A secret of extreme longevity emerges

By Robert Lee Hotz

By analyzing the DNA of the world's oldest people, Boston University scientists said Thursday they have discovered a genetic signature of longevity. They expect soon to offer a free test that could let people learn whether they have it in themselves to live to a very old age.

The researchers, who studied more than 1,000 people over the age of 100, identified a set of 150 unique genetic markers that, taken together, are linked to extreme longevity. They acknowledged that they didn't yet know all of the actual genes involved, nor their function in extending old age.

"This is an extremely complex trait that involves many processes," said lead researcher Paola Sebastiani, a biostatistician at BU's School of Public Health. Even so, "we can compute your specific predisposition to exceptional longevity."

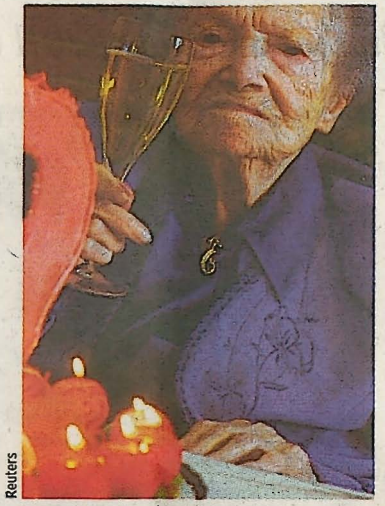
The researchers said they have no plans themselves to patent the technique or profit from it. Instead, they expect to make a test kit available on the Internet later this month to foster longevity research.

"This is a major breakthrough," said Nir Barzilai, director of the Institute for Aging Research at the Albert Einstein College of Medicine in New York, who studies the genetics of longevity but was not involved in the project. "It shows you that 150 markers [among millions] are all you need to distinguish between people who live to 100 and people who don't."

Scientists have long sought to crack the genetic code of healthy aging. On average, people in developed countries today can expect to live between 80 and 85 years, largely as a result of improvements in diet and public health. But the oldest of the old—the "well-derly"—live two to three decades longer, often free of the mental and physical ailments of age.

The oldest person alive today is 116 years old, according to the Los Angeles Gerontology Group. The oldest person on record lived to be 122 years old.

No one knows the complete prescription for a healthy long life. But genes that help control cellular responses to famine, drought and other survival stresses may play a key role in staving off the diseases and chronic ailments of aging, research suggests.



Reuters

Rosa Rein turned 112 in 2009.

While a healthy lifestyle is paramount, such genetic factors appear to become more important the longer we live. Indeed, a variation in a single key gene called FOX03A can triple the chances a person may live past 100, researchers at the Pacific Health Research Institute in Hawaii recently reported.

In research published online Thursday by the journal Science, Dr. Sebastiani, BU geriatrician Thomas Perls and their colleagues studied variations in the biochemical code of DNA drawn from members of the New England Centenarian Study, considered the world's largest comprehensive study of these long-lived people and their families.

The scientists compared the genetic makeup of these centenarians with people who lived more average life spans. The genetic markers they found are scattered across the entire three billion DNA characters of the human genome and touch on at least 70 known genes. Depending on personal habits, diet, injuries, accidents and other factors, these genes boost an individual's chances of survival in the lottery of life, the scientists reported.

The information allowed the BU researchers to identify those predisposed to exceptional longevity with 77% accuracy in controlled tests, they reported.

"Now, we are going to have to find out what all these genes are, what they do, and if there is a way we can affect them," said geriatrics expert Bradley Willcox, who was not involved in the Science paper. He is a principal investigator of the Hawaii Lifespan study and the Okinawa Centenarian Study, which involve analysis of thousands of aging men.

In the meantime, the test will be available through a public website maintained by the New England Centenarian Study. To take the test, however, people will have to provide their own complete genome, and that can cost thousands of dollars from gene-sequencing companies.

The scientists warned that their test might reveal more than some people would like to know. Genetic testing often reveals tantalizing but incomplete information about our risk for disease, and it's difficult to know how to act in response. Clues about our life span, for example, could affect decisions about insurance coverage or long-term medical treatments.

"I don't think people are ready for this from a social point of view," said BU's Dr. Perls. "But I don't think that will stop companies from trying to market this," he added.