Medical Xpress

# Scientists link chromosome length to heart disease risk

March 25 2012

No one really wants the short end of the stick, in this case the short end of a chromosome. Telomeres, which are DNA-protein complexes at the ends of chromosomes, can be thought of as protein "caps" that protect chromosomes from deteriorating and fusing with neighboring chromosomes.

It is typical for telomeres to shorten as cells divide and chromosomes replicate over time. Now a new study from Brigham and Women's Hospital (BWH) suggest a strong link between telomere shortening and poor cardiovascular outcomes in patients with acute coronary syndrome.

The study is being presented at the American College of Cardiology 2012 Annual Scientific Session, March 24 to 26 in Chicago.

Scientists measured telomere length in 5,044 patients with an acute coronary syndrome who were followed for 18 months.

They evaluated the risk of cardiovascular death or heart attack based on telomere length and other characteristics.

Shorter telomeres were associated with older age, male gender, smoking, prior heart attack and heart failure; although, the correlation between each individual factor and telomere length was modest. Age, for example, only accounts for seven percent of the variability in telomere length.

Telomere length was strongly associated with risk of cardiovascular death or heart attack. Patients with shorter telomeres had the highest risk. This relationship was consistent across various age groups.

"We know that many different genetic and environmental factors, like diabetes, high cholesterol and smoking predispose patients to suffering cardiovascular events," said Christian T. Ruff, MD, MPH, Cardiovascular Division, BWH Department of Medicine, and lead study investigator. "Even when accounting for all of these other known risk factors, patients with short telomeres have an increased risk of having a heart attack or dying from heart disease."

Taking the research findings from bench to bedside, Ruff points out that measuring telomere length may be useful in a clinical setting, providing a sort of predictor for cardiovascular events.

"Telomere shortening may represent some sort of 'biological clock' which integrates the cumulative effect of environmental and genetic stresses on the body, both of which can contribute to cardiovascular events." said Ruff.

The researchers will continue to validate their findings to see if the relationship between telomere length and cardiovascular outcomes holds true in broader populations of patients. They also plan on experimenting on whether the rate of telomere shortening over time also predicts adverse cardiovascular events.

"In the future, we hope to identify clinical, biochemical and genetic characteristics that predict telomere shortening," said Ruff. "We hope to have the ability to determine if therapies and medications that impact these processes may delay telomere attrition and lessen the risk of cardiovascular events in these patients."

Provided by Brigham and Women's Hospital