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New study finds length of DNA strands can predict life expectancy

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Can the length of strands of DNA in patients with heart disease predict their life expectancy? Researchers from the Intermountain Heart Institute at Intermountain Medical Center in Salt Lake City, who studied the DNA of more that 3,500 patients with heart disease, say yes it can.

In the new study, presented Saturday, March 9, at the American College of Cardiology's Annual Scientific Session in San Francisco, the researchers were able to predict survival rates among patients with heart disease based on the length of strands of DNA found on the ends of chromosomes known as telomeres—the longer the patient's telomeres, the greater the chance of living a longer life.

The study is one of 17 studies from the Intermountain Heart Institute at Intermountain Medical Center that are being presented at the scientific session, which is being attended by thousands of cardiologists and heart experts from around the world.

Previous research has shown that telomere length can be used as a measure of age, but these expanded findings suggest that telomere length may also predict the life expectancy of patients with heart disease.

Telomeres protect the ends of chromosome from becoming damaged. As people get older, their telomeres get shorter until the cell is no longer able to divide. Shortened telomeres are associated with age-related diseases such as heart disease or cancer, as well as exposure to oxidative damage from stress, smoking, air pollution, or conditions that accelerate

biologic aging.

"Chromosomes by their nature get shorter as we get older," said John Carlquist, PhD, director of the Intermountain Heart Institute Genetics Lab. "Once they become too short, they no longer function properly, signaling the end of life for the cell. And when cells reach this stage, the patient's risk for age-associated diseases increases dramatically."

Dr. Carlquist and his colleagues from the Intermountain Heart Institute at Intermountain Medical Center tested the DNA samples from more than 3,500 heart attack and stroke patients.

"Our research shows that if we statistically adjust for age, patients with longer telomeres live longer, suggesting that telomere length is more than just a measure of age, but may also indicate the probability for survival. Longer telomere length directly correlate with the likelihood for a longer life—even for patients with heart disease," said Dr. Carlquist.

Dr. Carlquist and his colleagues from the Intermountain Heart Institute at Intermountain Medical Center drew on two unique resources that offer unparalleled opportunity for researchers to study the effects of telomere length and survival rates of heart patients:

- An archive of peripheral blood DNA samples collected from almost 30,000 heart patients, with as much as 20 years of follow-up clinical and survival data. This is stored in Intermountain Healthcare's world-renowned computerized medical informatics record system.

"With so many samples and very complete electronic records, it's a unique resource," said Dr. Carlquist. "It's unmatched in the world, and it allows us to measure the rate of change in the length of a patient's

telomeres over time rather than just a snapshot in time, which is typical for most studies."

- The opportunity to work with experts from around the world, including Richard Cawthon, MD, PhD, who's an international expert on telomere measurement and function.

"I believe telomere length could be used in the future as a way to measure the effectiveness of heart care treatment," said Dr. Carlquist. "We can already test cholesterol and blood pressure of a patient to see how treatment is working, but this could give us a deeper view into how the treatment is affecting the body and whether or not the treatment is working."

Provided by Intermountain Medical Center