



Libyan International Medical University
Faculty of Basic Medical Science

Can Young Stem Cells Make Older People Stronger ?

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Abstract :

Frailty syndrome over all decreases the muscle strength and according to three studies presented in this report it is clear that infusion of young stem cells or modification of the old ones can make a old person feel stronger .

Introduction :

Frailty syndrome is a condition, seen particularly in older patients, characterized by low functional reserve, easy tiring, decrease of libido, mood disturbance, accelerated osteoporosis, decreased muscle strength, and high susceptibility to disease. ⁽¹⁾

Stem cells are unique cells. They have the ability to become many different types of cells, and they can replicate rapidly. ⁽²⁾

Discussion :

At the University of Miami Hare (directs the Interdisciplinary Stem Cell Institute at the University of Miami and cofounded Longeveron) and colleagues wanted to see what the effect would be of dosing patients with new cells.

For their Phase 1 clinical trial, they recruited 15 patients with different levels of frailty, and treated them with a single infusion of stem cells from the bone marrow of healthy adult donors. The treatment appeared safe, Hare says, and there were also hints that it might be working: the average distance walked in six minutes was extended by nearly 40 meters—an increase of 10 percent—six months after the infusion, and patients' average cognitive scores rose slightly. In other measures, such as grip strength, there was no significant change. The researchers also conducted an expanded.

Phase 2 trial. They recruited 30 patients, splitting them into a placebo group, a group given a dose of 100 million cells, and a group given 200 million cells. No adverse events linked to the cells occurred within one month after any of the infusions, and the 100-million group—though not the 200-million group nor the placebo group—showed improvements in the 6-minute walking test and other physical performance measures, along with drops in TNF- α levels. ⁽³⁾

At the University of Rochester to understand the role of stem cells in age-related muscle decline, Chakkalakal (Joe Chakkalakal, Ph.D., assistant professor of Orthopaedics in the Center for Musculoskeletal Research at URMIC.) and his team depleted muscle stem cells in mice without disrupting motor neurons, nerve cells that control muscle. The loss of stem cells sped up muscle decline in the mice, starting in middle, rather than old age. Mice that were genetically altered to prevent muscle stem cell loss maintained healthier muscles at older ages than age-matched control mice. ⁽⁴⁾

A new study at the University of Toronto published shows that during aging a subpopulation of stem cells begin to express a modification of a protein that inhibits their ability to grow and make new stem cells.

Penney Gilbert (assistant professor at the Institute of Biomaterials & Biomedical Engineering (IBBME) and the Donnelly Centre for Cellular & Biomolecular Research (CCBR) at the University of Toronto.) says if we instead treated old stem cells outside the body with a drug that prevented that protein modification from occurring, in combination with culturing the cells on something soft that is reminiscent of soft skeletal tissue, like a hydrogel biomaterial, the combination allowed the aged cells to grow and make more copies of themselves.

The rejuvenated cell cultures were transplanted into injured and aged tissues, with remarkable results: the transplanted cells returned strength to the damaged and aged tissues to levels matching a young, healthy state. ⁽⁵⁾

Conclusion :

We can improve symptoms of Frailty syndrome by fusions of young stem cells or by protein modification in old stem cells .

Recommendation :

Is it true that physical exercise from a young age clears out cells with many mutations, or does it result in the generation of a higher number of such cells?

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