



Healthy Aging





Health, premature aging, healthy aging and intervention

The aging process can be described as a slow decline of multiple biological functions. Aging is a multifactorial process including molecular mechanism such as genomic instability, telomere attrition, epigenetic alterations, and mitochondrial dysfunction. While being hugely affected by external factors like environment, toxins, radicals, lifestyle, and diet, these processes result in a greater susceptibility to a wide variety of age-related diseases. An important influencing factor of aging is the epigenetic makeup of the cells.

Epigenetics can be described as the software which regulates the gene sequences seen as hardware in gene expression. It is widely accepted that during the aging process the overall epigenetic methylation of the DNA decreases. Local DNA methylation of very specific DNA sites can also be correlated with the age of individuals. As the body ages and the cells divide, a small portion of DNA is lost with each cell division at the end of our chromosomes, where specific DNA–protein structures (termed telomeres) protect our genome from the loss of any vital information and DNA instability. When telomeres get critically short, cells undergo senescence and/or apoptosis.



Analytical concepts

Increased experience in genetics, epigenetics, microbiota, and molecular mechanisms has resulted in the possibility of individualizing analyses to improve healthcare. Analytical concepts in premature aging can be based on a preventive, individual approach which identifies possible risks from dysfunctions in individual molecular mechanisms such as epigenetics, telomeres, inflammation or DNA instability, as well as risk factors from environment, lifestyle, and nutrition.

Our analysis aims to establish a preventive concept in cooperation between the client and a healthcare professional.

With our analytical concepts, we try to identify causal mechanism of health issues. This approach will strengthen intervention and monitoring. We integrate lifestyle, nutrition, and molecular analysis to give you an individualized optimal intervention plan for delaying premature aging and to promote healthy aging. Analysis in this area has to be guided by a responsible medical expert.



Intervention

Intervention in premature aging and healthy aging mostly requires integration of lifestyle, nutrition, medication or supplements and personalized nutrition.





