Exposure to common agricultural fungicide shown to influence rat behavior for generations

A new study in the Proceedings of the National Academy of Sciences shows that pregnant rats exposed to the common agricultural fungicide vinclozolin pass on the damage to their descendents.

While the co-author stated that the purpose of the study was to investigate potential phenomena which are caused by exposure to the chemical, not to assess the risk humans face, as I pointed out in my recent article on a ground-breaking study on the effects on high-fructose corn syrup on rats’ brains, rats are regularly used as models.

Like bisphenol-A (which the Food and Drug Administration refuses to ban from food packaging) despite indications that it is a similarly dangerous endocrine disruptor even at low doses), this chemical has been shown to interrupt the course of normal sexual development, among other dangers.

For those who are unfamiliar, vinclozolin – sold under brand names Ronilan, Curalan, Vorlan and Touche – is used to fight various diseases which target crops, such as molds, rots, blights and is even regularly used on gold courses.

The study, conducted by United States-based researchers, showed that descendents of pregnant rats exposed to the chemical showed more anxiety and stress a whopping three generations after the original rat was exposed.

These descendents showed higher levels of stress and anxiety than the spawn of non-exposed rats, and researchers suggest that this may be able to explain the rising numbers of diagnoses of anxiety disorders, autism and obesity among human beings in the recent past.

Some have postulated that there is actually no rise in autism or anxiety disorders, but instead a more frequent diagnosis of said illnesses since we now better understand them.

This research, however, makes that attempt to explain away the rise in...
these conditions look increasingly less reasonable.

Indeed, the fact that there has been a marked rise in new autism diagnoses is hardly arguable, as highlighted by Steven Novella of Science-Based Medicine in 2008.

"That the number of new autism diagnoses is dramatically increasing is generally accepted and not a point of debate," Novella wrote.

Novella outlines the two basic hypotheses behind this rise: "1) That the true incidence of autism is rising due to an environmental cause, 2) That the rise in incidence is mostly or completely an artifact of increased surveillance and broadening of the definition of autism."

While his 2008 article, covering research conducted by Professor Dorothy Bishop of the University of Oxford, seems to be leaning towards the second hypothesis, it appears that this latest research supports the first.

"We are now in the third human generation since the start of the chemical revolution, since humans have been exposed to these kinds of toxins," said David Crews of the University of Texas, the lead author of the study.

"There is no doubt that we have been seeing real increases in mental disorders like autism and bipolar disorder," said Crews.

"It’s more than just a change in diagnostics. The question is why? Is it because we are living in a more frantic world, or because we are living in a more frantic world and are responding to that in a different way because we have been exposed? I favor the latter," he explained to Agence France-Presse.

The study involved researchers exposing pregnant rats to vinclozolin, which is regularly used as a fungicide on both fruits and vegetables, and has been linked to hormone disruption – and thus is technically known as an endocrine disruptor – with effects persisting across generations of exposed animals.

While Michael Skinner of Washington State University, the co-author of the study, pointed out that the amount of exposure was indeed “higher than what you would expect in the environment,” he also emphasized that “there is not a whole lot known about environmental levels of this particular compound.”

Skinner and his fellow researchers tested the third generation offspring of male rats, specifically investigating their reactions to a stressful situation.

This experimental situation was physical restraint during adolescence, which they then compared with the reactions of rats that had elders who were not exposed to the chemical fungicide.

They discovered that rats with a family history of fungicide exposure not only had higher levels of testosterone compared with the other rats but also weighed more – thus the potential link to obesity.

Furthermore, the rats with ancestors exposed to the chemical showed higher levels of anxiety, greater sensitivity to stress and greater activity in the regions of the brain associated with stress compared with the unexposed test group.

The study also found that in a separate trial testing sociability, the offspring of fungicide-exposed rats “showed less interest than other rats in new individuals and environments.”

Skinner said that these experiments were only conducted on male rats and that studies focused on the female descendants are still ongoing.

"The ancestral exposure of your great grandmother alters your brain
development to then respond to stress differently,” said Skinner.

“We did not know a stress response could be programmed by your ancestors’ environmental exposures,” he added, thus potentially supporting the aforementioned hypothesis which states, “That the true incidence of autism is rising due to an environmental cause.”

The researchers postulate that the genetic composition of sperm and eggs in elder rats is actually altered by exposure to the fungicide, which then may lead to altered stress responses in adolescent rats in future generations.

While vinclozolin, as previously mentioned, has been found to be an endocrine disruptor mimicking male hormones like testosterone, it was used for quite a while in the 1980s and continues to be used to this day, although to a lesser degree.

If similar findings are any indicator, I seriously doubt that the Environmental Protection Agency (EPA) – which regulates the chemical – will actually step up and do their job.

Unfortunately it has become painfully clear that we cannot rely on the government to keep us safe and instead we have to turn to ourselves and our local community for support.

If you would like to play it safe and avoid this fungicide wherever possible, your best bet is to either grow your own food, start a truly organic community garden, or find a local farmer you can trust.

Source
Posted by Angelo Agathangelou at 2:29 PM

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