

Fitness

This report measures how physical fitness impacts biological age and accelerated biological aging, by examining associated methylation patterns at various locations of your DNA.

*Developed By TruDiagnostic's Bioinformatics & Research Department
© TruDiagnostic, 2023*

A NEW AGING ALGORITHM

How your physical fitness impacts age.

It is a visible and well-known fact that physical fitness declines as we age. This functionality and performance loss is well-correlated with health, and can be measured indirectly through reduced function in specific organs (such as the lungs), as well performance tests of strength.

The rate and extent of this decline varies between individuals, however, **those who maintain physical fitness as they age are at lower risk for a range of diseases**. These people also tend to live longer lives.

The use of DNA methylation (DNAm) has allowed for the development of fitness biomarkers, as well as biomarkers of age-related changes in physical fitness. Physiological data can be incorporated into algorithms in order to **predict aging-related morbidity, disability, and mortality** through DNAm biomarkers; indicating that individual differences in various fitness parameters can be reflected in DNAm data.

The incorporation of physical fitness measurements into epigenetic clocks **increases the measurable effects of lifestyle, medical, and environmental interventional changes** on the aging process. The DNAmFitAgeAccel algorithm, also simply known as FitAgeAcceleration, was developed by researchers at UCLA, and is an estimate of epigenetic age acceleration. We have created a version of this, however, we incorporated our OMICm Age algorithm (developed with Harvard) instead. We call this **OMICm FitAge**, which tells you how old you are according to your physical fitness and functionality.





VO2MAX

Maximal oxygen uptake, or VO2Max, is a measure of cardiovascular health and aerobic endurance. It measures **the volume of oxygen the body processes** during incremental exercise, in milliliters used in one minute of exercise per kilogram of body weight (mL/kg/min). DNAmVO2Max can be measured by blood to provide an epigenetic calculation of one's physical fitness. Highly fit individuals, as classified by VO2Max scores, are correlated with having a lower BMI and a higher GripMax (grip strength).

GRIPSTRENGTH

Maximum hand grip strength (GripMax) is a measurement of force (taken in kg), and is used to calculate the age-associated decline in terms of **muscle strength**. Evidence suggests that grip strength may be a predictor of all-cause and disease-specific mortality, future function, bone mineral density, fractures, cognition and depression, and problems associated with hospitalization.

FEV1

Forced Expiratory Volume, also known as FEV1, measures **lung function** by determining the amount of air that is forced from the lungs in one second. DNAmFEV1 is a strong predictor of mortality and comorbidities.

GAITSPEED

Gait speed, also known as **walking speed**, is measured in meters-per-second, and can fluctuate based on one's fitness level, the type of terrain, and how much effort is used. Muscle strength, especially in your lower body and hip flexors, also affects gait speed. Gait speed significantly and cumulatively decreases as your age increases, however, smaller declines are often associated with each year that age increases. This averages out to a difference of 1.2 minutes slower for every kilometer at age 60, than at age 20. Both men and women have a walking speed that stays fairly consistent until reaching their 60s, which is when it starts to decline considerably.



PROVIDED BY:  TruDiagnostic™
The Epigenetic Company

Your Results.

DISCLAIMER: All population graphs included in this report are based off of data from thousands of research participants and TruAge test takers. Population graphs are included to provide context to your results, with your individual scores being indicated by a neon green dot that is plotted amongst population trends.



Fitness Age

26.97

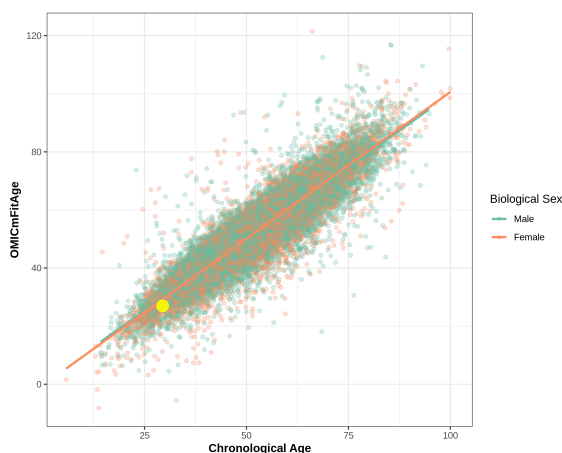
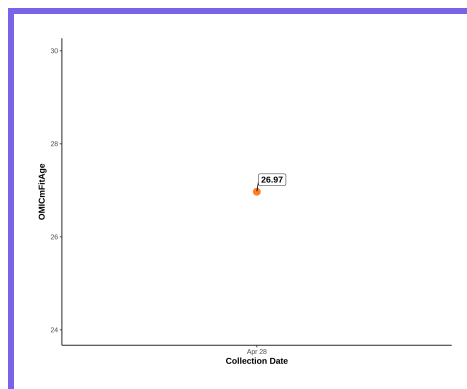
Calendar Age

