

# Exercise may lead to improvement in patients with Parkinson's

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A new study from researchers at the Keck School of Medicine of the University of Southern California (USC) shows that treadmill exercises may benefit patients with Parkinson's Disease and those with similar movement disorders.

The study is led by USC neuroscientist Michael Jakowec, Ph.D., assistant professor of neurology and appears in the May 16 issue of the *Journal of Neuroscience*.

Recent studies have shown that exercise can have beneficial effects in patients with Parkinson's Disease but the underlying reasons haven't been fully explored. This new study using treadmill exercise in animal models looked at the effects of dopamine in motor learning and execution.

Parkinson's Disease is a chronic and degenerative disease that leads to slowness, balance disorders, tremors and difficulty in walking. The disease results from the loss of dopamine-producing nerve cells in the brain. It is critical as a stimulator of motor system nerves in the body. While there is no current cure for the disease, several treatments do offer relief from its symptoms.

This particular study looked at treadmill exercise and its effects between animal models with and without a loss of certain cells that are similar to what a Parkinson's Patient might suffer. Given the importance of dopamine in Parkinson's Disease, the researchers looked at changes in dopamine levels, among other results.

They found that the subjects with cell loss and that exercised indeed had an effect on dopamine levels while normal subjects showed less of a difference in levels.

"Our study shows that the beneficial effects of exercise in Parkinson's Disease may be due to a more efficient use of dopamine," says Giselle Petzinger, M.D., assistant professor of neurology at the Keck School of Medicine of USC and the study's first author. "Surviving dopamine cells in our animal models- made to simulate what Parkinson's patients suffer with- subjected to intensive treadmill exercise appear to work harder."

Studies with John Walsh, Ph.D., associate professor at the USC Andrus Gerontology Center and a co-investigator of the study, showed that these cells release greater amounts of dopamine and decrease the rate of its removal from the synapse compared to neurons in subjects that do not undergo exercise.

The findings suggest that the benefits of treadmill exercise on motor performance may be accompanied by changes in dopamine neurotransmission that are different in the injured subjects compared to the non-injured.

"Studies in our animal model of Parkinson's disease support the fact that exercise is beneficial for patients with Parkinson's," says Jakowec.

"Exercise may help the injured brain to work more efficiently by allowing the remaining dopamine producing neurons to work harder and in doing so may promote stronger connections in the brain."

Further studies will investigate if beneficial effects of exercise have long-term effect on the injured brain, identifying the molecular links between exercise and the brain, and to better understand the molecular mechanisms within neurons that lead to these changes.

Source: University of Southern California

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