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Men's heart disease risk linked to high testosterone and low estrogen

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Why men have more heart disease than premenopausal women has been unclear, but a new study shows that the sex hormones testosterone and estrogen alter cardiovascular risk factors in a way that raises a man's risk of heart disease. Results of the study will be presented Saturday at the Endocrine Society's 97th annual meeting in San Diego.

Men have higher testosterone and lower estrogen levels than premenopausal women. Therefore, doctors have suspected that testosterone may promote cardiovascular disease or that estrogen may protect against it, or both, according to Elaine Yu, MD, MSc, the study's lead investigator and an assistant professor at Harvard Medical School, Boston.

Their study, conducted in 400 healthy men ages 20 to 50, found that higher levels of testosterone led to lower levels of HDL cholesterol, or "good" cholesterol, but estrogen appeared to have no effect on HDL cholesterol. In contrast, the investigators reported that low levels of estrogen led to higher fasting blood glucose (sugar) levels, worsening insulin resistance and more fat in muscle, markers for developing diabetes, which is itself a risk factor for heart disease.

"These observations may help explain why men have a higher risk of cardiovascular disease," Yu said.

Yu and her research team were able to determine whether estrogen or testosterone regulated various cardiovascular risk factors by comparing

two groups of men whose hormone levels were temporarily changed with combinations of medications.

At the start of the study, all men received the drug goserelin (Zoladex, AstraZeneca) to suppress their own production of testosterone and estrogen. Then the 198 men in the first group received daily treatment for four months with either a placebo (dummy) gel or one of four doses of testosterone gel (AndroGel, AbbVie), ranging from low to high (1.25 to 10 grams). This treatment set the men's testosterone levels from very low (as in before puberty) to high-normal, Yu said.

The other group, made up of 202 men, received the same treatment as in group 1 but also received anastrozole (Arimidex, AstraZeneca) to block conversion of testosterone to estrogen. Men naturally convert some testosterone to estrogen. Blocking this process resulted in very low levels of estrogen in the second group, according to Yu.

Study participants had their weight measured and had fasting blood tests for markers of heart disease and diabetes. At the start and end of the study, they had a thigh scan with quantitative computed tomography (CT) to measure muscle fat.

The researchers found that neither testosterone nor estrogen regulated changes in LDL, or "bad," cholesterol; blood pressure; and body weight. "It appears that these common risk factors for cardiovascular disease are not regulated by sex hormones," Yu said.

In summary, higher testosterone levels and lower estrogen levels in men worsen cardiovascular risk factors that may help to explain gender differences in heart disease.

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cost.

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