# Exercise may slow progression of ALS

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University of Alberta researchers are looking at exercise as a new way to slow the degenerative processes of ALS, commonly known as Lou Gehrig's disease.

Dr. Kelvin Jones, a recipient of this year's ALS Canada Discovery Grant, has been pioneering research in this field for four years, using mice genetically altered to present familial ALS. He's found that exercise has a positive impact on the mice, slowing the disease significantly.

"Exercise in mice showed a beneficial effect," said Jones, a professor in the Faculty of Physical Education and Recreation. "We have been looking at the rate of denervation of the muscles to see how quickly the disease progresses and the muscles weaken. Findings have been very encouraging."

Jones implanted a tiny pacemaker-like device into the transgenic mice, stimulating the fast-twitch - muscles that fatigue easily. These are muscles typically used for short bursts of speed, such as a sprinter would use, but a marathon runner is more likely to have more slow-twitch muscles, which are well-vascularized and with more myoglobin (an oxygen-carrying protein found in the muscles of most mammals) and designed for endurance.

What he found was that by stimulating the fast-twitch muscles (in essence exercising them passively without the mouse running on a treadmill or wheel) the fast-twitch muscles changed their characteristics, converting to slow-twitch muscles, which are built for endurance.

It was this transformation in the muscles that slowed the progression of ALS in the transgenic mice.

Fast-twitch muscles are more vulnerable to degeneration in ALS patients, therefore, says Jones, "If you have ALS, the more of the fast-twitch muscle fibre you have, based on the mouse studies, the quicker the symptoms (of ALS) come on.

"What we think is that if we try to build more of the slow-twitch muscle fibre in ALS patients it would slow the progression of the disease."

Now Jones is ready to take the next step: to conduct clinical trials with humans. He's optimistic that exercise, which has a proven track record of improving patient survivorship in major diseases, such as cancer and cardiovascular disease, will show the same benefits in patients with ALS, improving their quality of life, mitigating the impacts of the disease and helping them to survive longer, and with better quality of life.

There have been almost no clinical trials using exercise on people with ALS, says Jones. ALS patients typically participate in drug trials because up to now exercise hasn't usually been offered as a way to mitigate the impacts of the disease. Quite the contrary: neurologists are more likely to prescribe taking it easy because they believe that exercise makes the disease worse and can hasten death - that's because ALS patients have more of the slow-twitch muscles which are very vulnerable and degenerate first.

With his new funding Jones will seek opportunities to work with researchers conducting drug trials with ALS patients to include an exercise component to their studies to determine what type of exercise prescriptions would be most beneficial.

"Just as physicians want to know with a drug what the dosage should be,

how long to take it, and how often, so too do they want the same information for an exercise prescription," he said. "Neurologists would love to give advice about physical activity that uses the principles of evidence-based medicine. That's what I want to achieve."

One drug, Riluzone, is the only FDA-approved drug for clinical trials. It has been shown to extend life for approximately three months beyond the usual life expectancy of a person with ALS of two to five years.

"It really is about quality of life," said Jones." ALS is incurable, but if exercise can make an ALS patient's life more comfortable, they're better able to manage the disease for longer and it makes their lives a little easier, it's worth pursuing."

Provided by University of Alberta