Name

Jon Doe

Birth date

01-01-53

Analysis number

1

Date

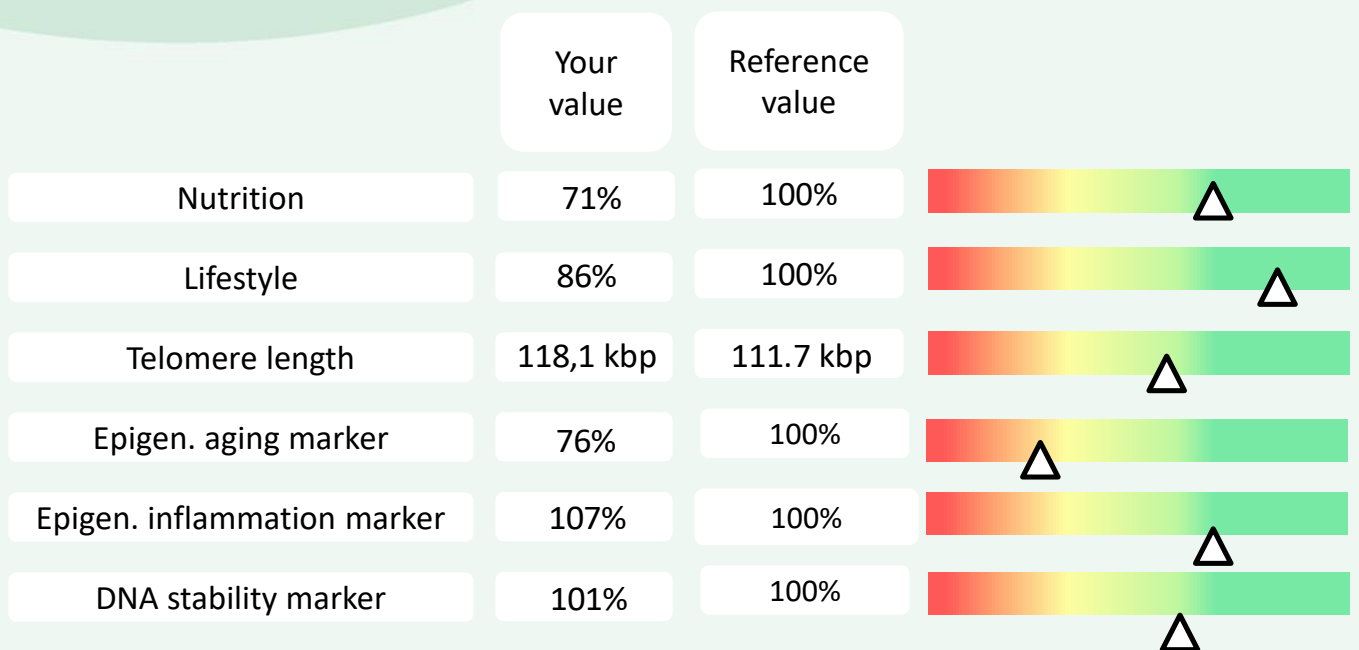
07-10-24

Analyzed Elements

Nutrition
Lifestyle
Telomere length
Epigen. aging marker
Epigen. inflammation marker
DNA stability marker

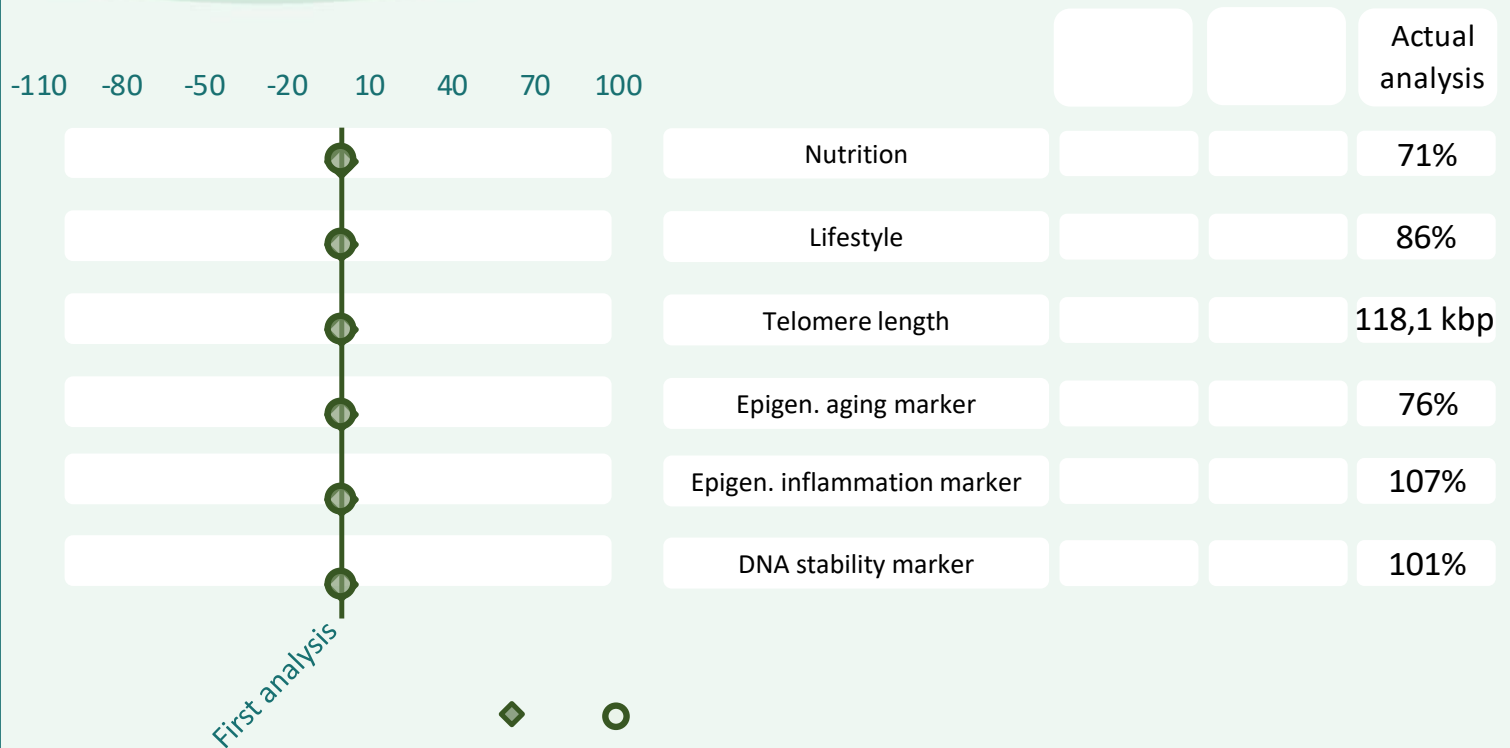
Summary of the analysis at a glance

Analysis overview



The chart above displays an overview of your values in percent compared to the average values corresponding to your age and gender. An assessment of these values is shown in a traffic light system.

