

Puncturing the GM Myths

From an interview with [Dr. Mae-Wan Ho](#), Director of the Institute of Science in Society, by Anastasia Stephens of the Evening Standard

Dr. Mae-Wan Ho, senior academic scientist in a UK University was pressured into taking early retirement for speaking out on the hazards of GM. She is currently director of the Institute of Science in Society, Editor of its quarterly magazine, *Science in Society* and author of many books including *Living with the Fluid Genome* (www.i-sis.org.uk). She is also member of an international Independent Science Panel on GM launched 10 May 2003 and co-author of its report, *The Case for a GM-Free Sustainable World* (www.indsp.org).

AS: We have altered and manipulated plants and animals for centuries - just look at the dog breeds we have created and the hybrid roses. Why is GM any worse than this?

MWH: To breed dogs, you need actual reproduction, crossing dog breeds belonging to the same species. Animal and plant breeding can only be done within a species or between closely related species. You can't ever cross a spider with a goat.

Genetic modification, on the other hand, can do that and more because it bypasses reproduction altogether, and is therefore not restricted by species barriers. Entirely new genes and combinations of genes are made in the laboratory and inserted into the genomes of organisms to make genetically modified organisms. Contrary to what you are told by pro-GM scientists, the process is not at all precise. It is uncontrollable and unreliable, and typically ends up damaging and scrambling the host genome, with entirely unpredictable consequences.

AS: You accuse the world's governments of deliberately misleading the public over GM. Why would governments do this?

MWH: I have never accused the world's governments of deliberately misleading the public over GM. There are good governments that don't do that, they listen to a wide range of scientists, take account of all the scientific evidence and respond to public opinion.

Then there are bad governments that don't tell the public the truth about the inherent risks of GM, helped by a pro-GM scientific establishment that will even bend science to serve the interests of the biotech industry.

AS: How can you prove that our Government is ignoring its own scientific advisers over the hazards of GM to the health and environment?

MWH: Let's face it. Scientific evidence has gone decisively against GM. But our government has chosen scientific advisors that tell them what they want to hear all along. Scientists like us have lost our jobs speaking out. We submit evidence on the hazards of GM to the government's scientific advisory committees again and again over the years, only to be met with bland denial and dismissal. Fortunately, some good governments all over the world are taking heed, and are rejecting GM on account of uncertainty over safety to health and the environment. The UK government is isolated, even in Europe, over its pro-GM stance.

AS: Are the anti-GM brigade anything more than a bunch of conspiracy theorists?

MWH: There is no "anti-GM brigade". There are ordinary citizens angry at the lies they've been told, and the undemocratic way in which GM crops are foisted on them. There are angry farmers who will be out of business once their crops are contaminated by GM genes. There are scientists incensed at the abuse of science that has allowed GM crops to be approved, which have all the signs of being unsafe.

There is no "anti-GM brigade"; on the contrary, there is a distinct pro-GM brigade that will stop at nothing to promote the corporate agenda. They've infiltrated the science-media establishment and the government, and using smear tactics borrowed from America's far-right to try to discredit and silence all critics.

AS: The government's Farm Scale Evaluations of GM maize found it was better for the environment than the conventional maize crop to which it was compared. Why do you refute this evidence?

MWH: You only have to use your common sense to see through the shameful abuse of science in the GM maize trial, indeed of all the trials in the Farm Scale Evaluations, which have cost the taxpayer £3 million. GM crops are compared to the most destructively managed industrial non-GM crops, not organic or other low input agriculture. No measure of gene flow, health impacts on a wide range of wild life or human beings, no study on the soil ecosystem; only a few species of weeds and insects as indicator of biodiversity. They still get the answer they don't want for two of the crops.

The GM maize appeared to do better because it was compared to conventional plots sprayed with deadly triazine herbicides that Europe has banned a week before the results were announced, so the GM maize trial was no longer valid. But days before Margaret Beckett announced the approval of the GM maize, eleven scientists from five publicly funded research institutes wrote a paper that was rush-published online in the prestigious journal *Nature* claiming they have evidence that the GM maize will still do better than non GM after the triazine herbicides are no longer in use. That 'evidence', it turns out, is based on comparing the GM maize plots with 28 non-GM maize plots, 24 of which were in fact sprayed with the banned triazine herbicides. That paper is highly misleading, to say the least, and should never have gone past the peer-review process.

And you know what, they never measured yield, because if they did, they would very probably have found that the GM maize did much worse. A local citizen Jean Saunders in Oxfordshire took photographs of her local maize trial. She has evidence of the severely stunted GM crop that flowered later, with far fewer and smaller cobs than the non-GM crop.

