TRUAGE BY TRUDIAGNOSTIC

SYMPHONYAge

SYSTEM METHYLATION PROXY OF HETEROGENOUS ORGAN YEARS

This report calculates disease-related risks by examining 11 major organ systems and their biological effects on one another.

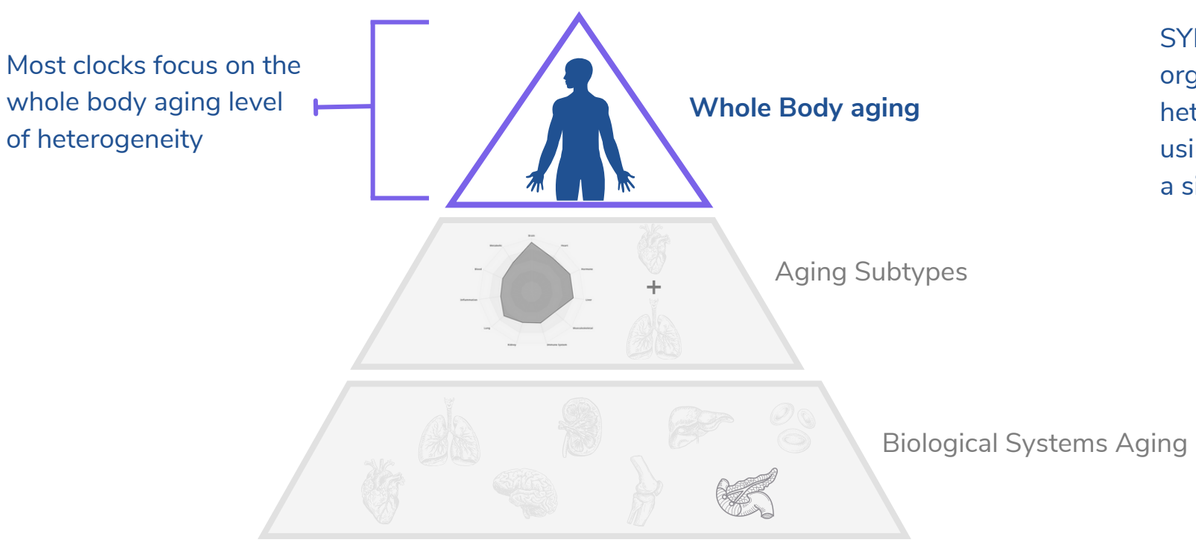
Developed By TruDiagnostic's Bioinformatics & Research Department - Original technology developed by Yale University

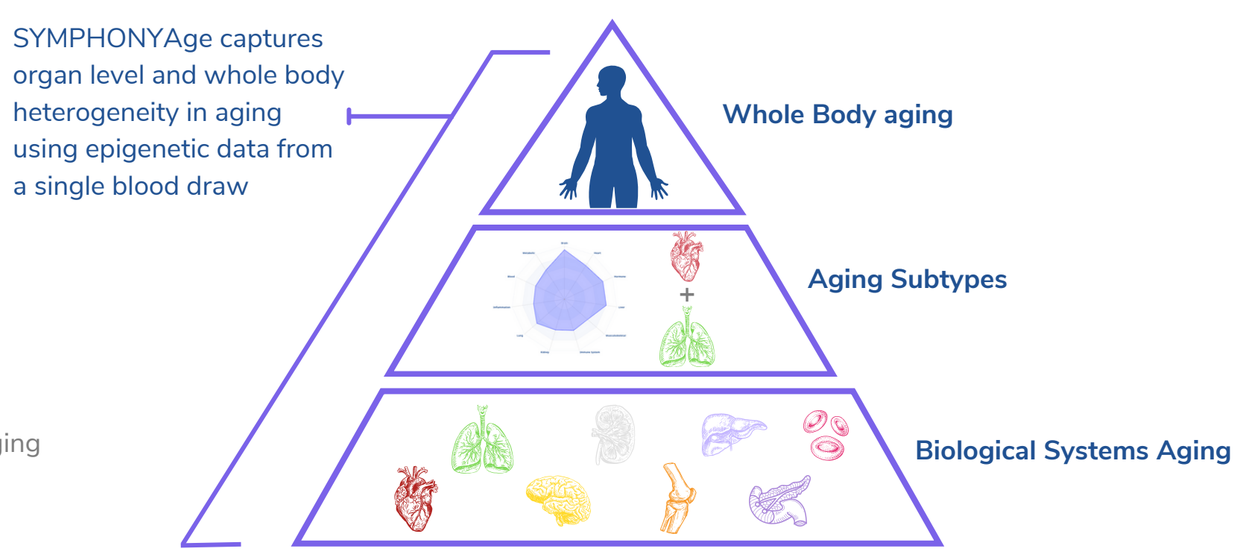
Everyone Ages Differently

By studying the science of aging, scientists have created special tools called epigenetic clocks that measure aging more accurately than just using your birthdate. These tools can tell how old your body really seems and how fast you're aging, because not everyone ages at the same rate.

