

Researchers discover surprising new roles for a key regulatory enzyme of blood pressure

September 8 2012

At the 1st ECRC "Franz-Volhard" Symposium on September 7, 2012 at the Max Delbrück Center for Molecular Medicine (MDC) in Berlin-Buch, Professor Ken Bernstein reported that in mice an excess of ACE led to a much stronger immune response than usual. In animal experiments, not only could bacterial infections be combated more effectively, but also the growth of aggressive skin cancer (melanoma) in mice could be contained by a stronger response of the immune system. In contrast, if the mice lacked ACE, the immune cells worked less effectively.

In addition, ACE apparently has an influence on blood formation. It has been known for many years that, in humans, [ACE inhibitors](#) induce a small reduction of red blood cell levels. To elucidate the exact roles of ACE, the Bernstein's research team deactivated the genes in mice that normally provide the blueprint for the enzyme. As a consequence, these so-called "knock out" mice could no longer produce the enzyme. The examination of these mice revealed that they in fact had significantly fewer [red blood cells](#). Also, the [white blood cells](#) in these animals were less functional. According to the researchers' studies, ACE evidently plays a role in the development of the different blood cells.

Bernstein's team also showed that ACE apparently plays an important role in the development of the kidneys. In mice that could not produce the enzyme, the small arteries and the tissue of the kidneys revealed pathological changes, and the urine flow was impaired.

According to these findings, [male fertility](#) is also associated with ACE. Male mice lacking ACE continued to produce sperm, but they were no longer able to reproduce. However, if in the mice not the enzyme itself, but rather a product of ACE – namely the hormone angiotensin II – was suppressed, they could continue to reproduce. Until now it was thought that ACE mainly exerts its effect through the production of angiotensin II. These results show, however, that ACE is enzymatically active and produces other active products apart from angiotensin II, for example in the testes.

Provided by Helmholtz Association of German Research Centres

Citation: Researchers discover surprising new roles for a key regulatory enzyme of blood pressure (2012, September 8) retrieved 4 May 2024 from <https://medicalxpress.com/news/2012-09-roles-key-regulatory-enzyme-blood.html>

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