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Press Release

One for all: Convergent mechanism of ageing discovered

Fundamental signalling pathway is crucial for longevity

Several different causes of ageing have been discovered, but the question remains whether there are common underlying mechanisms that determine ageing and lifespan. Researchers from the Max Planck Institute for Biology of Ageing and the CECAD Cluster of Excellence in Ageing research at the University Cologne have now come across folate metabolism in their search for such basic mechanisms. Its regulation underlies many known ageing signalling pathways and leads to longevity. This may provide a new possibility to broadly improve human health during ageing.

In recent decades, several cellular signalling pathways have been discovered that regulate the lifespan of an organism and are thus of enormous importance for ageing research. When researchers altered these signalling pathways, this extended the lifespan of diverse organisms. However, the question arises whether these different signalling pathways converge on common metabolic pathways that are causal for longevity.

The search begins in the roundworm

The scientists started their search in the roundworm Caenorhabditis elegans, a well-known model organism for ageing research. “We studied the metabolic products of several, long-lived worm lines. Our analyses revealed that, among other things, we observed clear changes in the metabolites and enzymes of the folate cycle in all worm lines. Since folate metabolism plays a major role in human health, we wanted to further pursue its role in longevity”, explains Dr. Andrea Annibal, lead author of the study.

A common mechanism for longevity

Folates are essential vitamins important for the synthesis of amino acids and nucleotides – the building blocks of our proteins and DNA. “We tuned down the activity of specific enzymes of folate metabolism in the worms. Excitingly, the result was an increase in lifespan of up to 30 percent”, says Annibal. “We also saw that in long-lived strains of mice, folate metabolism is similarly tuned down. Thus, the regulation of folate metabolism may underlie not only the various longevity signalling pathways in worms, but also in mammals.”

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”We are very excited by these findings because they reveal the regulation of folate metabolism as a common shared mechanism that affects several different pathways of longevity and is conserved in evolution”, adds Prof. Dr. Adam Antebi, director at the Max Planck Institute for Biology of Ageing. “Thus, the precise manipulation of folate metabolism may provide a new possibility to broadly improve human health during ageing.” In future experiments, the group aims to find out the mechanism by which the folate metabolism affects longevity.

Press picture:
We will be happy to send you this picture as a separate jpg.
Please contact Dr. Maren Berghoff, contact details see below.

Andrea Annibal uses the mass spectrometer to investigate various metabolites in long-lived worms and mice.

Original publication:
Andrea Annibal, Rebecca George Tharyan, Maribel Fides Schonewolff, Hannah Tam, Christian Latza, Markus Max Karl Auler, Adam Antebi
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About the Max Planck Institute for Biology of Ageing
The Max Planck Institute for Biology of Ageing investigates the natural ageing process with the long-term goal to pave the way towards increasing health during ageing in humans. It is an institute within the Max Planck Society, which is one of Germany's most successful research organisation. Since its foundation in 2008 the institute is an integral part of a life science cluster in Cologne that pursue ageing research.

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