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Chemical exposure influences rat behavior for generations

AFP - When pregnant rats are exposed to a common crop chemical, their descendants three generations later show more anxiety and stress than the offspring of unexposed peers, US researchers said.

The study in the Proceedings of the National Academy of Sciences suggests that the animal model may provide an explanation for the mounting number of cases of anxiety disorders, autism and obesity among humans in recent years.

"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 lead author David Crews of the University of Texas.

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

"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."

For the study, researchers exposed pregnant rats to vinclozolin, a common fungicide used in fruits and vegetables and which is known to disrupt hormones and have effects across generations of animals.

The amount of chemical exposure was "higher than what you would expect in the environment, but there is not a whole lot known about environmental levels of this particular compound," said co-author Michael Skinner at Washington State University.

Skinner added that the purpose of the study was not to assess risk for humans to but to examine potential phenomena caused by exposure.

He and colleagues tested the third generation of male rats and their reactions to a stressful situation of physical restraint during adolescence, comparing those that had elders with chemical exposure and



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File photo shows a field of corn crop in Perryton, Texas. When pregnant rats are exposed to a common crop chemical, their descendants three generations later show more anxiety and stress than the offspring of unexposed peers, US researchers said.



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Children walk through a pumpkin patch in Maryland, US. The researchers believe that chemical exposure alters the genetic makeup of the sperm and eggs and may lead to future generations showing altered stress responses in their teen years.

those that did not.

The rats with the family history of fungicide exposure weighed more and had higher testosterone levels than the others.

They were also more anxious, more sensitive to stress, and showed greater activity in stress-related regions of the brain than descendants of unexposed rats, said the study.

In a separate test for sociability, the fungicide-exposed offspring "showed less interest than other rats in new individuals and environments," added the study. Studies on female offspring are ongoing, Skinner said.

"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."

The researchers believe that chemical exposure alters the genetic makeup of the sperm and eggs and may lead to future generations showing altered stress responses in their teen years.

Vinclozolin began being used to control mold and rot in US crops in the early 1980s, but its use declined sharply after studies showed it could mimic male hormones, like testosterone, and interrupt normal sexual development.

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