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Monsanto's GM Corn And Cancer In Rats: Real Scientists Deeply Unimpressed. Politics Not Science Perhaps?

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It's very difficult to take a purportedly scientific paper which opens with the following [phrase seriously](#).

“

The health effects of a Roundup-tolerant genetically modified maize (from 11% in the diet), cultivated with or without Roundup, and Roundup alone (from 0.1 ppb in water), were studied 2 years in rats. In females, all treated groups died 2–3 times more than controls, and more rapidly.

Given that most mortal beings only have to go through dying the once it would seem that we are discussing the prevalence of reincarnation in rats. One can imagine interest in such research from various religious groupings but it would be difficult to describe the process as science. However, yes, that is a cheap shot: mocking non-native English speakers for their difficulties with the English language is such. What they mean is that more of the female rats on the GM diet died and died younger than the control group. Which is at least the beginnings of a piece of scientific research.

For yes indeed we really would like to know whether Monsanto's Roundup Ready corn (maize to Europeans) does cause health problems. We don't think it does for several reasons. The multiple studies that have been done before looking at this very question for example. The fact that hundreds of millions of animals have been fed the stuff for years without anyone noticing anything odd about said animals. We've even got a nice natural experiment going on. Those humans in the Americas (North, South and Central) have been eating GM corn in vast quantities for a number of years now. Those humans in Europe have not. Again, we have not noted any difference in disease prevalence among the two groups that cannot be and is not explained by other factors.

But this paper claims to take us into new areas: instead of studying the rats only for 90 days as with earlier studies they studied them for their natural lifespan, around two years. They also claim to have found very different results from everyone else. Taken in the abstract this is fine: that's what science is for. Finding out things that we didn't [know before](#).

“ Today, researchers led by Gilles-Eric Séralini at the University of Caen in France announced evidence for a raft of health problems in rats fed maize that has been modified to be resistant to the herbicide Roundup. They also found similar health problems in rats fed the herbicide itself.

The rodents experienced hormone imbalances and more and bigger breast tumours, earlier in life, than rats fed a non-GM diet, the researchers claim. The GM- or pesticide-fed rats also died earlier.

This kind of GM maize accounts for more than half the US crop, yet the French team says this is the first time it has been tested for toxicity throughout a rat's lifespan (Food and Chemical Toxicology, DOI: 10.1016/j.fct.2012.08.005).

If this is true then we definitely want to know about it. Yes, we really do, whatever it might do to Monsanto's share price or business. In fact especially given what it might do to that business.

The question is though, is it true? The politest thing we can say about the research so far is that they haven't managed to prove that it is true, no. Scientists working in the area have been, how shall we put this, less than complimentary about some of the [methods used](#):

“ Prof Tom Sanders, head of the nutritional sciences research division, King's College London, warned the type of rat used was very prone to mammary tumours, particularly when food intake was not restricted. And Dr Wendy Harwood, senior scientist, John Innes Centre, said: “The full data set has not been made available, but the findings do not contradict previous findings that genetic modification itself is a neutral technology, with no inherent health or environmental risks.

“Without access to the full data, we can only say that these results cannot be interpreted as showing that GM technology itself is dangerous. However they do indicate possible concerns over long-term exposure to Roundup that require further study.”

There are more such comments [here](#):

“ Prof Anthony Trewavas, Professor of Cell Biology, University of Edinburgh, said:

“The control group is inadequate to make any deduction.”

This is about as close as a scientist is going to come to saying you've got it wrong, you stupid, stupid, boy.

[Or here](#):

“ Tom Sanders, head of the nutritional sciences research division at King's College London, noted that Seralini's team had not provided any data on how much the rats were given to eat, or what their growth rates were.

“This strain of rat is very prone to mammary tumors particularly when food intake is not restricted,” he said. “The statistical methods are unconventional ... and it would appear the authors have gone on a statistical fishing trip.”

And the pictures of rats with tumours in [the paper](#):

“ The most evocative part of the paper is those pictures of tumorigenesis,” said Prof Maurice Moloney from Rothamsted Research, where much UK GM study is undertaken.