29.44

Your OMICm FitAge is

LOWER THAN

your calendar age by 2.47 years.



For every one year older that your OMICm FitAge is over your calendar age, there is an average **0.29 decrease in relative grip strength** and a 0.32 increase in BMI. OMICm FitAge has estimated that highly-fit individuals (classified through VO2max) have a **1.5 to 2.0 younger biological age** compared to low/medium fit individuals in females and males, respectively.

Younger OMICm FitAge was associated with better memory test performance, emphasizing the **beneficial role of physical exercise on cognitive health**.

Diego Iruretagoyena | ID # 2A2HFZC

COLLECTED : 04/28/2024 | REPORTED : 05/22/2024



Your **Gait Speed** epigenetic biomarker proxy is higher than

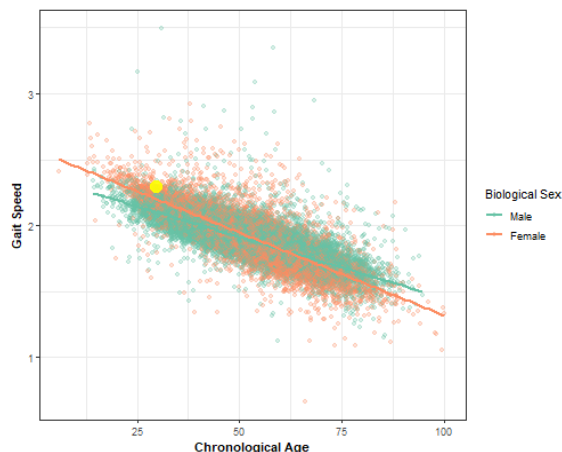
99.01%

of the population at your same calendar age and sex



Lower gait speed is associated with impairment of daily activities, physical inactivity, and cardiovascular disease.

Faster gait speeds indicate greater mobility-which helps to prevent disability, disease, and loss of autonomy.



Your Gait Speed epigenetic biomarker proxy score is 2.30.

Your **Grip Strength** epigenetic biomarker proxy is higher than

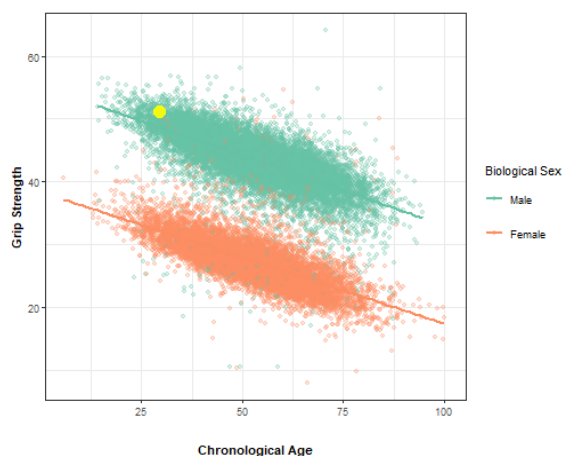
85.71%

of the population at your same calendar age and sex



Higher levels of Gripmax (DNA methylated Grip Strength) are associated with better verbal short-term memory; which is further associated with decelerated aging.

However, traditional grip strength measurements are correlated with overall strength, upper limb function, bone mineral density, fractures, falls, malnutrition, cognitive impairment, depression, sleep problems, diabetes, multimorbidity, and **quality of life**.



