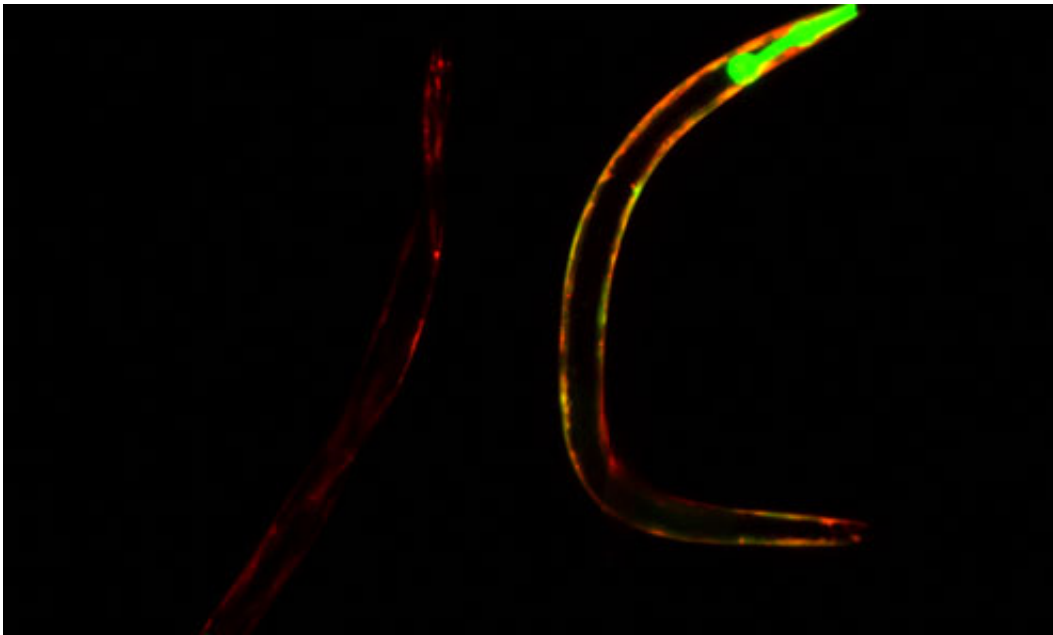


Substance with the potential to postpone aging

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Credit: University of Copenhagen

The coenzyme NAD⁺ plays a main role in aging processes. In mice and roundworm adding the substance can both extend life and postpone the onset of aging processes. New research conducted at the Center for Healthy Aging and the American National Institute of Health shows that this new knowledge will eventually be able to help patients with Alzheimer's and Parkinson's disease.

As we live longer and longer, a lot of people are occupied with their state

of health and, not least, quality of life in old age. Therefore, researchers all over the world are trying to understand aging mechanisms, as this knowledge may eventually help to postpone physical aging and extend life. None of the existing explanations of physical aging are able to explain all the biological aspects of human aging.

Substance Bridges Gap

Previous research has shown that a main process in aging is the capacity of the cells to keep our genes, our DNA, more or less intact. However, changes in the cells' [power stations](#), the mitochondria, also affect aging processes. An international team of researchers from the Center for Healthy Aging at the University of Copenhagen and the National Institute of Health in the United States has shown that the substance NAD⁺ bridges the gap between two main aging theories - repairs to the DNA and poor functioning mitochondria. The results have just been published in the leading journal *Cell Metabolism*.

'Our new study shows an age-dependent decrease in the level of NAD⁺, and this decrease is far greater for organisms with early aging and a lack of DNA repairs. We were surprised to see that adding NAD⁺ postponed both the aging processes of the cells and extended life in worms and in a mouse model', says Professor Vilhelm Bohr from the Center for Healthy Aging and the National Institute of Health.

The researchers have bred mice and roundworm with the illness Ataxia telangiectasia, A-T, for the purpose of the study. In A-T patients the part of the brain that is responsible for coordination gradually degenerates, DNA repairs are lacking, and they experience other symptoms characteristic of early aging.

Adding NAD⁺ Postpones Aging

'We know from previous studies that a drop in the level of NAD⁺ results in metabolism errors, neurodegeneration and aging, but the underlying mechanisms remain unclear to us. Our new study stresses that the substance NAD⁺ plays a main role both in maintaining the health of the cells' power stations and in their capacity for repairing the genes', says Professor Vilhelm Bohr.

The study also indicates that damage to the DNA can result in poor functioning mitochondria, and that this can lead to increasing neurodegeneration in A-T patients. Adding the substance NAD⁺ can stop the damage to the mitochondria.

Help for Patients in the Future

Even though the researchers have only examined the effect of the substance on model organisms and not administered the substance to patients, they expect to see the same effect in humans, as the cell repair mechanisms are universal for the cells of all living organisms. Understanding the universal mechanisms at cell level is key to understanding human aging and why we become more susceptible to illness as we grow older. Hopefully, this new knowledge will be able to help postpone physical aging processes and prevent illnesses such as Alzheimer's and Parkinson's disease.

More information: Evandro Fei Fang et al. NAD⁺ Replenishment Improves Lifespan and Healthspan in Ataxia Telangiectasia Models via Mitophagy and DNA Repair, *Cell Metabolism* (2016). [DOI: 10.1016/j.cmet.2016.09.004](https://doi.org/10.1016/j.cmet.2016.09.004)

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