

Inflammation, not telomere length, predicts healthy longevity of centenarians

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Credit: Peter Griffin/public domain

Scientists have cracked the secret of why some people live a healthy and physically independent life over the age of 100.

For the first time, a team of experts from Newcastle University's Institute for Ageing and Keio University School of Medicine, Tokyo, explored which biological and pathological processes may be the most

important for successful ageing after 100 years of [age](#).

They identified that to live past the age of 100 you must keep [inflammation](#) down in the body and telomeres long – which are the part of human cells that affect how our cells age.

Severe inflammation is part of many diseases in the old, such as diabetes or diseases attacking the bones or the body's joints, and chronic inflammation can develop from any of them.

Professor Thomas von Zglinicki, from Newcastle University's Institute for Ageing, led the UK part of the study. He said: "Centenarians and supercentenarians are different - put simply, they age slower. They can ward off diseases for much longer than the general population."

In groups of people aged 105 and over (semi-supercentenarians), those 100 to 104 ([centenarians](#)), those nearly 100 and their offspring, the team measured a number of health markers which they believe contribute towards successful ageing, including blood cell numbers, metabolism, liver and kidney function, inflammation and telomere length.

Scientists expected to see a continuous shortening of telomeres with age, however what they found was that the children of centenarians, who have a good chance of becoming centenarians themselves, maintained their telomeres at a 'youthful' level corresponding to about 60 years of age even when they became 80 or older.

Professor Zglinicki (pictured) said: "Our data reveals that once you're really old, [telomere length](#) does not predict further successful ageing. However, it does show that those who have a good chance to become centenarians and those older than 100 maintain their telomeres better than the general population, which suggests that keeping telomeres long may be necessary or at least helpful to reach extreme old age."

Lower levels of inflammation

Centenarian offspring maintained lower levels of markers for chronic inflammation. These levels increased in everybody with age including centenarians and older, but those who were successful in keeping them low had the best chance to maintain good cognition, independence and stay alive for longer.

Professor Zglinicki added: "It has long been known that chronic inflammation is associated with the ageing process in younger, more 'normal' populations, but it's only very recently we could mechanistically prove that inflammation actually causes accelerated ageing in mice.

"This study, showing for the first time that inflammation levels predict successful ageing even in the extreme old, makes a strong case to assume that chronic inflammation drives human ageing too.

"Our study showed that over a wide age range, including unprecedentedly large numbers of the extremely old, inflammation is an important driver of ageing that might be something we can develop a pharmacological treatment for.

"Accordingly, designing novel, safe anti-inflammatory or immune-modulating medication has major potential to improve healthy lifespan."

Data was collated by combining the community-based group studies: Tokyo Oldest Old Survey on Total Health, Tokyo Centenarians Study and Japanese Semi-Supercentenarians Study.

The research comprised of 1,554 individuals, including 684 centenarians and (semi-)supercentenarians, 167 pairs of offspring and unrelated family of centenarians, and 536 very old people. The total group covered ages from around 50 up to the world's oldest man at 115 years.

The study's aim was to identify biological factors that predict successful ageing at extreme old age, and to see whether improved performance in these factors would already be recognisable in centenarian offspring.

It is hoped that understanding the factors determining extreme longevity may help to achieve extended healthy lifespan for the wider population and to close the gap between the fastest and the slowest ageing population groups.

Dr Yasumichi Arai, Head of the Tokyo Oldest Old Survey on Total Health cohort and first author of the study, said: "Our results suggest that suppression of chronic inflammation might help people to age more slowly.

"However, presently available potent anti-inflammatories are not suited for long-term treatment of [chronic inflammation](#) because of their strong side-effects. Safer alternatives could make a large difference for the quality of life of older people."

Many individuals grow old because medicine helps people to survive and live with multiple diseases and dependencies.

Professor Nobuyoshi Hirose, Head of the Tokyo Centenarians Study and the Japanese Semi-Supercentenarians Study, added: "If we can find out what makes centenarians and supercentenarians different it might become possible to improve all our lives as we age."

More information: "Inflammation, but not telomere length, predicts successful ageing at extreme old age: a longitudinal study of semi-supercentenarians." *EBioMedicine*. [DOI: 10.1016/j.ebiom.2015.07.029](https://doi.org/10.1016/j.ebiom.2015.07.029)

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