Variations of the analyzed parameter over time



This is your first analysis.



Evaluation of your nutrition and lifestyle questionnaire

Overview of your eating habits

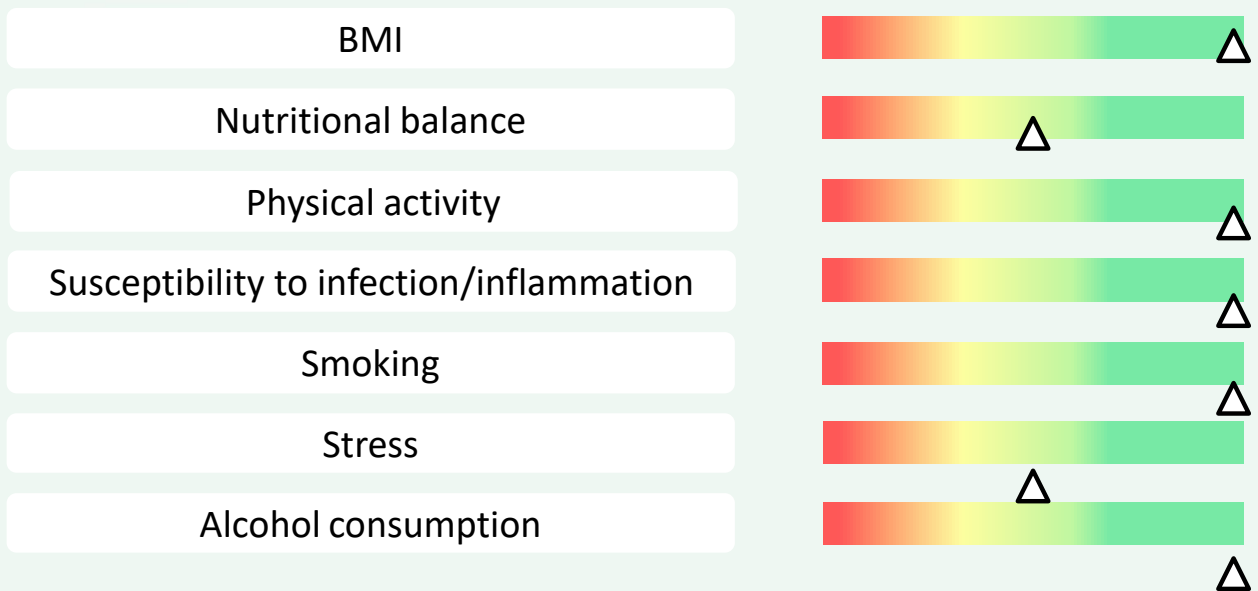


Your diet was analyzed and compared to the WHO-based recommendations such as the Food Pyramid. Results of the nutrition groups are expressed in the traffic light system.

Your diet includes a variety of healthy foods, but further improvements are needed for an optimal nutrient intake. Increase your fruit and vegetable intake to 5 servings daily. Make sure to consume fermented foods such as yogurt, buttermilk, kefir several times a week. Fiber contributes to longer satiety and reduces the risk of several diseases. Increase your fiber intake by consuming whole grains, seeds or seed (husks) and vegetables. Make sure to drink at least 2 liters of fluids in the form of water or unsweetened tea.



