM soy group.<sup>16</sup> The average size and weight of the GM group was smaller (see photo),<sup>17</sup> and they were unable to conceive.<sup>18</sup> Just after this study was completed, the Russian laboratory coincidentally began feeding GM soy-based feed to all their rats. **After two months on the GM soy diet, the infant mortality of rats throughout the**

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<sup>8</sup> Malatesta, et al, “Ultrastructural Analysis of Pancreatic Acinar Cells from Mice Fed on Genetically modified Soybean,” *J Anat.* 2002 November; 201(5): 409–415; see also M. Malatesta, M. Biggiogera, E. Manuali, M. B. L. Rocchi, B. Baldelli, G. Gazzanelli, “Fine Structural Analyses of Pancreatic Acinar Cell Nuclei from Mice Fed on GM Soybean,” *Eur J Histochem* 47 (2003): 385–388.

<sup>9</sup> Arpad Pusztai, “Can science give us the tools for recognizing possible health risks of GM food,” *Nutrition and Health*, 2002, Vol 16 Pp 73-84

<sup>10</sup> R. Tudisco, P. Lombardi, F. Bovera, D. d’Angelo, M. I. Cutrignelli, V. Mastellone, V. Terzi, L. Avallone, F. Infascelli, “Genetically Modified Soya Bean in Rabbit Feeding: Detection of DNA Fragments and Evaluation of Metabolic Effects by Enzymatic Analysis,” *Animal Science* 82 (2006): 193–199.

<sup>11</sup> Arpad Pusztai, “Can science give us the tools for recognizing possible health risks of GM food,” *Nutrition and Health*, 2002, Vol 16 Pp 73-84

<sup>12</sup> Stanley W. B. Ewen and Arpad Pusztai, “Effect of diets containing genetically modified potatoes expressing *Galanthus nivalis* lectin on rat small intestine,” *Lancet*, 1999 Oct 16; 354 (9187): 1353-4.

<sup>13</sup> Nagui H. Fares, Adel K. El-Sayed, “Fine Structural Changes in the Ileum of Mice Fed on Endotoxin Treated Potatoes and Transgenic Potatoes,” *Natural Toxins* 6, no. 6 (1998): 219–233.

<sup>14</sup> Arpad Pusztai, “Can Science Give Us the Tools for Recognizing Possible Health Risks for GM Food?” *Nutrition and Health* 16 (2002): 73–84.

<sup>15</sup> S. Leeson, “The Effect of Glufosinate Resistant Corn on Growth of Male Broiler Chickens,” Department of Animal and Poultry Sciences, University of Guelph, Report No. A56379, July 12, 1996.

<sup>16</sup> I.V.Ermakova, “Genetically Modified Organisms and Biological Risks,” *Proceedings of International Disaster Reduction Conference (IDRC)* Davos, Switzerland August 27th – September 1st, 2006: 168–172.

<sup>17</sup> Irina Ermakova, “Genetically modified soy leads to the decrease of weight and high mortality of rat pups of the first generation. Preliminary studies,” *Ecosinform* 1 (2006): 4–9.

<sup>18</sup> Irina Ermakova, “Experimental Evidence of GMO Hazards,” Presentation at Scientists for a GM Free Europe, EU Parliament, Brussels, June 12, 2007

**facility reached 55.3%.<sup>19</sup>**

When male rats were fed Roundup Ready soy, their testicles became dark blue instead of pink.<sup>20</sup> GM soy diets also altered young sperm cells in mice;<sup>21</sup> and when parent mice ate GM soy, it changed the functioning of DNA in their offspring's embryos.<sup>22</sup> An Austrian government study reported that mice fed GM corn had fewer babies, and smaller babies.<sup>23</sup>

### **Farmers report livestock sterility and deaths**

About two dozen farmers report that pigs had reproductive problems when fed varieties of Bt corn. Pigs were sterile, had false pregnancies, or gave birth to bags of water. Some cows and bulls also became sterile. Other farmers blamed Bt corn for the deaths of cows, horses, water buffaloes, and chickens.<sup>24</sup>

When Indian shepherds let their sheep graze continuously on Bt cotton plants after harvest, within 5-7 days 1 out of 4 sheep died. An estimated 10,000 sheep died in one region alone. Post mortems showed severe irritation and black patches in intestines and livers. Investigators said preliminary evidence "strongly suggests that the sheep mortality was due to a toxin. . . . most probably Bt-toxin."<sup>25</sup> The majority of corn grown in the US produces Bt-toxin.

