Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Corporate Communications

ETH Zurich
Media Relations
Phone +41 44 632 41 41
Fax +41 44 632 35 25
mediarelations@cc.ethz.ch
www.ethz.ch/media

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Life-prolonging effect of vitamin niacin demonstrated in roundworms

Niacin, the fountain of youth

Zurich, 29.09.2013. **The vitamin niacin has a life-prolonging effect, as Michael Ristow has demonstrated in roundworms. From his study, the ETH-Zurich professor also concludes that so-called reactive oxygen species are healthy, not only disagreeing with the general consensus, but also many of his peers.**

Who would not want to live a long and healthy life? A freely available food supplement could help in this respect, scientists from ETH Zurich have demonstrated in roundworms. Vitamin B3 – also known as niacin – and its metabolite nicotinamide in the worms' diet caused them to live for about one tenth longer than usual.

As an international team of researchers headed by Michael Ristow, a professor of energy metabolism, has now experimentally demonstrated, niacin and nicotinamide take effect by promoting formation of so-called free radicals. "In roundworms, these reactive oxygen species prolong life," says Ristow.

"No scientific evidence for usefulness of antioxidants"

This might seem surprising as reactive oxygen species are generally considered to be unhealthy. Ristow's view also contradicts the textbook opinion championed by many other scientists. Reactive oxygen species are known to damage somatic cells, a condition referred to as oxidative stress. Particular substances, so-called antioxidants, which are also found in fruit, vegetables and certain vegetable oils, are capable of neutralising these free radicals. Many scientists believe that antioxidants are beneficial to health.

"The claim that intake of antioxidants, especially in tablet form, promotes any aspect of human health lacks scientific support," says Ristow. He does not dispute that fruit and vegetables are healthy. However, this may rather be caused by other compounds contained therein, such as so-called polyphenols. "Fruit and vegetables are healthy, despite the fact that they contain antioxidants," says the ETH-Zurich professor. Based on the current and many previous findings he is convinced that small amounts of reactive oxygen species and the oxidative stress they trigger have a health-promoting impact. "Cells can cope well with oxidative stress and neutralise it," says Ristow.

Substance mimics endurance sport

In earlier studies on humans, Ristow demonstrated that the health-enhancing effect of endurance sports is mediated via an increased formation of reactive oxygen species – and that antioxidants abolish this effect. Based on the present study, he concludes that niacin brings about a similar metabolic condition to

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exercise. “Niacin tricks the body into believing that it is exercising – even when this is not the case,” says Ristow. Such compounds are known as “exercise mimetics”.

The researchers conducted their experiments on the model organism Caenorhabditis elegans. This worm, which is merely one millimetre in length, can be easily maintained and has a lifespan of only a month, making it the ideal model organism for ageing research.

Also relevant for humans

The results of the study may also be of relevance for humans, says Ristow. After all, the metabolic pathway initiated by niacin is very similar in roundworms and higher organisms. Whether niacin has similar effects on the life expectancy of mice is the subject of Ristow’s current research. Previous studies also suggest a health-enhancing effect of niacin in humans with elevated blood cholesterol levels.

Niacin and nicotinamide have been approved as dietary supplements for decades. Ristow could easily envisage the substances being used broadly for therapeutic purposes in the future. A whole series of foods naturally contain niacin, including meat, liver, fish, peanuts, mushrooms, rice and wheat bran. Whether nutritional uptake is sufficient for a health-enhancing or lifespan-extending effect, however, remains to be demonstrated, says Ristow.

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Further Information

ETH Zurich
Michael Ristow
Professor for Energy Metabolism
Phone: +41 44 655 74 46
michael-ristow@ethz.ch

ETH Zurich
Claudia Naegeli
Media Relations
Phone: +41 44 632 41 41
mediarelations@hk.ethz.ch