AS: If GM can help feed 800 million people around the world who suffer malnutrition, isn't its development a moral imperative?

MWH: That is a wicked lie perpetrated by the pro-GM brigade in the mainstream press, using hunger and poverty and moral blackmail to promote the industry. There are indeed hundreds of millions of hungry people in the world who are too poor to buy food, and they can be helped today if the political will is there.

India alone has 320 million who go to bed hungry every night, while more than 60 million tonnes of food grains are stacked away to rot in the open or in the go-downs. In neighbouring Bangladesh and Pakistan too, food silos are bursting while their poor people starve. GM cannot help the poor, it is very likely to make it worse for them because GM seeds are patented, and farmers are not allowed to save seeds for replanting or exchange as they have been doing for thousands for years. The GM crops need lots of fertilizers and herbicides that the poor can never afford to buy.

AS: Doesn't genetic modification follow what nature does already - the evolutionary principle of genetic selection?

MWH: No, GM breaks all the rules of evolution, it short circuits evolution altogether. It bypasses reproduction, creates new genes and gene combinations that have never existed, and is not restricted by the usual barriers between species. Evolution happened over billions of years, each species has its own space and time on the evolutionary stage, they didn't all evolve at once, so gene exchange between different species were restricted by space and time as well as by biological barriers.

AS: If as manufacturers and governments argue, GM could lead to crops that are more productive, grow on land that is otherwise barren, and decrease the use of pesticides, shouldn't it be hailed as a breakthrough?

MWH: We've been hearing those promises for more than 30 years, and they still remain distant potentials. US Department of Agriculture documents a net increase in pesticide use of 50 million pounds after GM crops have been grown since 1994. The biotech bubble has burst several years ago. All the agro-biotech companies have been falling in the stock market, led by Monsanto. They no longer invest in GM crops research. They are now trying to use GM crops to produce pharmaceuticals in the open field, which will contaminate our food supply with vaccines, immune-suppressive chemicals and worse.

AS: A GM strain of rice that produces high levels of Vitamin A is already helping to prevent blindness in South East Asia. Isn't this good news for producers and consumers alike?

MWH: That is yet another lie that they keep retelling, long, long after it has been exposed. This "Vitamin A rice" or "Golden rice" produces such a minute amount of Vitamin A precursor carotene that a person has to eat some 3.5kilos per day to get the minimum requirement. But, anyone who is malnourished won't be able to convert carotene into Vitamin A anyways. Besides, many green leafy vegetables that anyone can grow in their own backyard will supply lots more Vitamin A and other essential nutrients and minerals.

Why did the scientists embark on such a stupid, useless project in the first place, at the cost of tens of millions to the taxpayer only to produce a junk crop that has more than 70 patents attached to it? Why don't scientists learn and work together with farmers who are doing sustainable non-GM agriculture that recovers local varieties adapted to grow and flourish in the local environment, which has proven much, much more successful?

AS: One of the first commercially approved GM crops is a soya bean modified to be tolerant of the herbicide glyphosate. Manufacturers argue that spraying with glyphosate replaces a more toxic regime involving several herbicides. Isn't GM in this case helping the environment?

MWH: Glyphosate is not a benign herbicide. It is a broad-spectrum herbicide that will kill all species of plants indiscriminately, broadleaves and grasses both, so it is actually much more devastating for the environment. It also destroys nitrogen-fixing bacteria and kills earthworms, both of which are crucial for maintaining soil fertility. New research is linking glyphosate to cancers in humans, spontaneous abortions and neuro-behavioural defects in children born to people using the herbicide. It causes genetic damage in mammals, fish and frogs.

New data from the US Department of Agriculture actually found that glyphosate tolerant GM crops have increased the use of herbicides, especially as fields have become infested with glyphosate tolerant weeds after just a few years.

AS: GM could lead to better-flavoured, cheaper food with a longer shelf life. Isn't that what we all want?

MWH: Yet other unfulfilled promises that we are tired of hearing. There's no research on that now. Two long shelf-life tomatoes have come and gone, one in the United States, the other in Britain. They were utter failures, and quietly withdrawn after a few years.

AS: The Institute of Food Science and Technology claims that since 1987, more than 25,000 field trials of GM plants have been carried out in 45 countries without adverse environmental consequences. Surely this is enough to allow the use of these crops?

