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## Fountain of Youth in Your Muscles? Researchers Uncover Muscle-Stem Cell Mechanism in Aging

*Working out can help you shed pounds -- but that's just the beginning. New research from Tel Aviv University has found that "endurance exercises," like a Central Park jog or a spinning class, can make us look younger. The key, exercise, unlocks the stem cells of our muscles.*

Prof. Dafna Benayahu and her team at Tel Aviv University's Sackler School of Medicine say their findings explain for the first time why older people, who have exercised throughout their lives age more gracefully. They have discovered how endurance exercise increases the number of muscle stem cells and enhances their ability to rejuvenate old muscles. The researchers hope their finding can lead to a new drug to help the elderly and immobilized heal their muscles faster.

The results of the study were recently published in the journal PLoS ONE.

### **The real rat race:**

The muscles and skeleton in our bodies work together, explains Prof. Benayahu. "When we age, we experience sarcopenia, a decline in mass and function of muscles, and osteopenia refers to bone loss," she says. As a result, our musculoskeletal system is more susceptible to daily wear and tear, which also explains the increased risk of falling in the elderly.

Investigating a rat population, Dr. Gabi Shefer from the research team says that the finding shows that exercise increased the number of satellite cells (muscle stem cells) -- a number which normally declines with aging. The researchers believe that a decline in the number of these cells and their functionality may prevent proper maintenance of muscle mass and its ability to repair itself, leading to muscle deterioration.

Comparing the performance of rats of different ages and sexes, they found that the number of satellite cells

increased after rats ran on a treadmill for 20 minutes a day for a 13-week period. The younger rats showed a 20% to 35% increase in the average number of stem cells per muscle fiber retained -- and older rats benefited even more significantly, exhibiting a 33% to 47% increase in stem cells.

### **A good reason to get up and dance:**

Endurance exercise also improved the levels of "spontaneous locomotion" -- the feeling that tells our bodies to just get up and dance -- of old rats. Aging is typically associated with a reduced level of spontaneous locomotion.

The combination of aging and a sedentary lifestyle significantly contributes to the development of diseases such as osteoporosis, obesity, diabetes and cardiovascular diseases, as well as a decline in cognitive abilities. If researchers can discover a method to "boost" satellite cells in our muscles, that could simulate the performance of young and healthy muscles -- and hold our aging bones in place.

"We hope to understand the mechanisms for the activation codes of muscle stem cells at the molecular level," says Prof. Benayahu. "With this advance, we can let ourselves dream about creating a new drug for humans -- one that could increase muscle mass and ameliorate the negative effects of aging."

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