“They give the impression that this never happens in controls. I'd be surprised if it didn't, but that ought to be explicitly demonstrated, and if there was a control that ended up showing similar kinds of tumorigenesis then a picture of that rat should be shown as well, just so we can see if there are any qualitative differences between them.”

There are more detailed complaints as well. Here's [one explanation](#) of why the graphics in the paper are terribly misleading.

But the real killer criticisms come in the statistics they have used. Or rather, the standard statistical techniques that they have not used. You can see discussions of them [here](#) and [here](#). The problem being that given the design of the experiment, the number of rats used and then the way the information has been presented to us we simply do not know, and cannot work out, whether this is a result of the effects of GM corn, Roundup or pure blind chance. And that is the point of the various statistical tests, to attempt to exclude pure blind chance as a cause of what is being observed.

Sadly, we can have no confidence at all in results which do not perform these standard tests to exclude that chance element. Nor in studies that do not give us the information to allow us (well, not me, obviously, but someone who knows what they're doing) to perform such tests independently. These tests are not performed ergo we can have no confidence in the results.

So let's roundup (*sorry, sorry*) what we actually know about the science of this paper. The researchers took a strain of rat which is known to suffer from a specific type of tumour. Indeed, that's what this strain of rat is for: to allow us to study these types of tumour and the effects of any treatment upon them. They then fed some rats on GM corn, fed others Roundup itself in the water and a small number were fed on non GM corn and fresh water. They then observed tumours of the type this rat is known to be subject to. So far so obvious.

Their claim is that the rats fed GM corn and Roundup got more such tumours earlier than the control group. The criticism of this finding is that the control group was simply too small to allow such an observation to be made with any certainty. And they have not conducted, or at least not presented, the standard statistical tests which would allow them or us to determine whether the results were the outcome of pure blind chance.

This may be many things but it isn't good science: which is why the various scientists quoted above are so unimpressed.

Almost as an aside it's amusing to note that the finding they do claim seems not to be dose dependent. Most odd for as Paracelsus pointed out centuries ago it is the dose which is the poison. We actually seem to see that the male rats fed more GM corn and more Roundup do better than those fed less. An extremely odd finding but one which could perhaps be explained by the fact

that one of the [authors is a homeopath](#). The smaller the dose the larger the effect sort of thing. Perhaps they banged the bottles of Roundup laced water on a horsehair cushion for a bit or something?

Yes, that's another cheap shot. That a larger dose leads to a lower effect is in fact an indication (but no more, for we've not the real numbers to judge) that we're dealing with statistical chance here, not an actual effect of the doses.

But having said, with all the *politesse* possible, that this is not good science, why then leap to the idea that it is politics? For the fairly obvious reason that is is most certainly being [used politically](#):

“ A study claims that rats fed with GM corn that was produced by US firm Monsanto had suffered tumors and multiple organ damage. Following the study's publication, thousands of protesters went out to the streets in Brussels on Wednesday, calling for an overhaul of food policy in Europe.

“Those in the food industry who said there wasn't a risk lied, they didn't tell people the truth. Europe's independent food agencies now have to act. It is absolutely essential that we kickstart the debate and re-examine GM food. The new evidence shows how dangerous GM crops are for human health,” said Green MEP Jose Bove.

Then again you could get Jose Bove to denounce GM on the streets of Brussels at any time of any day or night so that's nothing unusual.

We might also look at the people pushing the paper. [The Sustainable Food Trust](#). To a reasonable degree of accuracy this seems to be the militant wing of the [Soil Association](#). For those of you who don't know your British hippies this is essentially the British trade union for organic farmers. Yes, with all the nonsense about homeopathic treatment for animals although most of them do stop short of having to bury a cow horn in the dung pile by moonlight (no, really, there is a wing of the movement which insists that this helps in some manner).

That's a cheap shot too: denigration by association. Even if it's a valid observation at times this is, strictly speaking, an error of logic. However, we can go further. The lead author, Gilles-Eric Seralini, certainly has some very strong views on the [subject of GM crops](#). He also has form in being, umm, perhaps not as careful as we would all like him to be in [his statistical techniques](#). Gilles-Eric [has been funded by Greenpeace](#) in the past and we all know how much they love the idea of GM crops. Dr. Seralini has even been critiqued by the European Union itself over his use of [statistical techniques](#).