Investigators in the state of Haryana, India, report that most buffalo that ate GM cottonseed had reproductive complications such as premature deliveries, abortions, infertility, and prolapsed uteruses. Many calves died.

### **Protect yourself; choose Non-GM food**

There are four major GM foods: soy, corn, cottonseed, and canola. They entered our food supply about 12 years ago and are likely contributing to the deteriorating health of Americans. Without any human clinical trials or post-marketing surveillance, we can't tell which declining health statistic may be due to these foods. But we also can't afford to wait to find out. GM foods must be removed from our diet now.

To learn more about the health dangers of GMOs, and what you can do to help end the genetic engineering of our food supply, visit [www.ResponsibleTechnology.org](http://www.ResponsibleTechnology.org).

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<sup>19</sup> I.V.Ermakova "GMO: Life itself intervened into the experiments," Letter, *EcosInform* N2 (2006): 3-4.

<sup>20</sup> Irina Ermakova, "Experimental Evidence of GMO Hazards," Presentation at Scientists for a GM Free Europe, EU Parliament, Brussels, June 12, 2007

<sup>21</sup> L. Vecchio et al, "Ultrastructural Analysis of Testes from Mice Fed on Genetically Modified Soybean," *European Journal of Histochemistry* 48, no. 4 (Oct-Dec 2004):449-454.

<sup>22</sup> Oliveri et al., "Temporary Depression of Transcription in Mouse Pre-implantation Embryos from Mice Fed on Genetically Modified Soybean," *48th Symposium of the Society for Histochemistry, Lake Maggiore (Italy), September 7-10, 2006*.

<sup>23</sup> Alberta Velimirov and Claudia Binter, "Biological effects of transgenic maize NK603xMON810 fed in long term reproduction studies in mice," *Forschungsberichte der Sektion IV, Band 3/2008*

<sup>24</sup> Jeffrey M. Smith, *Genetic Roulette: The Documented Health Risks of Genetically Engineered Foods*, Yes! Books, Fairfield, IA USA 2007

<sup>25</sup> "Mortality in Sheep Flocks after Grazing on Bt Cotton Fields—Warangal District, Andhra Pradesh" *Report of the Preliminary Assessment*, April 2006, <http://www.gmwatch.org/archive2.asp>

To learn how to choose healthier non-GMO brands, visit [www.NonGMOShoppingGuide.com](http://www.NonGMOShoppingGuide.com).

International bestselling author and filmmaker Jeffrey Smith is the leading spokesperson on the health dangers of genetically modified (GM) foods. His first book, [\*Seeds of Deception\*](#), is the world's bestselling and #1 rated book on the topic. His second, [\*Genetic Roulette: The Documented Health Risks of Genetically Engineered Foods\*](#), provides overwhelming evidence that GMOs are unsafe and should never have been introduced. Mr. Smith is the executive director of the [Institute for Responsible Technology](#), whose [Campaign for Healthier Eating in America](#) is designed to create the tipping point of consumer rejection of GMOs, forcing them out of our food supply.



Many offspring of female rats fed GM soy were considerably smaller, and more than half died within three weeks (compared to 10% of the non-GM soy controls) (FOR High res of photo, download from <http://www.seedsofdeception.com/utility/showArticle/?objectID=293> )

*Non-GM*



*GM*



The stomach lining of rats fed GM potatoes showed excessive cell growth, a condition that may be a precursor to cancer. Rats also had damaged organs and immune systems.