

Scientists have identified the role of chronic inflammation as the cause of accelerated aging

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Claudio Franceschi, a world-renowned scientist, professor at the University of Bologna (Italy) and head of the Research Laboratory for Systems Medicine of Healthy Aging at Lobachevsky University, together with other members of an international research team, has described the mechanisms underlying chronic inflammation and identified several risk factors leading to disease. As noted in the paper "Chronic inflammation in the etiology of disease across the life span," published in the journal *Nature Medicine*, these include infections, physical inactivity, diet, environmental factors, industrial toxicants and psychological stress.

Professor Claudio Franceschi's many years of research have resulted in the theory of "inflamm-aging," according to which aging is a general inflammatory process that involves the whole body and provokes diseases associated with age: Alzheimer's [disease](#), atherosclerosis, cardiovascular disease, type II diabetes and cancer.

"Today, chronic inflammatory diseases are at the top of the list of death causes. There is enough evidence that the effects of [chronic inflammation](#) can be observed throughout life and increases the risk of death. It's no surprise that scientists' efforts are focused on finding strategies for [early diagnosis](#), prevention and treatment of chronic [inflammation](#)," says Claudio Franceschi.

One of the serious results obtained to date has been the concept of immune aging, which enables researchers to characterize the immune function of an individual and to predict the causes of mortality much more accurately than by relying only on chronological age. In addition to well-known inflammation biomarkers, such as C-reactive protein, interleukins 1 and 6, tumor necrosis factor, scientists note the need to study additional biomarkers of the immune system, which differ very much from person to person, in particular, the subgroups of T- and B-lymphocytes, monocytes, etc.

Scientists have identified certain factors (social, environmental and lifestyle factors) that contribute to systemic chronic inflammation. Taken together, such factors are the main cause of disability and mortality worldwide.

Some of the most powerful tools in research of aging processes are genomic, transcriptomic and proteomic analyses (collectively referred to as "omics"). However, although the trajectory of human aging can be established as early as at the moment of fetal development in the womb, the factors influencing the whole life cycle also have a strong influence. Professor Franceschi insists that the lifestyle, the effects of stressors, the history of vaccinations, as well as the social and cultural characteristics of each individual starting from the first days of life to adulthood should be determined

in as much detail as possible and taken into account.

An integrative approach to the study of mechanisms of systemic chronic inflammation is being adopted by a growing number of scientists. Research is continuing, and scientists have a long way to go to fully understand the role of chronic inflammation in aging and mortality, and to be able to predict changes in a person's health throughout life.

Research results open up new strategies for early diagnosis, prevention and treatment of a wide range of diseases associated with systemic chronic inflammation. It is expected that prevention and treatment of inflammatory processes will serve to slow down aging and prolong life.

Under the guidance of Professor Franceschi, the megagrant project "Digital Personalized Medicine for Healthy Aging" is being implemented at the Lobachevsky University of Nizhny Novgorod where a unique Center for Healthy Aging and Active Longevity has been established with the aim of making a breakthrough in the search for aging markers, early diagnosis of age-related diseases and, ultimately, achieving active longevity.

More information: David Furman et al, Chronic inflammation in the etiology of disease across the life span, *Nature Medicine* (2019). [DOI: 10.1038/s41591-019-0675-0](https://doi.org/10.1038/s41591-019-0675-0)

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