Study sheds light on role of exercise and androgens such as testosterone on nerve damage repair

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A study by researchers from Emory University and Indiana University found that the beneficial effects daily exercise can have on the regeneration of nerves also require androgens such as testosterone in both males and females. It is the first report of both androgen-dependence of exercise on nerve regeneration and of an androgenic effect of exercise in females.

"The findings will provide a basis for the development of future treatment strategies for patients suffering peripheral nerve injuries," said Dale Sengelaub, professor in the Department of Psychological and Brain Sciences at IU. "And they underscore the need to tailor those treatments differently for men and women."

The researchers discussed the study on Monday at the Neuroscience 2012 scientific meeting in New Orleans.

Injuries to peripheral nerves are common. Hundreds of thousands of Americans are victims of traumatic injuries each year, and non-traumatic injuries, such as carpal tunnel syndrome, are found in even higher numbers. The researchers previously showed that two weeks of moderate daily exercise substantially improves regeneration of cut nerves and leads to functional recovery in mice, though different types of exercise are required to produce the effect in males and females. They now report that these beneficial effects of exercise require

androgens such as testosterone in both males and females.

In the study they conducted, they exercised three groups of male and female mice. Nerves of the three groups were cut and surgically repaired. Once group received the drug flutamide, which blocks the androgen receptor. A second group received a placebo treatment. The third group was unexercised. Regenerating nerve fibers in the placebo group grew to more than twice the length of those in unexercised mice in both males and females. In flutamide-treated mice, the effects of exercise were blocked completely in both sexes.

The study, "Enhancement of peripheral axon regeneration by exercise requires androgen receptor signaling in both male and female mice," will be discussed from 11 a.m. to noon on Monday in Hall F-J. Co-authors are Arthur W. English and Nancy Thompson, both from Emory University.

More information: The Society of Neuroscience is promoting the study to media covering the conference as a "Hot Topic."

Provided by Indiana University