

What if
People
Could

Live to 100
and Beyond



Photo by Titus Kana



and Still
be Healthy,
Active &
Engaged?

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Current Research



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In the LonGenity study, Dr. Barzilai and his team have thus far conducted genetic analyses of more than 500 centenarians and near-centenarians, over 700 of their children (60–85 years old) and more than 600 age-matched unrelated participants (controls). The research team validates its findings by comparing genetic markers found in the children of centenarians with those markers found in or absent from children whose parents have what's known as "usual survival." The study population is composed of *Ashkenazi Jews*, selected because their genetic makeup is comparatively homogenous, making it easier to identify the location of genetic variations.

RESEARCH GOAL: To develop drug therapies that mimic longevity genes and allow people to live longer, healthier lives.

The LonGenity research study, funded in 2006 by the National Institute of Aging, builds upon the Longevity Genes Project, initiated in 1998 by endocrinologist Nir Barzilai, M.D., who holds the Ingeborg and Ira Leon Rennert Chair of Aging Research at Albert Einstein

To learn more about Einstein aging research, visit www.EinsteinAgingStudy.com and www.SuperAgers.com



The LonGenity Research Team Leaders

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SUPER AGERS

Findings To Date

The Einstein team has identified several key biomarkers that may contribute to extreme longevity and found strong evidence that longevity is:

- Highly likely to be inherited from generation to generation;
- Highly correlated to high HDL ("good") cholesterol and inversely correlated to high LDL ("bad") cholesterol; and
- Likely to occur among people with larger HDL and LDL molecule sizes, resulting in lower incidences of cardiovascular disease, insulin resistance and high blood pressure.

Additionally, they have learned that:

- The cholesteryl ester transfer protein gene is linked to prevention of cognitive decline and Alzheimer's disease;
- A mutation in the apo lipoprotein C-3 gene changes the structure and particle sizes of lipoproteins, and participants with a certain genotype live, on average, four years longer than those without it;

- Removing an area of a recently discovered fat peptide, known as adiponectin, has been shown to improve insulin action and decrease arterial wall inflammation, both associated with exceptional longevity; and
- Telomeres, those parts of DNA at the edge of chromosomes that shorten every time the cell divides, are longer in centenarians, and the trait for longer telomeres seems to be inherited by their children.

Future Research Plans

Emerging and exciting technology advances are affording Einstein investigators the ability to examine a wide range of possible longevity factors, resulting in an entirely unbiased research approach as opposed to one based on previous assumptions.

- Using high-throughput technology and a systems biology approach, Einstein researchers have begun to and will continue to sequence the entire genomes of centenarians, which contain billions of pieces of information units known as nucleotides.

- Advances in the field of epigenetics will help Einstein scientists better understand how protective or harmful genes are activated, or "turned on" or "turned off." This could lead to drug therapies that regulate gene expression.
- Long-term follow-up with the children of centenarians and unrelated matched controls will prove with certainty whether the longevity genes that Einstein investigators have already discovered are directly related to protection against disease.
- The study population will be extended beyond Ashkenazi Jews.
- Einstein will willingly share results of its research studies and related data sets on the Web so that researchers around the world can conduct their own gene-validation studies.

Through global collaboration, Einstein researchers will join other scientists in finding keys to healthier aging and a better quality of life.