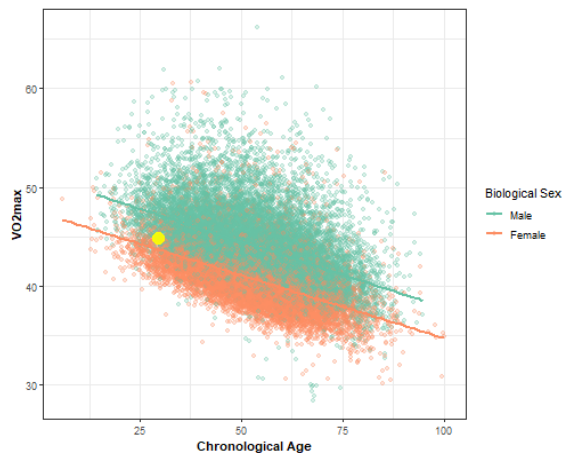
Your Grip Strength epigenetic biomarker proxy score is 51.12.



Your **VO2Max** epigenetic biomarker proxy is higher than

17.00%

of the population at your same calendar age and sex



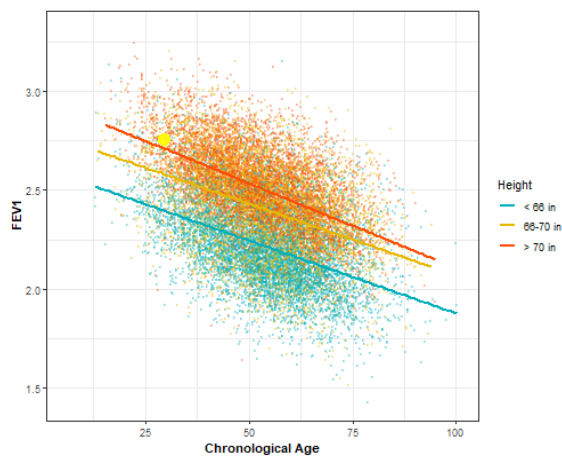
Your VO2Max epigenetic biomarker proxy score is 44.83



Your **FEV1** epigenetic biomarker proxy is higher than

63.52%

of the population with a similar reported age and height



Your FEV1 epigenetic biomarker proxy score is 2.76

Higher levels of VO2Max is associated with better, verbal short term memory. Highly fit individuals, as considered by VO2Max levels, are associated with younger OMICm FitAge and lower BMI.

FEV1 specifically measures lung function. Collectively, these parameters make-up spirometry testing, which is beneficial in diagnosing chronic obstructive pulmonary disease (COPD), asthma, restrictive lung disease, and other disorders that affect lung function. In addition, **VO2Max and FEV1 are predictive of mortality.**



Report references.

Bohannon RW. Grip Strength: An Indispensable Biomarker For Older Adults. *Clin Interv Aging*. 2019;14:1681-1691. Published 2019 Oct 1. doi:10.2147/CIA.S194543 Cirino, E. (2021, October 20). Spirometry: Procedure, "normal" values, and test results. Healthline. Retrieved December 22, 2022, from <https://www.healthline.com/health/spirometry>

Busch, T.d.A., Duarte, Y.A., Pires Nunes, D. et al. Factors associated with lower gait speed among the elderly living in a developing country: a cross-sectional population-based study. *BMC Geriatr* 15, 35 (2015). <https://doi.org/10.1186/s12877-015-0031-2>

Cronkleton, E. (2019, March 14). Average walking speed: Pace, and comparisons by age and sex. Health-line. Retrieved January 4, 2023, from <https://www.healthline.com/health/exercise-fitness/average-walking-speed#lifetime-walking-stats>

Jokai M, Torma F, McGreevy KM, et al. DNA methylation clock DNAmFitAge shows regular exercise is associated with slower aging and systemic adaptation. *medRxiv*. <https://www.medrxiv.org/content/10.1101/2022.07.22.22277842v1.full>. Published July 24, 2022. Accessed September 9, 2022.

McGreevy KM, Radak Z, Torma F, et al. DNAmFitAge: Biological age indicator incorporating physical fitness. *medRxiv*. <https://www.medrxiv.org/content/10.1101/2022.03.21.22272043v1.full>. Published March 22, 2022. Accessed September 9, 2022.