MWH: More lies. The most devastating environmental consequences have been documented by scientists in Argentina, the second largest grower of GM crops after the US. This country, once known as the "world's granary", has spiralled into despair from planting GM crops, especially GM soya. It is having huge problems with hunger, displaced rural populations and loss of traditional food crops. Weeds have multiplied, as resistance to glyphosate (the herbicide used with RR soya) soared. The herbicide has had to be applied more frequently and at higher concentrations. Toxic older herbicides, such as 2,4 D and Paraquat, banned in many countries are back in use. The pampas - the beautiful natural grasslands for which the country is renown - has disappeared, as have hundreds of thousands of hectares of forest. Aeroplanes are used to spray herbicides on RR soya, subjecting local populations to tremendous health risks.

AS: What do you say to the GM companies' claims that many opponents to GM have irrational views and a poor understanding of science?

MWH: On the contrary, it is the pro-GM brigade that has an irrational attachment to an obsolete understanding of genetics. Genetic engineering was inspired by the idea that everything about an organism is more or less hardwired in the genes, but all the scientific findings since genetic engineering began in the 1970s tell us just the opposite. There's a lot of cross-talk between genes and the environment, even the genome itself is fluid and dynamic. I've written a new book on it, called *Living with the Fluid Genome*.

What really worries me about the pro-GM brigade is that they are destroying science by bending it to suit their purpose. In that respect, they are the ones that are truly anti-science.

AS: Scientists are rearing GM animals to produce drugs or tissue to help cure human diseases. Surely that must be a good thing?

MWH: That's an even more risky enterprise to health, and thoroughly unjustified in terms of animal welfare. Most of the gene drugs created that way simply don't work, and they are very costly as well. A lot of hype goes with each new drug marketed, only to be withdrawn years later, when unacceptable "side-effects" including death surface. And watch out for the human embryonic stem cells, hyped as a panacea for cell and tissue replacement. They have side effects that include uncontrollable growth, or cancer by its usual name.

AS: A few genes straying here and there - is it really that dangerous?

MWH: "A few genes straying here and there" is what makes new viruses and bacteria that cause disease epidemics, like the recent SARS and AIDS. If you want to know the truth, the toolkit for GM is precisely the same as that for making biological weapons: viruses and bacteria that cause diseases and spread antibiotic resistance genes to make diseases more difficult to treat. Nasty surprises have already surfaced in 2001 when researcher in Australia "accidentally" created a lethal virus that killed all mice injected, in the course of modifying a harmless mouse-pox virus to create a vaccine. Nowadays, there

are laboratory techniques that can chop up different viruses into small pieces and make the pieces join together again at random to generate in a matter of minutes millions of new viruses. You won't even have time to look through them to see how many deadly ones you have created.

AS: We already eat GM-altered food - Chymosin, produced by GM microorganisms, has been used in cheese-making since the late 1980s. Has that caused harm?

MWH: There is a big difference between making enzymes in microbes modified for use in a closed vat in a factory, and sending GM crops out into the open environment. Still, when you say there is no harm, no one has seriously looked yet. Perhaps we should.

AS: Could GM really increase the risk of diseases like cancer, allergies and other unknown illnesses?

MWH: Up to 100 villagers in the south of the Philippines living near GM maize plots were reported to have suffered from serious illnesses when the GM maize came into flower last year. Prof. Terje Traavik of the Institute of Gene Ecology in Tromsø Norway found antibodies that react against the Bt toxin produced by the GM maize in the blood of 39 of the villagers. There are already scientific reports that several Bt toxins and spores of the soil bacterium - from which the Bt toxins were isolated - cause immune reactions in animals and allergies in human beings.

Before that, twelve dairy cows were reported to have died between 2001 and 2002 on a farm in Hesse, Germany, after being fed Syngenta's GM maize Bt176, and others in the herd had to be slaughtered on account of mysterious illnesses. Farmers protested in front of the Robert Koch institute at the end of last year because they suspect a cover-up, and to this day, there has been no serious investigation. But that's just scratching the surface. Other diseases are much slower to take effect.

Cancer may take years or decades, and if you don't look, you won't find it. But we already have evidence from gene therapy, which is genetic modification of human cells using construct and methods similar to those used in genetic modification of animals and plants. In gene therapy, it is generally accepted that the major side effects are infectious viruses appearing and cancer. Back in 2000, the first success of gene therapy was widely reported in the world press after 12 years of fruitless clinical trials. Researchers in Paris pioneered a treatment of infants with an X-linked severe combined immune deficiency by taking bone marrow cells out of the patients, putting in the missing gene and then selecting the cells that have been modified to inject back into the same patient. Eleven infants were treated, 9 apparently successfully. But 18 months or so later, two of them developed leukaemia. The foreign DNA has inserted into the wrong place, giving rise to uncontrolled cell multiplication, or cancer.