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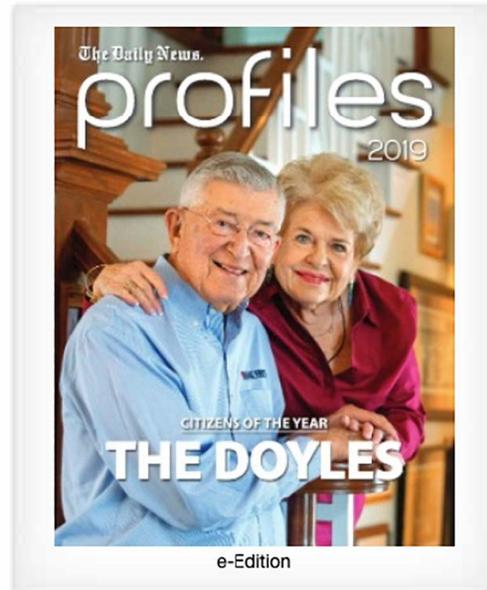
UTMB scientists develop drug to rejuvenate muscle growth

Story By KATHRYN EASTBURN | Photos by Jennifer Reynolds | The Daily News Apr 13, 2019 0



Camille Brightwell, left, a doctoral student a graduate assistant at the University of Texas Medical Branch in Galveston, and Harshini Neelakantan, a research scientist at the medical branch, prepare slides for their research on developing a drug to regenerate muscle function in older adults.

JENNIFER REYNOLDS/The Daily News



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University of Texas Medical Branch researchers have discovered a way to regenerate muscle function in older adults, good news for adults 65 and over, the fastest growing segment of the population in the United States and many other countries.

“We’ve identified a protein in muscle stem cells that appears to be responsible for their age-related dysfunction, and then developed a small-molecule drug that limits the effects of this protein,” said Stan Watowich, associate professor in the Department of Biochemistry and Molecular Biology and senior author of the study that was recently published in the journal *Biochemical Pharmacology*.

“By resetting muscle stem cells to a more youthful state, we were able to rejuvenate them so that they could more effectively repair muscle tissues,” Watowich said.

A variety of components contribute to mass and strength of muscles through aging, including stem cells, which, over time, lose a great deal of their ability to do their job of regenerating new muscle, Watowich said.

The research team identified a protein in muscle stem cells that appears to be responsible for their age-related dysfunction.

“We took the muscle tissue from young mice and the same group of tissues from aged mice, representative of people 65 and over,” said Harshini Neelakantan, a research scientist in the biochemistry department.

Experiments with mice showed a two-fold increase of a particular protein in the aged tissue compared to younger muscle tissue, leading the team to look at how the protein relates to the tissue and, ultimately, to development of a drug that can block the protein in muscle stem cells and thus inhibit atrophy in aged tissue.

“We treated aged animals for a series of two weeks with the compound, measured their muscle strength and how the muscles’ stem cells were reactivated,” Neelakantan said. “We’re basically resetting muscle stem cells to a more youthful state.”

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The long process of developing a marketable drug available to the public has just begun. Safety studies on two different animal species take about a year to complete. Assuming those studies demonstrate safety on multiple species, human clinical trials will take two more years to complete before the drug is eligible for approval by the U.S. Food and Drug Administration.

“There are no approved medicines out there that can help build muscle,” Neelakantan said. “We’re excited that we likely have a simple oral medication that probably can do that.”

Other studies are focused on biologics, usually injectable medications, and at cell therapy that tends to be expensive. The research team’s goal is to produce an oral medication that is safe, useful and affordable for the majority of people.

Scientists from the medical branch’s department of nutrition are also part of the team, looking at the role of exercise on aging muscles and the combined effect of the drug with exercise.

The idea is that you’ve lived to 70 and are just starting to exercise, this drug could prove to be valuable in harnessing the ability to regenerate muscle.

“It could help people reach the full benefit of their exercise,” said Christopher Fry, assistant professor in the Department of Nutrition.

Camille Brightwell, a post-graduate student in Fry’s lab, has worked as a personal trainer with older adults. Growing muscles through weight lifting can happen with older adults, but not to the same degree as a younger adult, she said.

“The goal with ongoing studies is to restore stem cell activity in an older mouse to that of a younger mouse,” Brightwell said.

Much of the spending in the rapidly increasing cost of health care in the United States goes to treating elderly people for health problems related to muscle decline, including hip fractures, falls and heart disease. With stronger muscles, many of these conditions could be avoided, according to the medical branch team.



“We’re not seeking to have everyone become a body builder, but to build the necessary strength to build function — getting out of a chair, carrying in your groceries, playing with your grandchildren,” Fry said.

“The only thing we know is that exercise helps and we hope in the future our drug will help, too.” ^{F0}₁₅

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