

Frequently Asked Questions

What is the importance of age in health? Is aging a disease?

People often think of age as a symptom of disease but it can also be a contributor to developing disease.

Aging is the number one risk factor for ALL chronic diseases, and chronic disease is the number one cause of death in developed countries. There are many types of common diseases we are all familiar with that are influenced by aging, which includes: type II diabetes, cardiovascular disease, and cancer.

Addressing age as a disease can help focus medicine on the prevention of aging-related diseases before the onset of disease symptoms occur.

What is the biological age?

Everyone knows how old they are. This is chronological age. However, this isn't always a great medical tool. I think that everyone has seen some 70 year olds who look amazing and can do everything they want in life. I imagine most have also seen 70 year old individuals who can do practically nothing due to some type of disease.

As a result, we know age is important but chronological age doesn't always help us. That is why biological age is created. It gives us a better idea of how functional and healthy you are from the perspective of your body.

This has been a goal for people who have been studying aging since the '40s. Until now, there hasn't been a metric which is great for a large number of applications. Epigenetic age measurements have changed this.

What are some examples of methods used to calculate biological age?

One of the most popular metrics used to calculate someone's biological age in the past has been telomere length. Telomeres are the sequence of DNA at the end of our DNA. As our cells divide, these get shorter over time. When our cells replicate too much our telomeres disappear and the cell pauses. This is called replicative senescence and was thought to be a great marker of aging. However, it wasn't highly correlated to age and in most cases doesn't have a link to our general health.

The one we use looks at methylation markers which happen through epigenetics.

This test was created by Dr. Steve Horvath and Dr. Greg Hannum in 2013. Dr. Horvath's work has stood out in particular because of its ability to accurately predict age across all age types. It is so accurate that it has been used in forensic criminal investigations, to tell the age of refugees in Europe, and even to decide premiums for life insurance because it can predict your death. It is able to predict age in a way that hasn't been available before.



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What is epigenetics and how is it different from genetics?

Every cell in our body has the same DNA. So how are the cells in our eyes so much different than the cells on our heart? The difference is between what DNA and genes get expressed in each cell.

Epigenetics is the study of the changes that happen in the way our DNA is organized and expressed. Epigenetics changes gene expression but does not alter the primary DNA sequence. Many things can change the way our body regulates epigenetics including lifestyle factors (nutrition, smoking and alcohol consumption, behavior, stress, physical activity, and working habits, etc.) and environmental factors (exposures, stressors, etc.) can impact these modifications, and therefore impact how our genes perform.

One way of perceiving traditional genetics is like looking at a light bulb and its components. Looking at the way the light bulb is constructed is like looking at our DNA sequence. However, looking at our epigenetic modifications is like looking at if the light bulb is on or off.

A person's lifestyle and environment have the ability to alter the DNA through epigenetic modifications, and these modifications remain as the cell divides making them have a significant impact on the body's tissues and organs.

Why is this important?

Epigenetic aging is important because aging is a leading risk factor for multiple chronic diseases and disorders. Therefore, finding a way to slow the biological aging process is essential. If you reduce the incidence of aging by 7 years, you could cut the incidence of disease in half!

The study of epigenetics has been around for a while now, but there is not a lot of research on it. The more we come to understand the subject over time, we will be able to revolutionize preventive medicine. This will give people around the world a better chance to live longer, healthier lives.

What is TruAge™?

TruAge™ is a test made for doctors and patients to determine how well they are aging and what their aging rate says about their risk factors for many other diseases. It is an epigenetic test which measures the methylation status of 900,000 points in your DNA to determine your biological age and disease risk.



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How was the test created?

This test uses a powerful algorithm and computer learning software by analyzing almost a million data points from over 10,000 patients. By looking at how it has shown very tight correlations to chronological age and how the body methylates your DNA, TruDiagnostic™ is able to use their precise and reliable algorithm to predict one's biological age. With the constant development of statistical technology and acknowledgment of aging and disease, we are now able to estimate your biological age like never before.



How do you change and affect your epigenetic age?

Although aging is inevitable, there are steps you can take to support healthy living. It's important to understand how lifestyle components can impact your body and its aging process. Several factors that can influence your epigenetic age include toxins, stress, sleep, exercise, diet, alcohol consumption, level of education, and sexual and romantic relationships. Being aware of these factors will allow you to make the right choices to have a better quality life.

For example, assume you're 25 years old, you smoke, and you live a sedentary lifestyle. Your biological age is certainly older than your chronological age, because it is associated with a higher risk for certain diseases brought on by living such a lifestyle. By using this test to address our biological age, it enables us to create healthy changes that have the ability to increase our lifespan as well as our healthspan.

What medications have been shown to help reverse the epigenetic aging rate?

Dr. Fahy and his team ran a small (9 patients) human clinical trial known as the Thymus Regeneration Immunorestitution, and Insulin Mitigation (TRIIM). The purpose of the TRIIM trial was to investigate if the immune system of older people could be rejuvenated to make them biologically younger and work better, as previously shown in mice.

For one year, the 9 subjects took DHEA, metformin, and growth hormone, and on average, shed 2.5 years of their biological age. Based on an epigenetic age estimator, this is the first-ever and only report of an increase in human lifespan by means of aging interventions.