“ The EFSA (2007) statistical assessment concluded that the assumptions underlying the statistical methodology employed by Seralini et al. (2007) did not hold and therefore would

lead to an excess of spurious significant results; the Monod and EFSA analyses confirmed this.

Would you believe that this knuckle rapping was over a paper which looked at the effects of GM maize being fed to rats? You would? My, how cynical you are.

But if we are to say that this is, at best, very slightly dodgy statistics being released to make a political point we must then ask ourselves what is that political point being made? It most assuredly cannot be to get Jose Bove demonstrating on the streets of Brussels. This is, you will recall, the man who made his name dismantling a McDonald's franchise which was under construction. So what could it actually be, this political point that people want to make? SFGate makes [the connection](#):

“ California Right to Know, the group pushing California's Prop. 37 to require labeling of genetically engineered foods, pounced on the study. Spokesperson Stacy Malkan said the most “important and shocking part of it is that this is the first available long-term study on GMOs, which have been in the food supply for the better part of 20 years.”

Oh. Yes, that is true, isn't it? There's a proposition on the ballot in California this fall that would lead to the mandatory labeling of GM containing food. And as Mark Bittman [has pointed out](#), the hope and aim is that so California, so the nation. Now I agree that this could just be taken as evidence that I have a nasty and suspicious mind. But here are parts of a press release that arrived in my inbox last night.

“ Massive Tumors in Rats Fed GMOs in First Long-Term Study
Leading Experts to Hold Press Call Today at 2:30pm EDT

Statement from Yes on Proposition 37, California Right to Know GMO Labeling Campaign

That campaign were certainly well informed about the imminent arrival of this scientific paper.

“ In response to this study, Yes on Proposition 37 California Right to Know Campaign Manager Gary Ruskin released the following statement:

“The results of this study are worrying. They underscore the importance of giving California families the right to know whether our food is genetically engineered, and to decide for ourselves whether we want to gamble with our health by eating GMO foods that have not been adequately studied and have not been proven safe. By requiring simple labels on genetically engineered foods, Proposition 37 gives Californians the ability to choose whether

to expose ourselves and our families to any potential health risks. The right to know is fundamental, and that's why 50 countries around the world have already enacted labeling requirements for genetically engineered food.”

You really would have to be most, most, cynical to think that there could be any relationship at all between the timing of this paper and this proposition.

Certainly far more cynical than I am prepared to commit myself to in print.

“ Paid for by Yes on 37 For Your Right to Know if Your Food Has Been Genetically Engineered Supported by Consumer Advocates Makers of Organic Products and California Farmers, Major funding by Mercola Health Resources LLC and Organic Consumers Fund. 5940 College Ave, Suite F , Oakland, CA 94618, United States

As the old saying goes you pays your money and you takes your choice. Who you wish to believe here is entirely up to you. Myself I would go with having more than just a *soupcon* of a suspicion that this is not very good science cobbled together and released in order to influence an upcoming political event. But that is just my opinion.

Just a final note for the “peer reviewed” crowd. No, it is not true that something that has been peer reviewed is thus good and true science. I can prove this quite easily: I myself have published, in a real academic journal, a peer reviewed paper. If, as many do, you think I am a politically partial blowhard then that rather devalues peer review. If we are to be more serious we would point out that truth in science is not shown by peer review. Rather, by replication. Whether of the experiment itself or of the manipulation of the data as it is presented. And what really makes this a very bad paper indeed is that we have not been given that basic numerical information by which we could repeat the sums and calculations that they have done.

Or as the Statistical Laboratory at the University of Cambridge [note](#):

“ I am grateful for the authors for publishing this paper, as it provides a fine case study for teaching a statistics class about poor design, analysis and reporting. I shall start using it immediately.

Oh dear....

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<http://www.forbes.com/sites/timworstall/2012/09/20/monsantos-gm-corn-and-cancer-in-rats-real-scientists-deeply-unimpressed-politics-not-science-perhaps/>