Health risks of genetically modified foods

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What is a GMO?

A genetically modified organism (GMO) is defined by the World Health Organisation as an organism “in which the genetic material (DNA) has been altered in a way that does not occur naturally”.

How is genetic engineering done?

- Involves manipulating an organism's genetic material (genome) in the lab by forcibly inserting pieces of DNA from other organisms or by modifying/'editing' the existing genetic code.
- Re-programmes the cells of the GMO to make a new protein or to modify an existing protein.
- Confers new properties or "traits" that are not naturally present in the organism.

Promises about GM crops

For 20 years we've been promised GMOs with

- Higher yield
- Better nutrition
- Better disease- and pest-resistance
- Tolerance to drought, flood and saline soils

The reality

99% of existing GM crops are modified to:

- Survive being sprayed with huge amounts of herbicide, typically Roundup (glyphosate)
- Express an insecticide

– or both

We're told
GM crops/foods are:

- Same as non-GM crops except for the deliberately added trait ("precision breeding")
- Safe
- Rigorously tested and regulated

The reality: GM crops can be toxic

In controlled studies on lab and farm animals, GM crops have been found to have

- Toxic effects
- Allergenic effects
- Altered nutritional value

Sources of toxicity

3 possible sources of toxicity from a GM crop:

1. Intended gene product, e.g. Bt insecticidal protein in GM Bt crops
2. Unintended changes in crop biochemistry as a result of disruption of genes during GM process
3. Herbicide residues in the GM crop, e.g. glyphosate and (now) 2,4-D

Toxic effects in controlled lab and farm animal studies include:

- Disturbed liver, pancreas and testes function
- Damage to liver, kidneys, and intestine
- Stomach ulcers and inflammation
- Altered blood biochemistry
- Immune response

Regulations don't protect us

- No regulator requires animal feeding studies longer than 90 days in rats (only 7-8 years in human)
- US regulator doesn't require any animal feeding studies
- Long-term studies are not carried out by industry. Those that are carried out (after commercialisation, and by independent scientists) often find problems!

"Trillion-meal study" shows GMOs safe?

Review by former Monsanto scientist claims:

- "Field data" from 100 billion animals following introduction of GM feed shows animal health has not worsened
- Number of animals "condemned" at slaughter has not increased

– Concludes GM feed safe

What's wrong with the study?

- Fails to control for multiple factors – rising antibiotic use, proportion of GM feed to total diet
- 95% of the 100 billion animals are broiler chickens, slaughtered at 49 days (natural lifespan 6–10 years)
- Includes short-term and dodgy peer-reviewed studies, e.g. 2-year study on cows replaced half the animals half-way through,[1] making results worthless

If GM feed is dangerous, why don't farmers notice anything wrong?

Short commercial lifespan of livestock animals:

- Dairy cow: 4–5 years
- Beef cow: 15–20 months

– vs natural lifespan of 17-20 years.

Long-term health effects don't show up.

Other reasons farmers may not notice problems:

- Some animals eat low proportion of GM feed, e.g. cows fed grass and silage
- Rising antibiotic use in conventional farming can hide inflammation
- Slaughterhouse inspections not detailed
- “New norm”: creeping problems become accepted by farmers
- Farmers keep quiet

Glyphosate/botulism link

- Research by Dr Monika Kruger shows glyphosate residues in GM animal feed suppress healthy gut bacteria and encourage growth of gut bacteria that cause botulism
- Study inspired by rising incidence of botulism in cattle in Germany.

Stomach of pig fed a GMO-free diet: no inflammation

Stomach of pig fed a GMO diet: severe inflammation

Stomach inflammation in GM-fed pigs

Severe stomach inflammation found in:

- **32% of GM-fed pigs**
- 12% of non-GM-fed pigs

Malformations in pigs fed GM soy

Conventional pig farmer (Ib Pedersen, Denmark) found the number of malformed piglets born increased with the amount of glyphosate in sows' feed:

- 0.25 ppm glyphosate = 1 out of 1432 piglets malformed
- 0.87-1.13 ppm glyphosate = **1 out of 260** piglets malformed

Defects include:

