# Inbred males' scent gives them away

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Female mice can steer clear of inbred males on the basis of their scent alone, according to evidence presented online on April 17th in *Current Biology*.

The researchers found that female mice chose to associate with males producing a greater diversity of major urinary proteins (MUPs), even when all else was held equal. An earlier study by the same team had shown that wild mice also rely on MUPs to recognize and avoid mating with their close relatives.

“We conclude that female mice can identify more outbred males by the higher diversity of urinary proteins they produce,” said Michael Thom of the University of Liverpool. “In addition to the multiple signaling roles already identified for MUPs, these proteins may also act as a signal of inbreeding. More outbred animals produce a greater number of different protein forms, and females may be able to recognize these superior males simply by ‘counting’ the number of proteins they produce, without waiting to see which might win in a fight.”

The findings offer the first evidence that females can recognize inbred males by using a signal that does not directly affect male health, he added. The results in mice raise the possibility that similar behaviors could be widespread in other species.

Inbreeding is often avoided in animals because it can lead faulty, otherwise hidden (or recessive) traits to surface in their offspring. Nevertheless, Thom said, inbreeding does sometimes occur.

“ We wanted to know whether females would prefer to associate with stronger, more outbred males over inbred individuals,” and if so, how they tell the difference between them, he said.

The researchers—led by Jane Hurst, who is also at the University of Liverpool—carefully bred mice to remove the intrinsic correlation between genome-wide heterozygosity and heterozygosity at two gene clusters that they thought might allow direct assessment of genetic diversity through scent: an extremely variable set of immunity genes previously implicated in scent recognition known as the major histocompatibility complex (MHC) and the MUPs. Heterozygosity means that animals’ two copies of a gene are represented by different variants; the extent of an individual’s heterozygosity across the genome provides a measure of their inbreeding.

When other sources of variation were controlled and competition was kept to a minimum, the female mice under study preferred to associate with MUP heterozygous over MUP homozygous males, they found. MHC heterozygosity, on the other hand, did not influence the females’ preference for nesting partners.

“We now have evidence that females are sensitive not only to the degree of MUP matching with potential mates, but also to genetic heterozygosity at this region within individual males,” Hurst’s team concluded. “The central role of MUPs in individual recognition, kin avoidance, and heterozygosity assessment make this an ideal system for addressing the function of genetic signals in social and mate choice in vertebrates.”

Source: Cell Press