Lifestyle overview



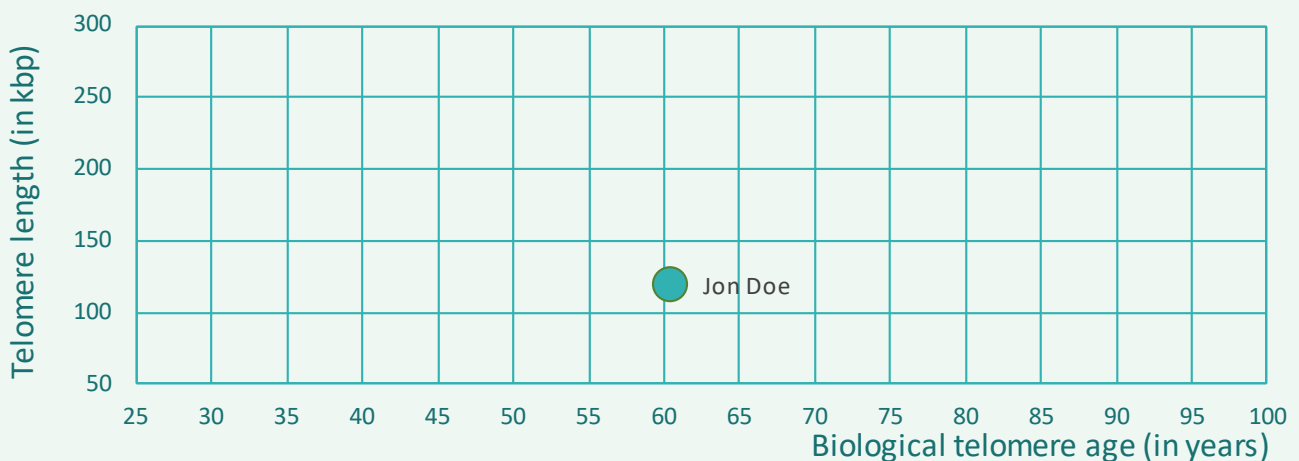
You have a good baseline for a balanced lifestyle, but there is room for improvement. Make sure to eat a varied diet and drink enough fluids. Staying hydrated and eating whole foods promotes health, performance and well-being. A good way to reduce your stress levels is to opt for relaxation techniques such as autogenic training, meditation or yoga. These techniques can help you relax and reduce stress. Try it out and see for yourself how regular relaxation exercises can have a positive impact on your life!



Analysis Results

Epigenetic mechanisms are molecular-biological processes which regulate the activity of genes without affecting the DNA sequence itself. DNA methylation is one of these mechanisms, and it indicates the addition of the small methyl-group to distinct positions of the DNA. The methylation level of distinct genes is correlated to the aging process, to conditions like obesity, and to disease. Changes of the epigenetic methylation pattern are associated with the development of complex diseases or premature aging. Epigenetic DNA methylation can be modified through environmental influences like diet and lifestyle.

Telomere length



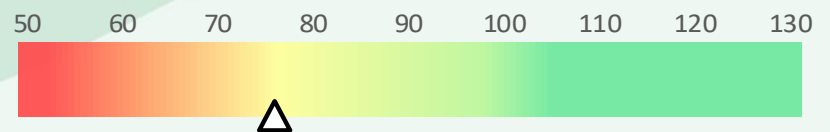
Your telomere length of 118.1 kbp is 5% longer compared to the age- and gender-matched control group. The calculated biological telomere age is 14.5% younger as your chronological age.

The ends of human chromosomes are protected and stabilized by distinct DNA sequences called telomeres. With each cell division, some base pairs of the telomere structure get lost, and thus the length of the telomere is correlated to an individual's age. Furthermore, lifestyle factors such as obesity, an unhealthy diet, smoking, and psychological stress have negative effects on telomere health. Telomeres which are shorter than age-appropriate are associated with a wide range of complex diseases. The length of the telomeres can be stabilized or even elongated through dietary- and lifestyle-interventions including specific supplements or through therapy of the underlying disease.



Epigenetic aging markers

Methylation (%)



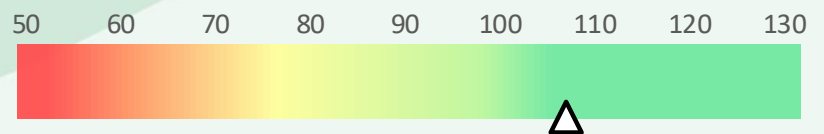
Compared to the age- and gender-matched control group, the epigenetic aging marker genes are 76% methylated. This is associated with an increased biological age.

The analysis of the methylation of strictly age-related genes is an established marker for the assessment of the biological gene age. The chart above shows the combined methylation level of these genes compared to an age- and gender matched control group (100%). A value of under 90% is associated with an older biological age, a value of more than 100% is desirable.



Epigenetic inflammation markers

Methylation (%)

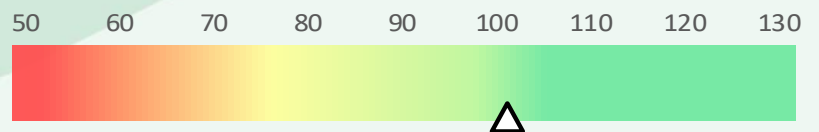


Compared to the age- and gender-matched control group, the inflammation marker genes are 107% methylated. This is a positive result.

