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GM potatoes damaged rats

This is “a much better-designed study than the industry-sponsored feeding studies I have seen in peer-reviewed literature that deal with Round-Up Ready soybeans or Bt corn.”²

—Michael Hansen, research biologist, Consumers Union

“**T**o this day, the Lancet study is the best designed and carefully controlled study of its type. Compared to industry studies, it is leagues apart.”

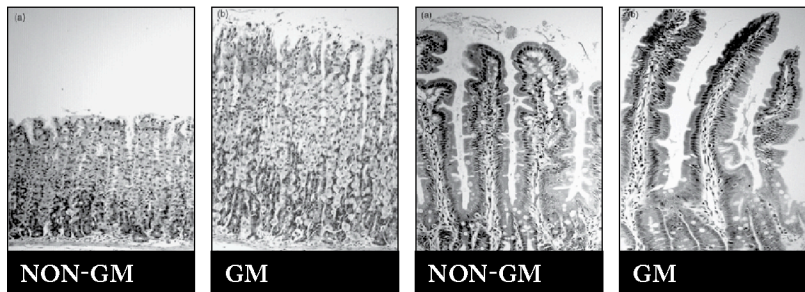
—Michael Antoniou, molecular geneticist, King’s College London

1. Rats were fed potatoes engineered to produce their own insecticide.

2. They developed potentially precancerous cell growth in the digestive tract, inhibited development of their brains, livers, and testicles, partial atrophy of the liver, enlarged pancreases and intestines, and immune system damage.

3. The cause was not the insecticide, but in all likelihood was the process of genetic engineering.

4. GM foods on the market—which were created from the same process—have not been subject to such an extensive testing protocol.

**Stomach**

The stomach lining of GM-fed rats showed proliferative cell growth.

Intestines

The excessive cell growth was also found in the wall of the small intestines (crypts) in rats fed GM potatoes.

In 1996, the UK government embarked on a plan to require long-term safety tests for all GM foods. A £1.6 million grant was awarded to a team of researchers to develop the testing protocol. Led by Arpad Pusztai of the prestigious Rowett Institute, the team developed a GM potato to use as the first “subject” for their studies. The potatoes were engineered with a gene from the snowdrop plant, which produces an insecticide called the GNA lectin.

Pusztai and his colleagues had conducted extensive research on the GNA lectin for nearly seven years and found it to be harmless to rats. Researchers anticipated that the potato engineered to produce the lectin would similarly be harmless. In fact, the UK government and the Rowett Institute were planning to commercialize the GNA potato and had contracts specifying how the royalties were to be divided.

To test the GM potato, six male rats were assigned to each diet category containing natural potato, natural potato with the lectin added, or GM potato. All three tests were repeated with raw, boiled, and baked potatoes, and rat diets were all supplemented to be complete and balanced. Rats were sacrificed at 10 or 110 days. This protocol had been approved in advance by the office that awarded the grant and similar designs had been used in more than 50 studies conducted at the institute. A 2003 article in *Nutrition and Health* described it as “remarkable in that the experimental conditions were varied and several ways were found by which to demonstrate possible health effects of GM-foods.”³

The GM potatoes adversely affected virtually every organ system of young rats—with most changes found after just 10 days. Their brains, livers, and testicles were generally smaller, suggesting disruption of normal growth processes due to either malabsorption of nutrients or unknown toxins. White blood cells responded to a challenge more slowly, indicating immune system damage; and organs related to the immune system, including the thymus and the spleen, also showed changes. The animals had enlarged pancreases and intestines, and partial atrophy of the liver.⁴ And in all cases, the GM potato created proliferative cell growth in the stomach and small and large intestines; the lining was significantly thicker than controls (see photo left).⁵ Although no tumors were detected, such growth can indicate a precancerous condition.

By contrast, rats fed non-GM potatoes spiked with the lectin were relatively unaffected. Even when rats were fed more than 700 times the amount of the GNA lectin that the GM potato produced (in an earlier study), the impact did not approach that of the GM potatoes.⁶ Thus, the damage

to the rats was not caused by the lectin, but apparently by “the genetic modification process itself.”⁷ This includes disruptions in the potato genome as well as unpredicted effects from additional genetic material inserted with the lectin gene (see section 2). **The study raised serious questions about the safety of all GM products on the market,** most of which were created with the same process and the same accompanying genetic material. Under normal circumstances, the disturbing results would be followed up to identify the cause of the problems, evaluate effects on female rats and test GM foods on the market to see if they were creating similar effects. It didn’t happen.

Research stopped, scientists gagged

Pusztai was invited to speak on television about GM food. With permission from his director, he was interviewed and spoke generally about his research—without sharing details in advance of publication. For about two days he was a hero at his institute, which was besieged with press. Then, allegedly two phone calls were placed from the UK prime minister’s office, forwarded through the receptionist to the director. The next morning, Pusztai was released from his job after 35 years and silenced with threats of a lawsuit, the 20-member research team was disbanded, and the project terminated. A part of the results was eventually published in the *Lancet*. In spite of the preliminary nature of the evidence, it remains the most in-depth GMO feeding study ever published.

Problems may be common in GM crops

It is sobering that these potatoes would have passed the tests used to get other GM crops approved. Stanley Ewen, who identified the proliferative cell growth in the rats, says that if GM foods create such effects in humans, they might increase the incidence of digestive system ailments such as Barrett’s esophagus and stomach and colorectal cancer. We don’t know if commercialized GM crops have this effect (although a rat study on experimental GM peas did show “significantly enlarged”⁸ small and large intestines that might have resulted from excessive cell growth). Consumers in the United States and elsewhere are exposed to GM ingredients everyday, but usually in smaller doses and in more processed formats than was used in this potato study.