

## Exercise sharpens functions of the mind

By Shari Roan  
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A faster mile, bigger biceps, more stamina -- all are proof that exercise hones the body. Less tangible is the effect on the mind.

During the past decade, neuroscientists have been churning out an abundance of data pointing to changes in the brain following physical activity. Some researchers have even suggested that the type of exercise matters.

"I would absolutely recommend people exercise for the mental benefits -- especially the elderly," says Henriette van Praag, a staff scientist at the Salk Institute for Biological Studies in San Diego

Movement appears to enhance memory, learning, attention, decision-making and multitasking. It also may slow or even reverse age-related decline.

The proof comes in two forms. The first is research showing that people who exercise score better on mental tests than those who don't.

Most of this research has been on older people. The second is research showing that exercise prompts structural changes in the brains of mice, spurring the growth of new nerve cells and connections between those cells.

While admittedly a far cry from human studies, the finding that new neurons can be formed later in life -- called neurogenesis -- is a revelation.

"Neurogenesis is probably a very important contributor to the effects of exercise on learning and memory," van Praag says.

A study published last fall in the Journal of Neuroscience by van Praag and the Salk researchers showed that the new neurons in older mice that began exercising were twice those of young, sedentary mice. The older, exercising mice also were better able to learn new tasks.

Exercise seems to enhance brain performance in three basic ways.

One, it increases the flow of oxygen to the brain and may help build tiny blood vessels that pave the way for the growth of new cells.

Two, it boosts substances called growth factors, including one called brain-derived neurotrophic factor, vital to the survival of new nerve cells.

Three, it increases important chemicals in the brain called neurotransmitters.