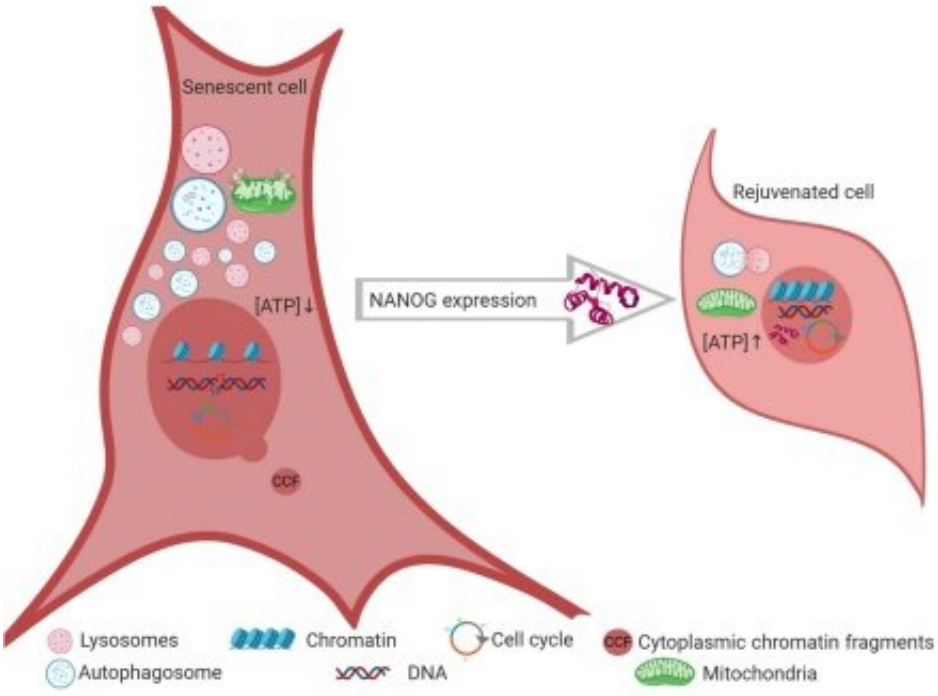
Study shows protein that reverses aging of skeletal muscle

September 14 2021, by Cory Nealon



The illustration shows a senescent muscle cell (left), including the numerous factors that led to its declining ability to divide and grow. It also shows the same type of cell after the overexpression of NANOG, which reversed many of the factors. Credit: University at Buffalo

A University at Buffalo-led research team has shown that a protein named for the mythical land of youth in Irish folklore is effective at reversing aging in skeletal muscle cells.

Published Sept. 3 in *Science Advances*, the study centers on the protein NANOG, which is derived from Tír na nÓg, a place in Irish lore renowned for everlasting youth, beauty and health.

In a series of experiments, researchers overexpressed NANOG in myoblasts, which are the embryonic precursors to muscle tissue. The myoblasts were senescent, meaning they were no longer able to divide and grow.

The overexpression ameliorated some of the primary characteristics associated with age-related deterioration of cells, including autophagy, energy homeostasis, genomic stability, nuclear integrity and mitochondrial function.

Most notably, NANOG increased the number of muscle stem cells in the muscle of prematurely aging mice. This demonstrated the feasibility of reversing cellular aging in the body without the need to reprogram cells to an embryonic pluripotent state, a process that's often used in stem cell therapy but runs the risk of tumorigenesis.

"Our work focuses on understanding the mechanisms of NANOG's actions in hopes of discovering druggable targets in signaling or metabolic networks that mimic the anti-aging effects of NANOG. Ultimately, the work could help lead to new treatments or therapies that help reverse cellular senescence, and aid the many people suffering from age-related disorders," says the study's corresponding author Stelios T. Andreadis, Ph.D., SUNY Distinguished Professor in the Department of Chemical and Biological Engineering at the UB School of Engineering and Applied Sciences.

More information: Aref Shahini et al, Ameliorating the hallmarks of cellular senescence in skeletal muscle myogenic progenitors in vitro and in vivo, *Science Advances* (2021). DOI: 10.1126/sciadv.abe5671

Medical Xpress

Provided by University at Buffalo

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