

Gene associated with pair-bonding in animals has similar effects in human males

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Variation in the gene for one of the receptors for the hormone vasopressin appears to be associated with how human males bond with their partners, according to an international team of researchers.

The researchers found that the "334" allele of a common AVPR1A variation, the human version of *avpr1a* studied in voles, seemed to have negative effects on men's relationship with their spouses.

"Our findings are particularly interesting because they show that men who are in a relatively stable relationship of five years or more who have one or two copies of allele 334 appear to be less bonded to their partners than men with other forms of this gene," says Jenae Neiderhiser, professor of psychology, Penn State. "We also found that the female partners of men with one or two copies of allele 334 reported less affection, consensus and cohesion in the marriage, but interestingly, did not report lower levels of marital satisfaction than women whose male partners had no copies of allele 334."

In voles, a mouse-like animal, the comparable gene has been studied extensively and has long been linked to vole bonding behaviors. This is the first study to suggest that the wealth of information on vole pair-bonding may also apply to humans and may help to inform research on human disorders related to impaired social interactions and communication, such as autism.

A series of studies on vole populations, begun at the NIMH Intramural

Research Program in the mid 1980s, showed that, in male rodents, variations in a section of the gene *avpr1a* affect social bonding behaviors, such as choosing a mate and parenting. The animal studies suggested a possible connection between a seemingly useless piece of DNA and bonding behavior. Recently, some research on AVPR1A in humans suggest a possible link with autism and certain social behaviors, such as altruism, but no direct link to human pair-bonding had previously been known.

"A study by Erica Spotts, National Institute on Aging, using this sample was one of the first to show genetic influences on marital relationships, but did not reveal which genes were involved," says Neiderhiser. "The work on pair bonding in voles was very exciting because it suggested to us a specific gene to examine."

Neiderhiser, Paul Lichtenstein, the Karolinska Institute in Sweden, and colleagues interviewed 2,186 adults taking part in the Twin and Offspring Study in Sweden (TOSS). The TOSS study collected detailed information from pairs of twins and their partners or spouses about their marital relationships, personality and mental health, as well as genetic data.

They report in this week's on-line issue of the *Proceedings of the National Academy of Sciences* that, in men, having allele 334 was inversely linked to measures of the strength of a person's bond to their mate. They also report that men who carried two copies of allele 334 were more than twice as likely to report serious marital or relationship problems, such as facing threat of divorce, as men who had did not carry it. These men also were almost twice as likely to be unmarried as men with no copies, despite having a long-term relationship with their mate.

Women married to men with one or two copies of allele 334 reported lower scores on measures of marital quality than women married to men

not carrying this allele.

Allele 334 is also associated with increased activity in the amygdala, a brain region involved in regulating emotions.

"In this new paper, Hasse Walum did an excellent job of linking this work to the work with voles by constructing the partner bonding measure that was then examined for associations with polymorphism in the gene AVPR1A," says Neiderhiser.

The researchers caution that their findings do not suggest this genetic variation can be used to predict an individual's pair-bonding behavior. However, their study complements findings from similar animal research and suggests that the well-defined relationship between genes, the brain and pair-bonding behavior in voles may also be relevant for humans.

Source: Penn State

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