For Immediate Release

Nathan Shock Center Study Extends Lifespan and Healthspan in Female Mice

Researchers at Albert Einstein College of Medicine Find Drug Provides Benefits Even When Started Late in Life

July 12, 2018 (New York, N.Y.) – A drug that specifically targets the growth hormone pathway can extend life in female mice, and delays aging even when it is given relatively late in life, a new study shows.

The study, published recently in Nature Communications, was led by Derek M. Huffman, Ph.D., of the Albert Einstein College of Medicine's Nathan Shock Center of Excellence in the Basic Biology of Aging. The American Federation for Aging Research (AFAR) serves as the Coordinating Center for the Nathan Shock Centers program, funded by the Division of Aging Biology of the National Institute on Aging. Springboarding this research, Dr. Huffman received an AFAR Research Grant for Junior Faculty in 2015.

In addition to colleagues at Einstein, two scientists affiliated with other Nathan Shock Centers co-authored the study: David B Allison, Ph.D. of the Nathan Shock Center at the University of Alabama Birmingham, and Yuji Ikeno, M.D., Ph.D., of the Nathan Shock Center at UT Health San Antonio, who received a 2008 Glenn/AFAR Breakthroughs in Gerontology (BIG) Award and is a former member of AFAR's National Scientific Advisory Council.

Also co-authoring the study was Pinchas Cohen, M.D., dean of the University of Southern California's Leonard Davis School of Gerontology and a 2017 Glenn/AFAR Breakthroughs in Gerontology (BIG) Award recipient.

Research has consistently shown that factors promoting growth can accelerate the rate of aging if they are not held in check.

"This phenomenon can also be found across nature—small dog breeds live longer than larger ones, ponies outlive thoroughbreds, and dwarf mice are able to substantially outlive their normal-sized siblings," Huffman says. "A key reason for this longevity advantage is that smaller animals have reduced activity of key growth factors, including insulin-like growth factor-1 (IGF-1)."

IGF-1 also has been linked to increased risk of several types of cancer, including prostate, breast, and colorectal cancer. And studies conducted through the Einstein Longevity Gene Project at the Albert Einstein College of Medicine in New York have shown that many centenarians have unique mutations in their IGF-1 receptors that reduce its activity.

The new study is the first to test whether drugs developed to target the IGF-1 hormonal pathway can delay aging. Signaling of this pathway is triggered when IGF-1, which circulates in blood, binds to IGF-1 receptors found on the surface on many types of cells in the body, promoting growth in those cells.

Huffman is co-director of Einstein's Chronobiosis and Engergetics/Metabolism of Aging Core—one of the three specialized cores at Einstein's Nathan Shock Center. Huffman and colleagues tested a laboratory-created molecule known as a monoclonal antibody (mAb) designed to block IGF-1 receptors. The drug had been developed and safely tested in human trials as a potential cancer therapy.

Researchers gave weekly injections of either the mAb or a control solution to male and female mice starting at 18 months (equivalent to people aged 50 to 60 years old) and continued the injections for the remainder of their lives. They monitored age-related health outcomes and how long the mice lived.

Male mice injected with the mAb showed little improvement compared with male controls. However, mAb-treated female mice lived 9 percent longer, compared with female controls. They also developed less cancer, and had more youthful cardiac function, exercise tolerance, grip strength, and motor coordination.

“The longevity and health benefits seen in the female mice receiving mAb were especially notable given that treatment wasn’t started until they were well past middle age,” Huffman says. “This suggests that IGF-1 receptors are a viable drug target that can result in extending healthy lifespan. It also suggests that mAbs targeting these receptors represent a viable class of drug to ‘fine tune’ this pathway that could be leveraged and optimized for use in women to improve health, even at older ages.”

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About the Nathan Shock Centers of Excellence in the Basic Biology of Aging. The Division of Aging Biology (DAB) of the National Institute on Aging funds the Nathan Shock Centers of Excellence in the Basic Biology of Aging across the U.S. The Centers provide leadership in the pursuit of basic research into the biology of aging. They do so through a Research Development Core, which administers small start-up funds locally and organizes national annual meetings to highlight specific areas of research. In addition, each Nathan Shock Center has several specialized cores that provide services to Shock Center members, as well as for-fee services to the community at large. The cores are different in each Center, depending on the strengths of each Institution. To learn more about the Nathan Shock Centers, visit http://nathanshockcenters.org/ or follow @NathanShockCtrs on Twitter or NathanShockCenters on Facebook.

About AFAR. The American Federation for Aging Research (AFAR) is proud to serve as the Coordinating Center for the Nathan Shock Centers of Excellence in the Basic Biology of Aging. AFAR is a national non-profit organization whose mission is to support and advance healthy aging through biomedical research. Founded in 1981, AFAR has championed the cause and supported the funding of science in healthier aging and age-related medicine. To address the shortage of physicians and researchers dedicated to the science of healthier aging, AFAR funds physicians and scientists probing the fundamental mechanisms of aging, as well as specific diseases associated with aging populations at critical points throughout their careers. Learn more at www.afar.org or follow AFARorg on Twitter and Facebook.

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