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Genetic Pre-Disposition Toward Exercise and Mental Development May be Linked, MU Study Finds

Active rats showed higher levels of brain development than lazy rats

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Story Contact(s):

Nathan Hurst, hurstn@missouri.edu, 573-882-6217

COLUMBIA, Mo. – University of Missouri researchers have previously shown that a genetic pre-disposition to be more or less motivated to exercise exists. In a new study, Frank Booth, a professor in the [MU College of Veterinary Medicine](#), has found a potential link between the genetic pre-disposition for high levels of exercise motivation and the speed at which mental maturation occurs.

For his study, Booth selectively bred rats that exhibited traits of either extreme activity or extreme laziness. Booth then put the rats in cages with running wheels and measured how much each rat willingly ran on their wheels during a six-day period. He then bred the top 26 runners with each other and bred the 26 rats that ran the least with each other. They repeated this process through 10 generations and found that the line of running rats chose to run 10 times more than the line of “lazy” rats.

Booth studied the brains of the rats and found much higher levels of neural maturation in the brains of the active rats than in the brains of the lazy rats.

“We looked at the part of the brain known as the ‘grand central station,’ or the hub where the brain is constantly sending and receiving signals,” Booth said. “We found a big difference between the amount of molecules present in the brains of active rats compared to the brains of lazy rats. This suggests that the active rats were experiencing faster development of neural pathways than the lazy rats.”

Booth says these findings may suggest a link between the genes responsible for exercise motivation and the genes responsible for mental development. He also says this research hints that exercising at a young age could help develop more neural pathways for motivation to be physically active.

“This study illustrates a potentially important link between exercise and the development of these neural pathways,” Booth said. “Ultimately, this could show the benefits of exercise for mental development in humans, especially young children with constantly growing brains.”

Booth’s study, “Nucleus accumbens neuronal maturation differences in young rats bred for low versus high voluntary running behavior,” was published in the *Journal of Physiology*. Frank Booth also is a professor in the [Department of Physiology](#) in the [MU School of Medicine](#) as well as a research investigator in the Dalton Cardiovascular Research Center at MU.

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Frank Booth is a professor in the MU College of Veterinary Medicine.

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For Media Inquiries

MU News Bureau
329 Jesse Hall
Columbia, MO 65211

Phone: 573-882-6211

Fax: 573-882-5489

E-mail:
munews bureau@missouri.edu

[Staff contacts](#) »

