

Remove fear gene and you get Mighty Mouse

BY LEE BOWMAN

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These mice know no fear – well, at least not much, anyway.

Born without a gene that controls their ability to react with appropriate fear to impending danger, the mutants become rodent daredevils, according to a new study.

These so-called knockout mice “show a decreased memory for fear and fail to recognize danger in environments they should innately avoid,” said Gleb Shumyatsky, an assistant professor of genetics at Rutgers University and lead author of the study published online today by the journal *Cell*.

The researchers report the gene *stathmin* – normally present in high levels in the amygdala, the brain’s fear center – controls innate and learned fear.

“This is a major advance in the field of learning and memory that will allow for a better understanding of post-traumatic stress disorder, phobias, borderline personality disorder and other human anxiety diseases,” Shumyatsky said.

Shumyatsky, along with No-

bel laureate Eric Kandel of Columbia University and Vadim Bolshakov of Harvard University Medical School, had earlier identified another gene in mice that controls learned, but not instinctive, fear.

Instinctive fears, such as a fear of heights or of predators, are often species-specific regarding actual or potential threats. In contrast, learned fear results from a particular uncomfortable or life-threatening event that an individual learns from experience to avoid.

Fear plays an essential role in survival, and so the memory of fear is easily established, difficult to erase and normally lasts a lifetime, the researchers said.

Shumyatsky said fear can be conditioned in the lab by linking a neutral stimulus, such as a light or a sound, to something that’s unpleasant or painful, such as an electrical shock.

The researchers propose that *stathmin*-deficient mice could be useful as animal models for research into a number of human mental disorders related to instinctive and learned fear, and to search for new drugs that might be used to treat those disorders.

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