Medical Xpress

Regular exercise can delay the aging process

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(PhysOrg.com) -- A team of Canadian scientists working with mice genetically modified to age twice as fast as normal has found regular exercise keeps them young.

Professor of pediatrics and medicine, Dr Mark Tarnopolsky, and colleagues from McMaster University in Hamilton, Ontario used a litter of mice that had been modified to have a defect in a gene involved in repairing mitochondria, which supply energy for the cells. When the mice were three months old (roughly equivalent to 20 years in humans) they then forced some of the mice to exercise on a treadmill for 45 minutes a few times a week, while giving the others no exercise.

The results showed that after five months (when the mice were the equivalent of 60 human years) the exercising mice looked like wild-type mice: younger and healthier and more active than the non-exercising

mice, which were almost immobile and had lost much of their hair. The non-exercising mice were also less sociable and less fertile than the exercisers.

The researchers said every tissue and every organ they examined was better in the exercising mice than in those that did not exercise, including the hair, skin, ovaries, testicles, spleen, kidneys, and liver. In the non-exercisers their brains had shrunk and hearts were enlarged, but they were normal size in the exercisers. The anti-aging effects were "unprecedented" and protected every part of the body.

The muscle structure in the exercising mice was normal, while in the sedentary mice it appeared damaged. The mitochondria in the exercising mice appeared young and healthy, while those in the sedentary mice looked old and damaged. This result was the most surprising because mitochondria have their own DNA, and the accumulation of mutations in their DNA has been thought responsible for the gradual decline in tissue functions during aging, and for conditions such as cancer, diabetes, Parkinson's disease and Alzheimer's disease.

Senior PhD student Adeel Safdar, a co-author of the paper, said the process was not entirely clear, but exercise is a good physiological stressor that forces the body to produce more energy. He said the exercised mice showed a "huge recovery" in mitochondrial function.

The researchers said the study deliberately kept the exercise regime simple and at only moderate intensity and the results would also apply to humans. Dr Tarnopolsky said he hopes the research will inspire people to get serious about exercising regularly. Other studies have also shown that even people who have been sedentary for a long time benefit enormously from moderate exercise.

Dr Tarnopolsky said that while death is inevitable, exercise is the most

potent anti-aging therapy available and can keep us healthy and disease free for longer than anything else.

The paper was published in the journal *Proceedings of the National Academy of Science* (*PNAS*).

More information: Endurance exercise rescues progeroid aging and induces systemic mitochondrial rejuvenation in mtDNA mutator mice, Published online before print February 22, 2011, doi: 10.1073/pnas.1019581108. *PNAS* www.pnas.org/content/early/201 … /1019581108.abstract

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