EXERCISE

The fountain of youth is really a treadmill

Researchers reverse aging in mice by having them run for 45 minutes, three times per week

BY SHARON KIRKEY

Canadian scientists appear to have proven that you can run away from old age.

In what could stand as the most powerful evidence yet that exercise prolongs life, a study by McMaster University researchers in Hamilton found that signs of premature aging were halted — and even reversed — in virtually every tissue and organ in the bodies of exercised mice.

The finding, which could be a turning point in anti-aging medicine, suggests the proverbial fountain of youth won't come from a pill or from an exotic berry from the Amazon, but rather plain old exercise.

Mice genetically altered to age faster were forced to run on treadmills for 45 minutes, three times a week.

Five months later, the mice looked as young, healthy and active as wild-type mice — mice that didn't have the genetic mutation — while their sedentary and same-aged siblings were balding, greying and shrinking.

The mice above were genetically manipulated to age rapidly. The healthy mouse on the left was a runner, the feeble mouse on the right wasn't. (Above right) lead investigator Dr. Mark Tarnopolsky.

While the exercised mice scampered and scurried about their cages, the aging non-runners huddled in a corner, barely moving.

Not only did the treadmill-running mice look as sleek-coated, bright-eyed and bushy-tailed as wild mice, but the researchers also saw "huge recovery" in age-related damage to practically every tissue they could analyze.

The study's beauty lies in its simplicity, says principal investigator Dr. Mark Tarnopolsky.

"What's neat about our study is that this is something that is conceivably so simple. We purposely exercised them three times a week for 45 minutes at a moderate-intensity exercise, which is something that any human — provided they don't have (an illness) — can do."

What's more, the exercise did more than just protect the muscles and heart, as might have been expected. The team found "unprecedented" anti-aging effects of endurance exercise on the brain, skin, hair, gonads (ovaries and testicles), kidneys, spleen and liver.

"Every part of the body was protected by exercise," said Tarnopolsky, a professor of pediatrics and medicine at McMaster's Michael DeGroote School of Medicine. "Exercise is the most potent anti-aging therapy available today and likely forever."

Death is inevitable, "but exercise is the only way to stay healthy and free of disease for a longer period of time," he said.

"We know that exercise has benefits even when humans start over the age of 65. But this study clearly shows that we can get closer to the fountain of youth if we start when we're young and do moderate exercise our whole life."

The findings, published Monday in the journal *Proceedings of the National Academy of Sciences*, represents "one of the most striking rescues yet reported in aging models without gene therapy or a pharmaceutical intervention," said lead author Adeel Safdar, a senior PhD student working with Tarnopolsky.

Epidemiological studies in humans have shown that people who are physically active or exercise regularly have fewer chronic diseases and tend to live longer — runners especially.

"So we thought this was a nice model that would allow us to really test how effective exercise really is in human aging," Tarnopolsky said.

The experiments began when the mice were three months old — about 20 in human years — and ended five months later when the mice were eight months old — in their late 60s by the human equivalent.

Bigger studies involving more mice are needed to determine just how strong the life-extending effect of exercise might be.

But, said Tarnopolsky, the message is "it's never too late" to star exercising.

"I really think we have to start when people are young. We have to encourage our children and people throughout their life to maintain healthy levels of physical activity."

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