

## Appendix 1: Mounting Scientific Evidence of Health Impacts of Roundup and GMOs

GM proponents claim that GM is a precise technique that allows genes coding for the desired trait to be inserted into the host plant with predictable outcomes and no unexpected effects. But [the genetic engineering process is crude, imprecise and highly mutagenic](#) (see GMO Myths and Truths, Myth 1.2).<sup>1</sup> It causes unpredictable changes in the DNA, proteins, and biochemical composition of the resulting GM crop, which can result in unexpected toxic or allergenic effects (see point 4 above) and nutritional disturbances (see point 6 above) as well as crop failure in the field and unpredictable effects on the environment (see point 2 above).

[Feeding studies](#) on laboratory animals and farm livestock have found that some GM crops, including those already commercialized, have toxic or allergenic effects. Effects, which may arise from the GM crop itself or from residues of the pesticides used on them, include<sup>2</sup>:

- Liver and kidney toxicity
- Enlarged liver
- Disturbed liver, pancreas and testes function
- Accelerated liver ageing
- Disturbances in the functioning of the digestive system and cellular changes in liver and pancreas
- Less efficient feed utilization and digestive disturbance
- Altered gut bacteria
- Intestinal abnormalities
- Excessive growth in the lining of the gut, similar to a pre-cancerous condition
- Altered blood biochemistry, multiple organ damage, and potential effects on male fertility
- Immune disturbances, immune responses, and allergic reactions
- Enzyme function disturbances in kidney and heart
- Stomach lesions and unexplained deaths
- Higher density of uterine lining
- Severe stomach inflammation and heavier uterus
- Differences in organ weights, which is a common sign of toxicity or disease

Further details of these studies can be found in [GMO Myths and Truths](#) (Myth 3.1).

In the most detailed feeding study ever carried out on a GM food, severe damage to the liver, kidney, and pituitary gland was found in rats fed a commercialized GM corn, along with tiny amounts of the Roundup herbicide it is grown with, over a long-term period. Additional observations included increased rates of large tumors, and increased mortality in the rats fed GM corn and/or Roundup. GM corn that had not been treated with Roundup had similar toxic effects to the GM corn sprayed with Roundup and to Roundup on its own, indicating that the GM crop itself was toxic.

This study came under heavy attack by pro-GM critics and was retracted by the journal that published it, over a year after it had passed peer review and appeared in print. However, the retraction was condemned as invalid by hundreds of scientists worldwide and the [study was republished](#).<sup>3</sup> A full discussion of the study and its retraction is in GMO Myths and Truths (Myth 3.2).

According to informal surveys and interviews conducted by the Institute for Responsible Technology,

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thousands of physicians and healthcare practitioners are advising patients to stop eating GMOs. The providers, and those who switch to non-GMO and organic diets, often report dramatic and widespread improvements in a variety of health conditions. The same is reported directly by consumers who make the switch, according to testimonies and surveys results collected by IRT and Moms Across America. These improvements mirror those reported by farmers and veterinarians about livestock that are also switched to non-GMO diets. Furthermore, they reflect many of the health issues discovered in the published animal feeding studies. Many believe that the [sharp rise of these type of disorders](#) in the US, paralleling the rise of GMO and Roundup consumption, is not a coincidence.<sup>4</sup>

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<sup>1</sup> Institute for Responsible Technology <http://responsibletechnology.org/GMO-Myths-and-Truths-edition2.pdf>

<sup>2</sup> Claire Robinson, "10 reasons we don't need GM foods," <http://www.gmwatch.org/files/10-reasons-we-dont-need-GM-foods.pdf>

<sup>3</sup> Environmental Sciences Europe (2014) "Republished study: a long-term toxicity of a Roundup herbicide and Roundup-tolerant genetically modified maize," (Jun) <http://www.enveurope.com/content/26/1/14>

<sup>4</sup> Nany Swanson (2013) <http://people.csail.mit.edu/seneff/glyphosate/NancySwanson.pdf>