

Common fungicide causes long-term changes in mating behavior

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Female rats avoid males whose great-grandfathers were exposed to a common fruit crop fungicide, preferring instead males whose ancestors were uncontaminated, researchers from The University of Texas at Austin have discovered.

Their research shows that environmental contamination could affect the evolution of wildlife through changes in mating behavior.

Drs. David Crews and Andrea Gore examined mate preference in male and female rats whose great-grandparents were exposed to the fungicide vinclozolin, which causes early onset of cancer and kidney disease in males.

They found that female rats could tell the difference between male descendants of rats that had or had not been exposed to vinclozolin.

The females strongly preferred to associate with males descended from unexposed rats.

Their research will be published the week of March 26-30 in the online Early Edition of the *Proceedings of the National Academy of Sciences*.

“Even across generations, your attractiveness as a mate is decreased if your great-grandfather has been exposed to environmental chemicals,” said Gore, professor of pharmacology and toxicology in the College of Pharmacy. “That will have an impact on your ability to reproduce and

could take you out of the gene pool.”

Vinclozolin causes changes in the male rats’ germline cells (for example, sperm). The fungicide does not directly alter DNA, but instead causes changes in elements that regulate genes. This is known as an epigenetic change.

In the rats studied by Crews and Gore, the early onset of disease caused by initial exposure to vinclozolin was passed down generation to generation through the germline of the males.

For the first time, Crews and Gore show the inherited epigenetic change can affect behavior.

“The important thing about this research is that it takes epigenetics to the brain,” said Crews, the Ashbel Smith Professor of Integrative Biology in the College of Natural Sciences. “The female is able to detect which male is likely to get early onset disease and which male is not before they show any manifestation of disease.”

“The female rats can sense something is wrong, although they can’t see it,” said Gore.

Males, on the other hand, exhibit no preference for female type.

“That has consequences for evolution, because it shows that females are selecting males on the basis of an epigenetic imprint as opposed to genetic changes,” said Crews.

Male rats generally move on to other populations to mate. Crews and Gore said in a natural setting the effect of vinclozolin exposure would not only span generations, but could also reach other populations of animals through migration of the males.

“Males disperse, and if they were to mate, it would be at times that they aren’t manifesting signs of disease,” said Crews. “They are literally time bombs.”

Source: University of Texas at Austin

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