However, knowing just one number for how old you are on the inside isn't enough. People live differently - some exercise a lot and keep their bodies younger, while others might keep their minds sharp but not eat well, which can make parts of their body age faster. And if someone smokes or drinks a lot, it can speed up aging in their lungs, heart, liver, or brain. So, treating everyone the same when it comes to aging doesn't make sense.

That is why SYMPHONYAge **(SYMPHONY: System Methylation Proxy of Heterogeneous Organ Years)** comes in. It's a new way of looking at aging by examining how different parts of the body age. Scientists at Yale used this method to study 11 different body parts and see how aging affects people differently (Sehgal, 2024). This big-picture approach helps understand aging better by putting all the pieces of the puzzle together.

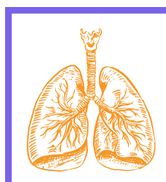




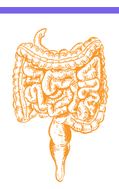
It's crucial to note that our body's systems don't age in isolation. Many age-related illnesses stem from issues in various biological systems working together. For instance, arthritis is the result of both musculoskeletal wear and inflammation, whereas stroke can happen due to problems in the cardiovascular system, metabolism, inflammation, and brain function. These interconnected patterns can lead to different aging types, making some people more prone to certain age-related diseases. Understanding these patterns helps in forecasting health outcomes.

CONSIDER TWO INDIVIDUALS THAT ARE 50 YEARS OLD...

Patient A is a smoker and has an unhealthy diet leading to high metabolic and lung age. Thus, the patient's risk for diseases such as lung cancer, COPD, and diabetes is increased due to advanced organ aging.

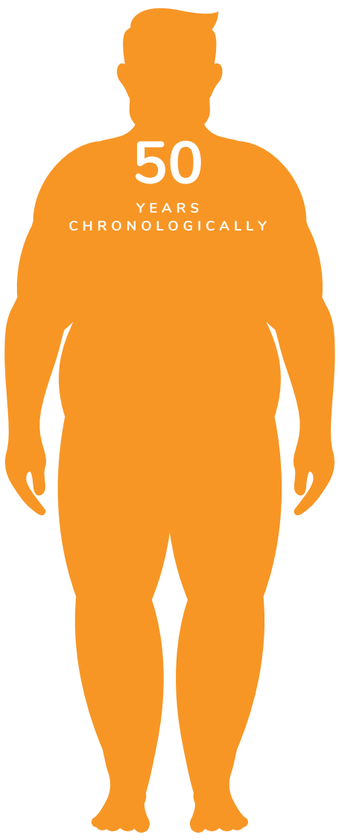


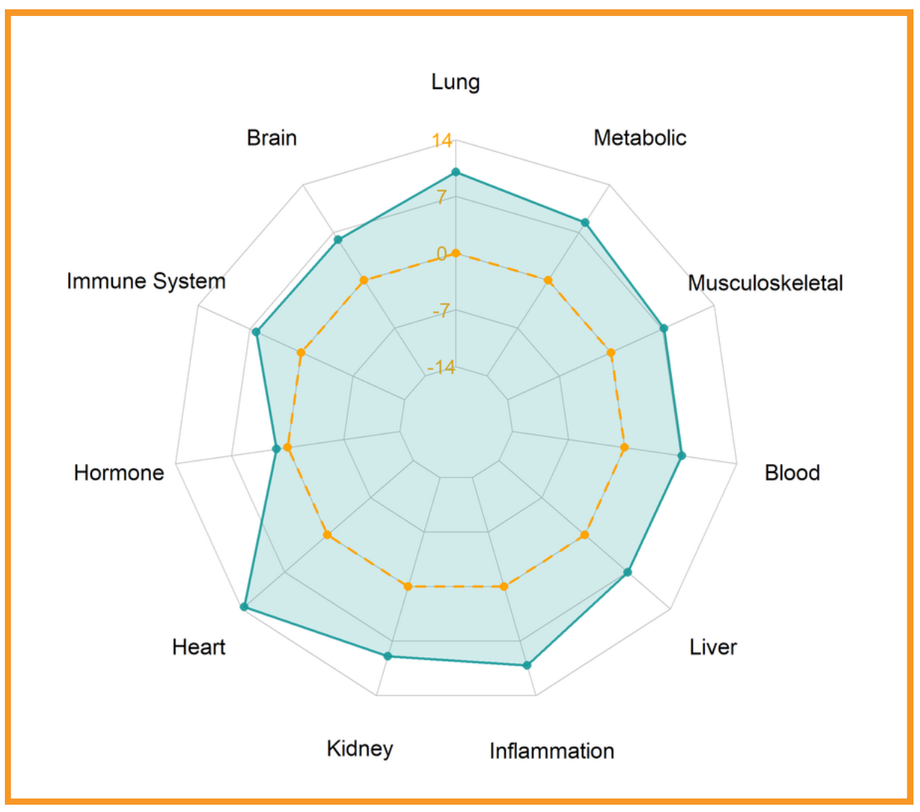
YOUR AGE
59
LUNG



YOUR AGE
57
METABOLIC

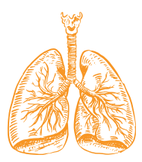
*With a **high** lung and metabolic score, Patient A's risk of lung and metabolic-related diseases are **higher** than people of the same chronological age.*



