## Glyphosate exposure causes 'transgenerational inheritance of disease' in rats, study claims, but scientists question data

Washington State University researchers have found a variety of diseases and other health problems in the second- and third-generation offspring of rats exposed to glyphosate, the world's most popular weed killer. In the first study of its kind, the researchers saw descendants of exposed rats developing prostate, kidney and ovarian diseases, obesity and birth abnormalities.

Michael Skinner, a WSU professor of biological sciences, and his colleagues exposed pregnant rats to the herbicide between their eighth and 14th days of gestation. The dose — half the amount expected to show no adverse effect — produced no apparent ill effects on either the parents or the first generation of offspring.

But writing in the journal <u>Scientific Reports</u>, the researchers say they saw "dramatic increases" in several pathologies affecting the second and third generations. The second generation had "significant increases" in testis, ovary and mammary gland diseases, as well as obesity. In third-generation males, the researchers saw a 30 percent increase in prostate disease....

More than one-third of the second-generation mothers had unsuccessful pregnancies, with most of those affected dying. Two out of five males and females in the third generation were obese.

## Read full, original article: Researchers see health effects across generations from popular weed killer

**Editor's Note:** This paper has been roundly criticized for many reasons on science websites across the Internet. Here are some representative comments from science friends on the study from what many people refer to as "the notorious Skinner lab"

It's a very questionable study for lots of reasons.

- 1. First, it used Sprague-Dawley rats, which naturally develop cancer tumors, and did not account for that in its analysis. The control size is about 2x that of the treatment sample, and the numbers are variable between treatment.
- 2. Second, no indication on how they dealt with these for their stat analysis-normal parametric stats cannot be used if one wants an accurate answer. Food intake per rat was not controlled. At 1 year old, tumor formation should be well on the way. These are never mentioned, but we can assume some of the pathologies observed would be from the tumors that are incipient or present.
- 3. Third they INJECTED glyphosate at incredibly high doses, which is obviously not how mammals, including humans, encounter it. Left out from the Wash U summary (I think deliberately) which drove the press coverage is this: "Timed-pregnant females on days 8 through 14 of gestation were administered daily intraperitoneal injections of glyphosate (25 mg/kg BW/day dissolved in PBS) (Chem Service, Westchester PA) or dimethyl sulfoxide (DMSO) or Phosphate Buffered Saline (PBS), as previously described". The amounts used are well below the NOEL, but way above the acceptable daily intrakes.
- 4. Fourth, here were no controls. The actual control population had a founder effect, so the authors

simply threw out that population and substituted one from another study, treated with different solvent, DMSO, than the PBS used to administer the glyphosate.

- 5. Fifth, they start with outbred mice, not inbred mice. So from the start there is extensive genetic variation. Then in the subsequent generations, they are breeding within the small number of rats they started with. Even if they try to avoid sibling/cousin crosses, this will lead to segregation and confounding genetic effects between controls and glyphosate treated populations.. As a result, even with the original controls, there is no way to know what is caused by treatment and what is purely due to genetics. In fact we know genetics is a factor, because their original controls population was tossed because of a founder effect!
- 6. Sixth, the Skinner lab, which carried this out, is controversial...to say the least. Skinner has been known to have falsified data in the past. There's a bit of chatter on this at Reddit, and it might be a useful pub-peer comment: <u>https://redd.it/bglrq9</u>. There is a brief write up in The Scientist about previous experience of falsified data from Skinner's lab, but he blamed someone else—he's done this more than once, apparently. <u>THE-SCIENTIST.COM</u>: <u>Postdoc fudged epigenetic data</u>

A former postdoctoral fellow at Washington State University has reportedly falsified data presented in two figures of an epigenetics paper, according to the Office of Research Integrity (ORI): http://ori.hhs.gov/misconduct/cases/Chang\_Hung-Shu.shtml released late last month. Image:flic...