

# How testosterone protects against inflammation

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Pharmacists of the University Jena, Germany, and partners have shown that cells from men and women react in a different manner to inflammatory stimuli. They found that in male cells the enzyme phospholipase D is less active than in the female ones. Based on these findings, the Jena pharmacists concluded that the male sex hormones play a key role in the modulation of the immune response.

It's all down to the testosterone: men are usually more muscular than women, they have deeper voices and more body hair. And – men are less susceptible to inflammatory diseases and allergies than women. This is also due to the male [sex hormones](#) as pharmacists at the Friedrich Schiller University Jena (Germany) have shown in a recent study.

"It is mostly women who are affected by diseases like rheumatoid arthritis, psoriasis or asthma", Professor Dr. Oliver Werz from the Jena University explains. Although this is a fact known for some time, the reasons for these differences are largely unknown. As the Jena Professor for pharmaceutical and medical chemistry and his team have revealed now, sexual hormones play an important role in this. The researchers report about this in the current edition of the scientific journal *FASEB Journal*.

"In a series of analyses we have shown that cells from men and women react in a different manner to [inflammatory stimuli](#)," Dr. Carlo Pergola from the Institute of Pharmacy of University Jena explains. Thus, certain immune cells of women produced nearly twice as many pro-

inflammatory substances than those of men. Together with colleagues from Tübingen (Germany), Stockholm (Sweden) and Naples (Italy) the Jena researchers pursued the molecular basis for these differences and published their findings in their current study. To this aim, they isolated immune cells of male and female donors and analyzed in test tubes the activity of the enzymes responsible for the production of pro-inflammatory substances. They found that in male cells the enzyme phospholipase D is less active than in the female ones. "Interestingly, the activity of the enzyme is reduced after treatment with testosterone also in the female [immune cells](#)", Dr. Pergola defines a crucial result.

Based on these findings, the Jena pharmacists concluded that the male sex hormones play a key role in the modulation of the [immune response](#). This would also explain another phenomenon that has been previously noticed, that is, [testosterone](#) can protect men from arteriosclerosis.

Most importantly, the new knowledge should be taken into account in the assessment of new therapies and drugs for inflammatory diseases, Professor Werz stresses. "New therapies are usually still more often being tested on male volunteers or patients". But the Jena study indicates now that the results derived from male subjects cannot be immediately transcribed to women. On the contrary, a 'customized' therapy for men and women would be important.

**More information:** Pergola C. et al.: Testosterone suppresses phospholipase D, causing sex differences in leukotriene biosynthesis in human monocytes. *The FASEB Journal* 2011 [DOI:10.1096/fj.11-182758](https://doi.org/10.1096/fj.11-182758)

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