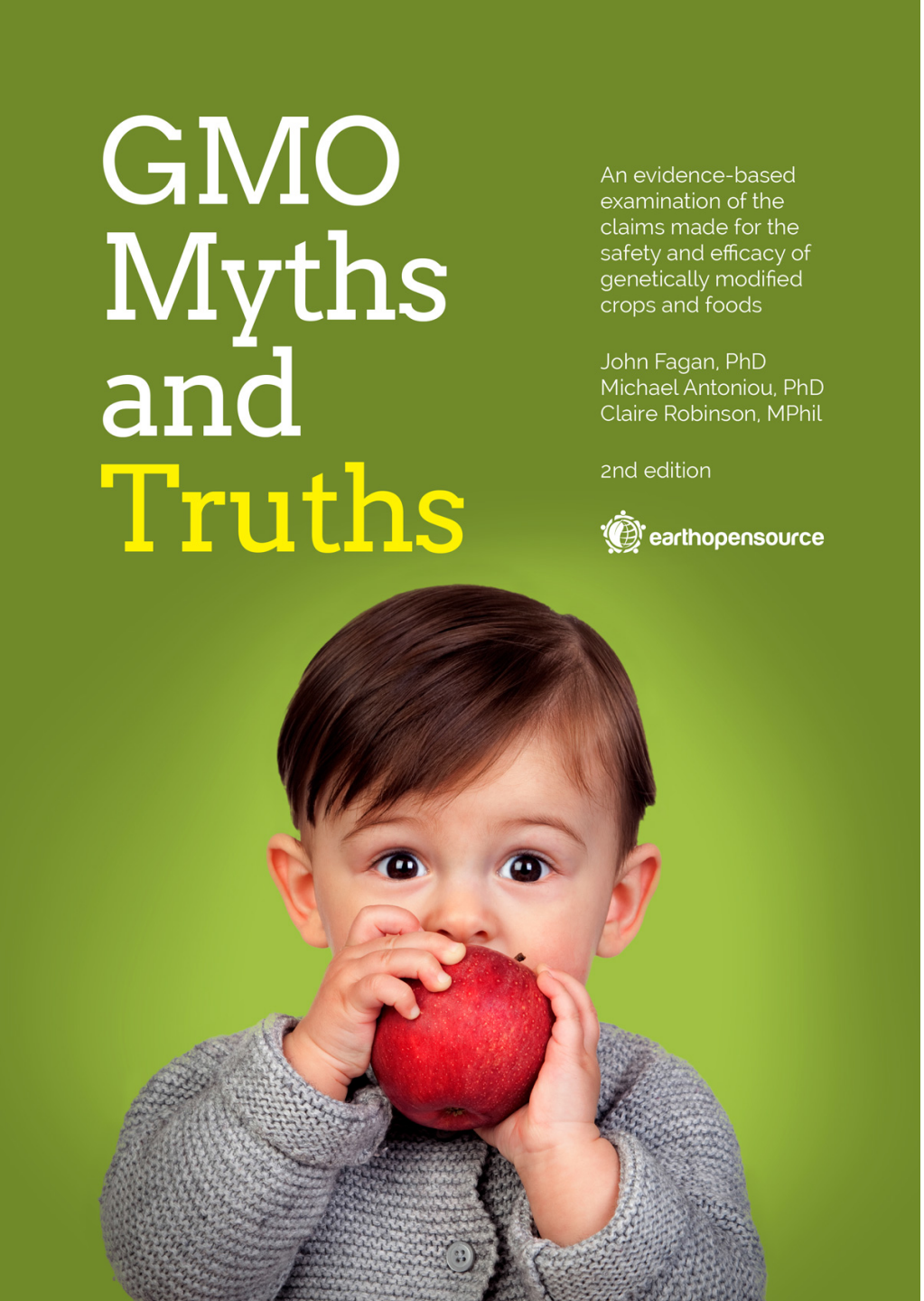
- Cranial and spinal
- Cyclopia (single central eye)
- Missing or shortened limbs

These malformations are the same ones seen in up to 1/80 of human newborns in areas of Argentina where GM herbicide-tolerant soy is cultivated.

Malformed piglets

After switch to non-GM feed

- 1.8 more live-born piglets per sow
- Diarrhoea disappeared
- Medication (especially antibiotics) down by 66%
- Non-GM feed more expensive BUT **farmer made more profit** due to lower medication costs.



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