

Light exercise a tonic to keep the brain young

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People don't have to run marathons to keep their brain cells in shape — regular, light activity may do the trick. In the first study to show that lifelong exercise decreases cellular aging in the brain, scientists from the McKnight Brain Institute of the University of Florida say that moderately active rats have healthier DNA and more robust brain cells than their less active counterparts.

The research was presented today at the Society for Neuroscience's 35th annual meeting in Washington, D.C.

“It would be wonderful if we had a pill that contained all the benefits of exercise, but we don't,” said Thomas Foster, the Evelyn F. McKnight chair for brain research in memory loss at the College of Medicine. “For this study, animals were not forced to run; they did it because it was entertaining, the same as a pet hamster on a running wheel. The results show that regular mild exercise can prevent oxidative damage. In people, that translates to a daily 30-minute walk or a light 1-mile run.”

Oxidative damage in the brain is believed to be a natural consequence of aging and a contributor to memory loss. In addition, increased oxidative damage has been implicated in the loss of brain cells that is associated with Alzheimer's disease and Parkinson's disease.

Oxidative damage can occur when molecules of oxygen gain electrons and become free radicals. The free radicals regain their balance by giving electrons to their neighbors. Most of the time the body routinely handles these renegades, but sometimes not before extensive damage

occurs in the cell.

Working with Christiaan Leeuwenburgh, an associate professor of aging and geriatric research at UF's Institute on Aging, Foster looked at groups of rats that had lived to old age. Some were more sedentary, while others had access to an exercise wheel.

At the end of the experiment, scientists examined chemical compounds in 41 tissue samples taken from a part of the brain important for balance and movement.

The more active rats were found to have fewer byproducts of oxidative stress in their brains. Fats known as lipids that help stabilize cell membranes, and DNA, the molecule that contains our genetic blueprint, both better withstood the rigors of time.

“The DNA for these animals after two years looked as if it were from their younger counterparts of only about 6 months of age,” Foster said. “It shows a little bit of exercise may stimulate the body to fight stress that's normally occurring in the brain.”

Damage to DNA causes cell mutations and cell death. Finding ways to preserve it may help prevent age-related memory loss and defend against deterioration of balance and motor function — important health goals as the U.S. population continues to age. The 2000 Census shows 34.9 million Americans are 65 or older. That amount is projected to grow to 47 million by 2020.

“There have been implications that exercise is beneficial for preventing neurological diseases and aging impairments, but these studies put a molecular imprint on what might be happening,” said Eric Klann, a professor of molecular physiology and biophysics at the Baylor College of Medicine who is not connected to the research.

“The difference between humans and rats is that it isn’t as easy to get humans to exercise,” Klann added. “Put an exercise wheel in a rat cage and a rat will zoom around on that thing all the time, unless it’s sleeping. But putting an exercise machine in your family room doesn’t mean you’re going to use it.”

The next step in the research is to determine which natural chemicals and mechanisms are triggered by exercise to fight oxidative stress, and to test whether reducing the stress actually improves brain function.

“By age 50 almost everyone has mild memory deficits,” Foster said. “We forget where we put the keys or jumble the names of our kids. If these losses increase, then we run into problems. We want to prevent that. Certainly exercise with a doctor’s permission is good at any time of life. Light walking, burning 150 calories at a time, may be beneficial in changing the enzymes within our bodies that protect us from free radicals and remove damaged molecules.”

Source: University of Florida

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