

# Female mice can identify inbred males by their scent

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Scientists at the University of Liverpool have found that female mice avoid mating with inbred males by ‘sensing’ the diversity of a protein type in their urine.

Researchers found that major urinary proteins (MUPs) – the main protein component of mouse urine – are less varied in inbred male mice compared to outbred males, a distinction female mice are able to make through ‘counting’ the protein types in the urine.

So far MUPs have only been discovered in rodents – where they function as a genetic signal for social and mate choices – but scientists believe that similar signals are likely to be present in other vertebrates.

Dr Michael Thom, from the University’s Mammalian Behaviour and Evolution Group, explains: “Inbreeding is often avoided in animals because it can lead to health problems in offspring, but despite this inbreeding can sometimes still occur. Why female mice would want to avoid inbred males is still uncertain, however, but it is interesting that it is certainly something of importance to them. The work raises the question, if this is important in mice, are there mechanisms in place to help others animals and humans make similar distinctions between outbred and inbred males?

“We set out to investigate how females were able to avoid mating with inbred males in favour of stronger, outbred males and what genetic signals they use to discriminate between the two. We looked at MUP

variability as well as variability across a set of immunity genes called histocompatibility complex (MHC) – a gene cluster previously implicated in scent recognition that allows animals, including humans, to distinguish between foreign antigens and the body's own cells.

“Both MHC and MUPs give distinct odours so we knew they were important in scent recognition, but we found that MHC diversity had no impact on identifying inbred males. Female mice instead chose to nest with those mice which had high levels of MUP diversity, suggesting that females are able to ‘count’ the number of proteins in male urine through their scent.”

Source: University of Liverpool

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