parasite, and a mosquito species called *Anopheles stephensi*, the group found that even in surviving mosquitoes, the fungus severely hampered the parasites' ability to develop and mature. "That looks like an important extra benefit," says Wendy Gelernter, a biopesticide consultant at PACE, a company in San Diego, California. In addition, both teams have data suggesting that a fungal infection dampens mosquitoes' appetite for blood meals, making them less likely to pick up parasites in the first place.

Ken Neethling, production director for BCP, a South African company specializing in biopesticides, says his firm may explore the malaria biocontrol strategy commercially; others are interested as well, Thomas says. For now, both teams plan to tinker with the sprays' formulations to see if they can improve infection rates. One key problem: The spores start losing their infectiousness in a matter of weeks. If that can't be solved, the spray would have to be applied over and over. (Pesticides, in contrast, can last a year or longer.) That could be "a near-fatal flaw," says Lines.

Still, these are problems well worth delving into, says Norbert Becker of the German Mosquito Control Association in Waldsee, Germany. As long as malaria kills more than a million people every year, he says, "every new strategy is appreciated."

–MARTIN ENSERINK

GENETICS

# In Voles, a Little Extra DNA Makes for Faithful Mates

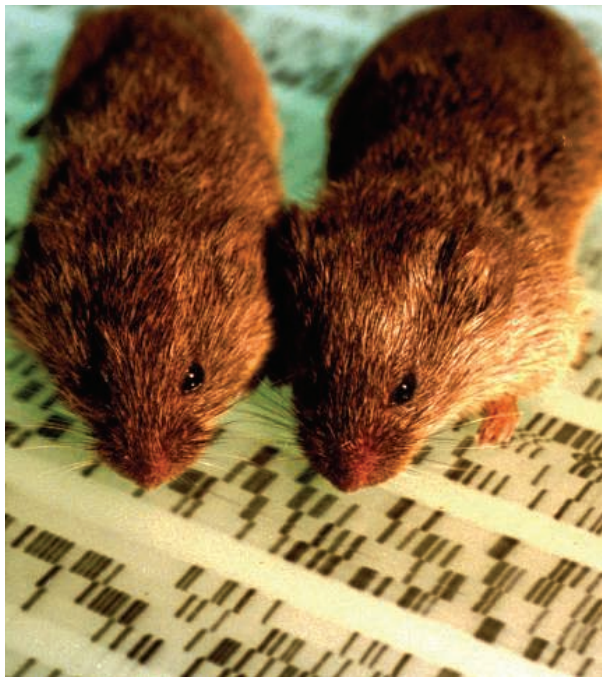
Prairie voles are renowned for being faithful mates, but some individuals are more faithful than others. The difference may lie in their so-called junk DNA.

On page 1630, Elizabeth Hammock and Lawrence Young of Emory University in Atlanta, Georgia, report that fidelity and other social behaviors in male prairie voles seem to depend on the length of a particular genetic sequence in a stretch of DNA between their genes. The longer this repetitive sequence, or microsatellite, the more attentive males were to their female partner and their offspring. Those with shorter microsatellites neglected their mates and pups, at least to some degree.

Although there's no evidence that human infidelity or poor parenting stems from similar variations, Hammock and Young, as well as other researchers, have begun to explore whether microsatellites can account for behavioral differences between people and primates such as chimps and bonobos. The new study's results "will force us to think about these variations in so-called junk DNA and how [they] make for changes in behavior," says Scott Young (who is not related to Lawrence Young), a neuroscientist at the National Institute of Mental Health in Rockville, Maryland.

Microsatellites are genetic stutters, usually just two or four bases long. There can be hundreds of these repeats in a row. They can befuddle the cell's DNA replication machinery, so the number of repeats within one may rise or fall from one generation to the next. And when they are in regulatory regions for genes, their changing lengths may affect the activity of those genes. This can have rapid evolutionary implications, Scott Young points out.

In the mid-1990s, researchers discovered a key microsatellite difference between prairie voles and their more promiscuous cousins, such as the meadow voles. Prairie voles have longer microsatellites near the gene encoding a receptor (V1aR) for the brain chemical vasopressin, and as a result they make more of the receptor than do meadow voles. This was the first clue that these sequences may influence social behavior. Last year, Young's team strengthened the connection when they caused meadow voles to emulate the faithful ways of prairie voles by adding extra copies of the *V1aR* gene to a portion of their brains (*Science*, 7 January, p. 30). "The vasopressin system is likely to be a major player in emotional and cognitive aspects of social bonding," comments Rainer Landgraf, a neuroscientist at the Max Planck Institute of Psychiatry in Munich, Germany.



**Honey, I'm home.** Sequencing studies revealed that the amount of junk DNA affects how male voles treat their mates.

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Now, Young and Hammock, originally one of Young's graduate students and now at Vanderbilt University in Nashville, Tennessee, have found that variations in *V1aR*-associated microsatellites among individual prairie voles influence expression of the gene and overall behavior. They paired and bred voles with long microsatellites and found that the resulting males spend more time licking and grooming their pups than did males with short microsatellites. They also placed males in cages with a female, allowing 18 hours for them to bond, then added a new female. Males with longer microsatellites spent more time with their partners than did those with shorter microsatellites. Taken together, the results "help create a picture of some of the building blocks that allow for the evolution of different levels of social behavior," says Catherine Marler of the University of Wisconsin, Madison.

Evan Balaban, a neuroscientist at McGill University in Montreal, Canada, isn't convinced, however. He argues that, instead of simply showing correlations between microsatellite length and a behavior, the researchers should do transgenic experiments to establish that microsatellites were truly responsible for the different behaviors. Furthermore, "the behavioral effects are small," Balaban adds.

Undeterred, Hammock and Young have already noted connections between *V1aR* microsatellites and primate behavior. Other researchers have associated the length of one of the four microsatellites in the human version of the gene with autism, a disorder of social interactions. In the chimp, this same microsatellite is 360 bases shorter, Hammock and Young note. But in bonobos, which are less aggressive than chimps and form more humanlike social bonds, the microsatellite is nearly identical to the human counterpart.

Even Balaban thinks such intriguing observations deserve follow-up. "Hopefully," he says, "[this will] direct people's attention to studying the role that variation in the control of the regulation of genes plays."

–ELIZABETH PENNISI