GENEWATCH

GLYPHO-GATE

By Sheldon Krimsky, with Gilles-Eric Séralini, Robin Mesnage, and Benoît Bernay

Background: Séralini et. al

Gilles Eric Séralini is a professor of molecular biology at Caen University, located in the town of Caen in Normandy, France. Professor Séralini was the lead author among a team of 8 scientists who submitted a paper to the peer-reviewed journal *Food and Chemical Toxicology* on the long term toxicity of Roundup herbicide and Roundup-tolerant genetically modified maize. The paper was received by the journal on April 11, 2012, sent out for review, accepted for publication on August 2, 2012, available online September 19, 2012 and appeared in print in the Elsevier journal November 2012.[1]

Séralini et al. exposed rats to GM maize and Glyphosate and studied them for 2 years. They found that female rats died at a rate 2-3 times greater than controls. Female rats developed large mammary tumors more often and earlier in life than the control groups. In treated male rats liver congestion and necrosis were observed 2.5 to 5.5 more frequently than controls; severe kidney disease was found to be 1.3 to 2.3 times greater with large palpable tumors occurring 4 times more than controls.

The paper was met with a firestorm of reaction. Some scientists and regulatory bodies found the study inconclusive, citing methodological flaws or limitations in the study design or statistical analysis, and recommended that the study be repeated. Others dismissed the study outright as biased and requested that the journal withdraw it. However, over a hundred scientists from universities and institutes throughout the world signed on to an open letter supporting Séralini et al. against what they viewed as corporate influence over the science of GM crops.

Many media outlets dismissed the study without even waiting for the paper to be fully aired in the scientific community. Faced with an unprecedented reaction to their journal publication, the editors of Food and Chemical Toxicology wrote: "The editors and publishers wish to make clear that the normal thorough peer review process was applied to the Séralini et al. paper. The paper was published after being objectively and anonymously peer reviewed with a series of revisions made by the authors and the corrected paper then accepted by the editor."

Séralini et al. issued an 8-page response to critics where they provided a table of criticisms and answers.[2]

Professor Séralini sent *GeneWatch* an announcement in which his research group identifies the most toxic chemical in Ready Roundup-the most widely used herbicide in the world--which is not the active ingredient glyphosate but a substance called POE-15. This substance is an adjuvant added to glyphosate, which the authors state is toxic to human cells. Adjuvant chemicals often escape the rigorous testing of active ingredients in pesticides. Another example of an adjuvant in synthetic pyrethroids is piperonyl butoxide, which is a potential carcinogen.

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Study: Glyhposate Not the Most Toxic Chemical in Roundup

In a new study published in the scientific journal *Toxicology*, Robin Mesnage, Benoît Bernay and Professor Gilles-Eric Séralini, from the University of Caen, France, have proven from a study of nine Roundup-like herbicides that their most toxic compound is not glyphosate-the substance the most assessed by regulatory authorities-but a compound that is not always listed on the label, called POE-15. Modern methods were applied at the cellular level (on three human cell lines), and mass spectrometry (studies on the nature of molecules). This allowed the researchers to identify and analyze the effects of these compounds.

Glyphosate is supposed to be the "active ingredient" of Roundup, the most widely used herbicide in the world, and it is present in a large group of Roundup-like herbicides. It has been safety tested on mammals for the purposes of regulatory risk assessment. But the commercial formulations of these pesticides as they are sold and used contain added ingredients, or adjuvants. These are often classified confidential and described as "inerts." However, they help to stabilize the chemical compound glyphosate and help it to penetrate plants, in the manner of corrosive detergents. The formulated herbicides (including Roundup) can affect all living cells, especially human cells. This danger is overlooked because glyphosate and Roundup are treated as the same by industry and regulators on long-term studies. The supposed non-toxicity of glyphosate serves as a basis for the commercial release of Roundup. The health and environmental agencies and pesticide companies assess the long-term effects on mammals of glyphosate alone, and not the full formulation. The details of this regulatory assessment are kept confidential by companies like Monsanto and by health and environmental agencies.

This study demonstrates that all the glyphosate-based herbicides tested are more toxic than glyphosate alone, and explains why. Thus their regulatory assessments and the maximum residue levels authorized in the environment, food, and feed, are erroneous. A drink (such as tap water contaminated by Roundup residues) or a food made with a Roundup tolerant GMO (like a transgenic soybean or corn) were already demonstrated as toxic in the recent rat feeding study[1] from Prof. Séralini's team. The researchers have also published responses to critics of the study.[2] This new research explains and confirms the scientific results of the rat feeding study.

Overall, it is a great matter of concern for public health. First, all authorizations of Roundup-type herbicides have to be questioned urgently. Second, the regulatory assessment rules have to be fully revised. They should be analyzed in a transparent and contradictory manner by the scientific community. Agencies that give opinions to government authorities, in common with the pesticide companies, generally conclude safety. The agencies' opinions are wrong because they are made on the basis of lax assessments and much of the industry data is kept confidential, meaning that a full and transparent assessment cannot be carried out. These assessments are therefore neither neutral nor independent. They should, as a first step, make public on the Internet all the data that underpin the commercial release and positive opinions on the use of Roundup and similar products. The industry toxicological data must be legally made public.

Adjuvants of the POE-15 family (polyethoxylated tallowamine) have now been revealed as actively toxic to human cells, and must be regulated as such. The complete formulations must be tested in long-term toxicity studies and the results taken into account in regulatory assessments. The regulatory authorization process for pesticides released into the environment and sold in stores must be revised. Moreover, since the toxic confidential adjuvants are in general use in pesticide formulations, we fear according to these discoveries that the toxicity of all pesticides has been very significantly underestimated.

The full study:

Mesnage R., Bernay B., Séralini G-E. (2013, in press). Ethoxylated adjuvants of glyphosate-based herbicides are active principles of human cell toxicity. *Toxicology*.
http://dx.doi.org/10.1016/j.tox.2012.09.006

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ENDNOTES

1. Gilles-Eric Seralini, Emile Clair, Robin Mesnage, Steeve Gress, Nicolas Defarge, Manuela Malatesta, Didier Hennequin, Jo?l Spiroux de Vendômors. Longterm toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize. Food and Chemical Toxicology 50(2012):4221-4231.

2. Gilles-Eric Seralini, et. al. Answers to critics: Why there is a long term toxicity due to a Roundup-tolerant genetically modified maize and to a Roundup herbicide. Food and Chemical Toxicology 53(2013):476-483.