

Study finds biological link between pain and fatigue

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A recent University of Iowa study reveals a biological link between pain and fatigue and may help explain why more women than men are diagnosed with chronic pain and fatigue conditions like fibromyalgia and chronic fatigue syndrome.

Working with mice, the researchers, led by Kathleen Sluka, Ph.D., professor in the Graduate Program in Physical Therapy and Rehabilitation Science in the UI Roy J. and Lucille A. Carver College of Medicine, found that a protein involved in muscle pain works in conjunction with the male hormone testosterone to protect against muscle fatigue.

Chronic pain and fatigue often occur together -- as many as three in four people with chronic, widespread musculoskeletal pain report having fatigue; and as many as 94 percent of people with chronic fatigue syndromes report muscle pain. Women make up the majority of patients with these conditions.

To probe the link between pain and fatigue, and the influence of sex, the UI team compared exercise-induced muscle fatigue in male and female mice with and without ASIC3 -- an acid-activated ion channel protein that the team has shown to be involved in musculoskeletal pain.

A task involving three one-hour runs produced different levels of fatigue in the different groups of mice as measured by the temporary loss of muscle strength caused by the exercise.

Male mice with ASIC3 were less fatigued by the task than female mice. However, male mice without the ASIC3 protein showed levels of fatigue that were similar to the female mice and were greater than for the normal males.

In addition, when female mice with ASIC3 were given testosterone, their muscles became as resistant to fatigue as the normal male mice. In contrast, the muscle strength of female mice without the protein was not boosted by testosterone.

"The differences in fatigue between males and females depends on both the presence of testosterone and the activation of ASIC3 channels, which suggests that they are interacting somehow to protect against fatigue," Sluka said. "These differences may help explain some of the underlying differences we see in chronic pain conditions that include fatigue with respect to the predominance of women over men."

The study, which was published in the Feb. 28 issue of the American Journal of Physiology - Regulatory, Integrative and Comparative Physiology, indicates that muscle pain and fatigue are not independent conditions and may share a common pathway that is disrupted in chronic muscle pain conditions. The team plans to continue their studies and investigate whether pain enhances fatigue more in females than males.

"Our long-term goal is to come up with better treatments for chronic musculoskeletal pain," Sluka said. "But the fatigue that is typically associated with chronic widespread pain is also big clinical problem -- it leaves people unable to work or engage in social activities. If we could find a way to reduce fatigue, we could really improve quality of life for these patients."

Source: University of Iowa

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