The measured inflammatory markers mainly concern metabolically related inflammations, i.e. non-acute inflammatory processes. Reduced methylation in comparison to the reference group means a higher activity of metabolic inflammatory factors. Low grade metabolic related inflammation is a key mechanism of aging. Increased metabolic related inflammation levels lead to symptoms of old age. The genes TNF- α and IL-6 regulate inflammatory responses. The degree of epigenetic regulation (methylation) of the two genes influences the production of these mediators and thereby the formation or decay of inflammatory reactions. Healthy people have high methylation, and individuals with metabolic disorders show low methylation of these genes. The chart above shows the combined methylation level of these two genes compared to an age- and gender matched control group (100%). A value of under 90% is associated with an older biological age, and a value of more than 100% is desirable.

DNA stability marker

Methylation (%)

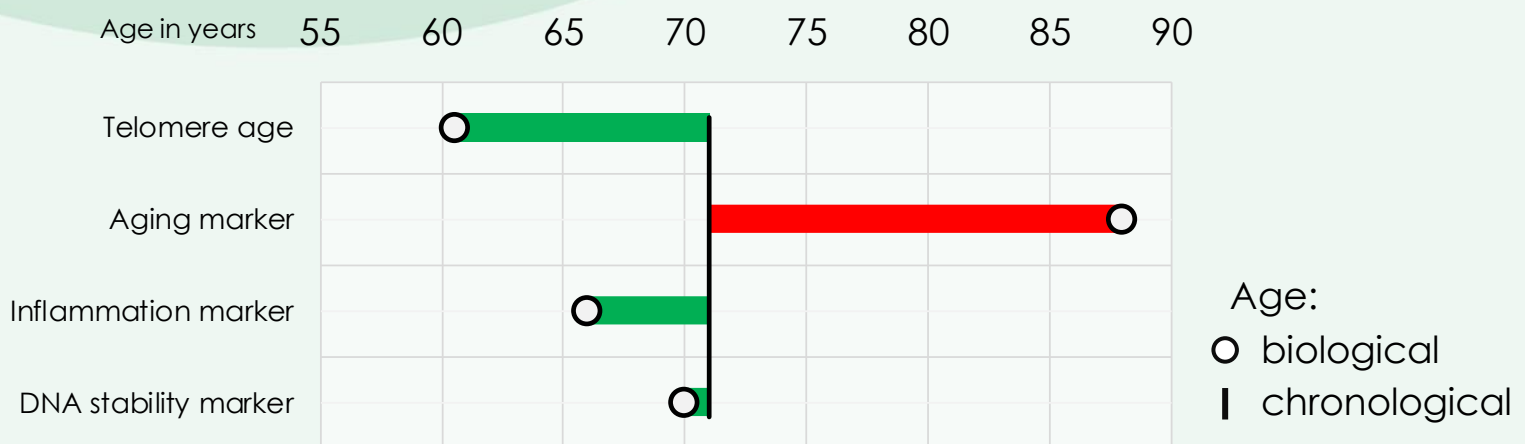


Compared to the age- and gender-matched control group, the DNA stability marker gene is 101% methylated. This is a positive result.

The DNA methylation of LINE-1 represents the methylation level of the whole DNA of this tissue. A high DNA methylation corresponds with a high stability of the DNA. A low DNA methylation level is associated with premature aging and to the development of diseases. The chart above shows the methylation level of this gene compared to an age- and gender matched control group (100%). A value of under 90% is associated with an older biological age, and a value of more than 100% is desirable.

Conclusion - Individual recommendation

General Results



Aging is a natural and complex process that involves various physiological mechanisms. In the overview above you can see how the levels of your biomarkers reflect your biological age in contrast to your chronological age. Your telomere length is above the average of your age-, gender- and ethnicity-adapted comparison group. Sport has been linked to a longer telomere length. Keep up your active lifestyle. Your epigenetic aging markers are below the mean of the reference group. Increase your fruit and vegetable consumption. Focus especially on leafy green vegetables. With their high folate content they can improve your epigenetic aging markers. Additionally, we recommend a plant based supplement (TIMEBLOCK®) it not only has known beneficial effects on the telomere length but also features a high folate content. Your epigenetic metabolic inflammation markers show values above average.

Nevertheless, you could benefit from an increase in your fiber intake, not only through whole grain products but also vegetables as well as seed(-husks). These fibers will benefit your gut microbiota, which can produce beneficial short chain fatty acids. Your DNA stability marker shows a value slightly above average. Try to eat a more balanced diet and reduce your stress level.