

Zoologists: Lusty voles, mindless of danger, mate like rabbits

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Forgetful Casanovas are lucky in love. At least that's how University of Florida researchers interpret the results of new research on the mating habits and nervous systems of prairie voles. An article about the research, which examined both the voles' behavior and their brains, appears in this week's edition of the *Proceedings of the National Academy of Sciences*.

Prairie voles, aka *Microtus ochrogaster*, are common native rodents in the central U.S. and southern Canada. Because they mate for life and are relatively easy to study, the mouse-like creatures have been the subject of much research by scientists probing questions of monogamy and sexual faithfulness among mammals.

Steve Phelps, an assistant professor of zoology and one of the paper's three authors, said many male voles pick a female partner and settle in a territory — often for life. A minority, however, shirks steady partners and home bases, instead ranging across other males' turf and mating with other males' females.

Alexander Ophir, a postdoctoral associate in zoology at UF, is the paper's lead author and conducted the research, which is funded by the National Science Foundation. Ophir, Phelps and Jerry Wolff, a biologist at St. Cloud State University in Minnesota, set out to find out what makes the male "wanderers" wander — behavior all the more puzzling because faithful males enthusiastically defend their partners, lunging at and biting the interlopers.

In their natural habitat, the voles spend their time amid tall grass, where they are difficult to observe. So the researchers radio-collared 48 lab-raised males and 48 lab-raised females, divided them into groups of 12, then placed the groups in eight enclosures in the voles' native territory in Tennessee. By tracking the collars, the zoologists were able to map the voles' movements for several weeks.

Once they had identified wanderers, faithful males and likely couplings, the scientists euthanized the voles so they could examine their brains. Through genetic analysis, they also sought to determine the paternity of young carried by the females.

The work quickly led to some surprises.

The researchers originally theorized that the wanderers would have less vasopressin 1a receptor in regions of their brains necessary for forming long-term relationships. Vasopressin 1a receptor is a protein that responds to the hormone vasopressin. Previous experiments have proven that the hormone is essential for the voles' monogamous behavior — if they are injected with the hormone, they form monogamous pairs; if it is removed, they go on the prowl.

To the researchers' surprise, the long-term relationship or "pair-bonding" brain regions in straying males had no shortage of receptors, Ophir found.

Other regions of the voles' brains, however, proved more telling.

In the paper, Ophir and his colleagues report that the dissections and analysis revealed that the wanderers lacked vasopressin 1a receptors in two regions known to be critical for spatial memory — knowledge needed when navigating the environment in search of food — or fun. Stay-at-home voles, by contrast, had lots of receptors in these dedicated

spatial regions.

That led the researchers to infer that wandering males may not remember the territories where they are attacked by defending faithful males. So rather than avoiding these risky sites, the males keep returning, possibly enduring repeated attacks but sometimes successfully mating with females. “What we think is that animals that lack this receptor have a hard time remembering where they encountered aggressive males,” Phelps said. “That keeps them coming back, which increases their contact with the females.”

Phelps added that from an evolutionary perspective, the faithful and wandering male strategies likely arose and persisted because both are successful strategies for procreation.

Interestingly, many of the neural and hormonal mechanisms of prairie vole pair-bonding seem to be at play in people experiencing true love. As for whether the research offers any lessons for human behavior, Phelps said it adds to evidence that love and faithfulness are not necessarily dictated by the same cerebral mechanisms.

“In this case, one brain region provides the basis for pair-bonding, while another provides the opportunity for straying,” he said. “In voles at least, what happens in Vegas stays there. That seems to be especially true when they can’t remember much of the trip.

Source: University of Florida

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