

## Fatigue in women is reduced in stress-related cortisol study

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A study of healthy women has harvested results involving fatigue and vigor that eventually may help researchers fine tune efforts to treat a multitude of illnesses and syndromes linked to low levels of the stress hormone cortisol.

That low cortisol levels are found in such maladies as chronic fatigue syndrome, post-traumatic stress disorder, fibromyalgia and atypical depression is not new. However, the study, published in the November issue of *Psychophysiology*, combined with other findings emerging from a comprehensive project, appear to support the idea that sex hormones tend to separate men from women in their reactions to stress, said Mattie Tops, a postdoctoral research associate in the NeuroInformatics Center at the University of Oregon.

The study is the first to demonstrate improvements in fatigue and vigor in healthy female subjects, a finding that "is particularly relevant because of the high prevalence of hypocortisolemic fatigue syndromes in women and the association in healthy women between low morning cortisol levels and complaints of fatigue and muscular pain," Tops and his colleagues wrote in their conclusion.

In the study, 27 healthy women between the ages of 30-55, who met certain medical criteria and agreed to certain restrictions in diet, were given either placebos or capsules containing 35 milligrams of cortisol during morning sessions. After reading or resting for 70 minutes, blood was taken for sampling. Then participants performed an hour of

computer-based tasks involving working memory, free recall, recognition memory and selective attention.

During this time, fatigue increased and vigor decreased, but those women who had received the cortisol reported a lesser increase in fatigue and higher vigor than did the women receiving placebos. The impact on fatigue levels was the most significant. The morning testing coincided with the time period in which naturally occurring cortisol levels are at their highest.

"In this study, we used healthy subjects who you wouldn't expect to have low cortisol levels," Tops said. "But fatigue is highly prevalent in women. It was kind of surprising that we found this at all. It may be a temporary effect of energy mobilization in conjunction with the cortisol administration, but the findings that cortisol ingestion provided positive results draw attention to those syndromes that are characterized by low cortisol levels."

The study was done in the Netherlands and is just one part of a larger project being done by Tops, a native of the Netherlands, and researchers at the University of Groningen and University Medical Center Groningen. A larger, not-yet-published study by the collaborators has found an association between low levels of cortisol and reports of high fatigue in women.

Tops is exploring a variety of interconnections involved in low cortisol levels, but not necessarily for the development of difficult-to-deliver cortisol-based treatments because of a long list of negative side effects that occur when levels are not accurately regulated. Cortisol supplementation has helped in some cases of post-traumatic stress disorder and chronic fatigue syndrome.

One issue that Tops and colleagues are seeking to address in some of

their studies is the possibility that a sex difference in stress response is involved in hypocortisolemic syndromes. Some findings, Tops said, fit in nicely with a study led by UCLA's Shelley E. Taylor and published in *Psychological Review* in 2000. Taylor's study proposed that women have evolved to respond differently than males to stress, adopting a "tend-and-befriend" reaction. Most studies call major responses to stress as a fight-or-flight mechanism in which hormones activate the nervous system for fighting for territory or fleeing for safety.

Taylor and colleagues argued that almost all such studies have involved male animals and men, and that women instead have selectively evolved a mechanism to assure the survival of self and children. To do so, women went about befriending others and forming social groups to reduce risk. Hormonal responses, they argued, thus have developed differently for men and women.

A key to treatment of low cortisol levels, Tops said, likely will involve the development of pharmaceuticals that target specific components involved in the interaction of various hormones in various medical conditions.

Source: University of Oregon

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