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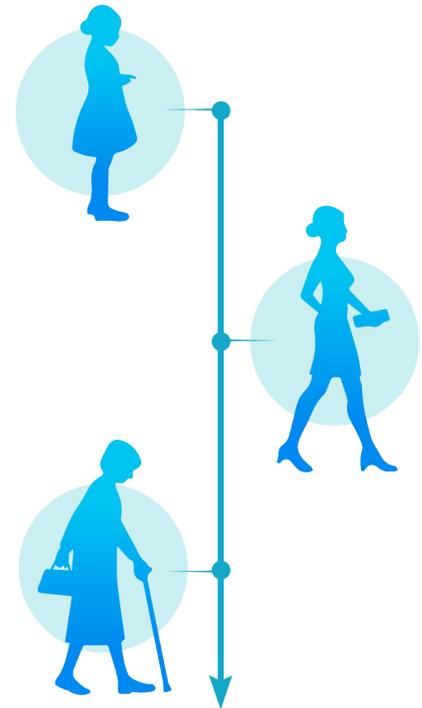
How does my epigenetic aging rate affect my risk for other diseases?

We already know that aging is associated with chronic disease development, however, it also increases epigenetic aging.

For each one-year increase in the difference between chronological and epigenetic age (the Δ age), there was a 6% increased risk of developing cancer within three years and a 17% increased risk of dying of cancer in the next five years. The fact that the DNAmAges were measured in blood and not in the cancer tissue itself makes these results intriguing. As the authors speculated, the actual link could be attributed to immune (blood) cells' role in tumor development via inflammatory mechanisms and pro-apoptotic processes both of which themselves may accelerate epigenetic aging.

An increased rate of aging bears a significant toll on your risk for disease. A 5% increase in methylation of identified CpGs was related to differences in coronary heart disease risk, which is able to cause a 65% increase in the risk of this disease.

Also, most stage zero cancer detection tools use epigenetics to detect cancers before they can be found elsewhere. This is called liquid biopsy and another tool of the epigenome.



What other testing will this evolve into?

Soon, TruDiagnostic™ will be offering a telomere estimation test which is more accurate than traditional telomere testing methods such as western blot. We also plan on adding a senescence burden and mortality test in the coming months. In the next few years, we plan on adding a best fitness and diet estimator test, Alzheimer's risk test, cardiovascular disease risk test, and cancer risk test.



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How is this different from genetic testing like 23andMe?

Genetics is the sequence of the DNA that you are born with and you die with. This means that our DNA sequencing is not influenceable, meaning you are stuck with it. But 60% of your DNA is controllable thanks to epigenetics.

Due to epigenetics, we are able to have control over the way our genes are expressed, due to certain influences we put on the body. Lifestyle changes, such as diet and exercise, are one way we can influence gene expression.

Other companies look at the genetic sequencing of an individual, which we have no control over. It is like knowing how a car engine works and finding out the motor stopped running but you aren't given the tools to fix it.

By addressing the modifiable parts of our DNA we are able to take control of things like disease risk and rate of aging, rather than

How do I take the test?

Purchase your TruAge™ kit at trudiagnostic.com/buy-now

How often can I take it?

We recommend taking the test every six months because your DNA methylation measurably changes within that time. By taking the test every half year you are able to notice if the treatments and lifestyle changes you have applied to your health have been effective in reducing your biological age.

Why do you use blood?

Unlike other tests that use saliva or urine, TruAge™ uses blood. While we know that saliva or urine is easier to collect, those methods don't have the scientific background supporting their use. As a result, we don't compromise results for easy collection. With our test, we can guarantee accurate and useful results from science.

Genetic Testing VS Epigenetic Testing

	23andMe and Similar Testing	TruAge™
Measures the Genetic Code	✓	
Reports Health Risks	✓	✓
Measurement of How Genes Are Expressed		✓
Able to Influence with Lifestyle Changes		✓
Unique Algorithms For Health Insights		✓
Measures a Value that You Can Improve Over Time		✓

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What other pieces of information can I get in the report beyond just my age?

In addition to your biological age, you will receive:

EpiAge™ Rate, the pace at which your body has aged for every year you've been alive. Science-backed lifestyle recommendations you can use to adopt healthier habits.

As patients become recurring users, they will be able to track their biological age via their patient portal. They will also have access to research, blogs, and lifestyle interventions that could help them adjust their biological age. Don't worry about interpreting the biological age and the EpiAge™ ratio. This will be interpreted for you depending on the difference of your patient's chronological age versus their biological age!

Additionally, we intend to introduce the new biomarkers of aging and systems-focused health and wellness reports as part of TruDiagnostic™ in 2020. We are constantly looking for new biomarkers to support the creation of future tests. TruDiagnostic™ partners receive first access to all of our up and coming tests, including Telomere Estimation, Senescence Burden Estimation, Alzheimer's Risk, Cardiovascular Disease Risk, Cancer Risk, Best Fitness and Diet Estimator.

If the algorithms only use less than 1000 spots on the DNA to calculate my age, why does TruAge™ test 900,000?

The field of epigenetic evaluation in clinical practice is just beginning. This is the first of many tests which will focus on methylation values and its effect on health. However, in order to interpret what the methylation markers mean, they have to be correlated to outcomes. This is done by looking at what types of people have what markers. When there is a very very precise connection, it can be turned into a diagnostic tool.

This means when new research publishes findings that correlate specific CpGs to certain diseases, risk for disease, and markers for aging, we are able to constantly update our database for our physicians and patients.

By utilizing such a large number of sites, we leave ourselves room to grow, so that our test is always on the cutting edge of biological age research. Because of our ability to evolve alongside the field of epigenetics, we are able to continuously add new information to our algorithm on a frequent basis.

Is epigenetic age connected to menopause?

One's age at menopause and epigenetic age share a common genetic signature indicating that aging and reproduction are intrinsically linked.

Reproductive senescence is a feature of all female mammals, but humans are unique because we experience exceptionally long post reproductive lifespans. By using the epigenetic clock we are able to indicate how menopause may accelerate the epigenetic aging process in blood.

Since we are able to have a lengthy period of life after menopause approaching the link between menopause and epigenetic age can help women successfully focus on their health and lifespan.