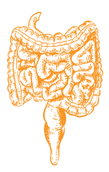


PATIENT A

Patient B has a healthy diet and exercises regularly. As a result, Patient B has decreased lung and metabolic age.

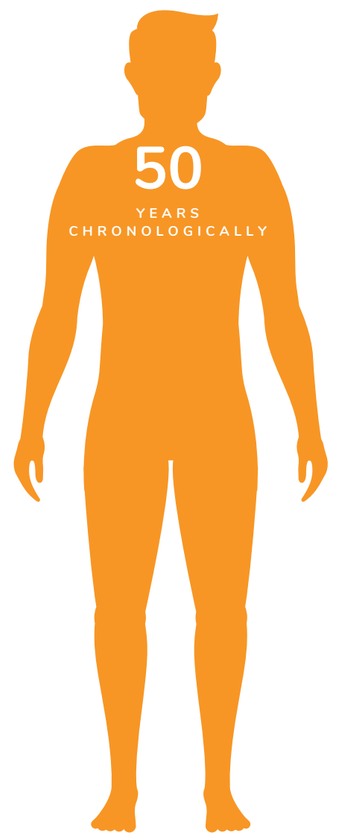


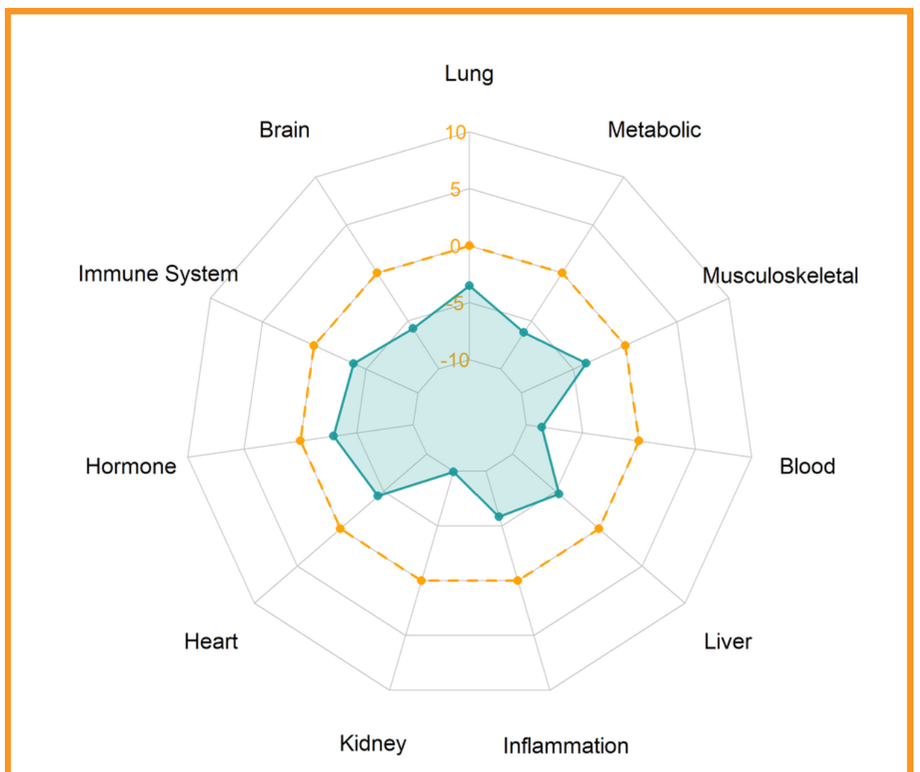
YOUR AGE
46
LUNG



YOUR AGE
45
METABOLIC

*With a **low** lung and metabolic score, Patient B's lung and metabolic related diseases are **lower** than people of the same chronological age.*





PATIENT B

What are the benefits of this approach?

Knowing the age of your organs can provide several advantages over knowing just your biological age. Some of these include:

A better understanding of disease risk: Knowing the age of individual organs can help identify which organs are aging faster and increasing the risk for developing age-related diseases associated with that organ system. Armed with this knowledge, targeted interventions can be developed to prevent or delay the onset of these diseases.

Precision medicine: Understanding the age of specific organs can help tailor medical treatments to an individual's needs. This can improve treatment outcomes and minimize side effects.

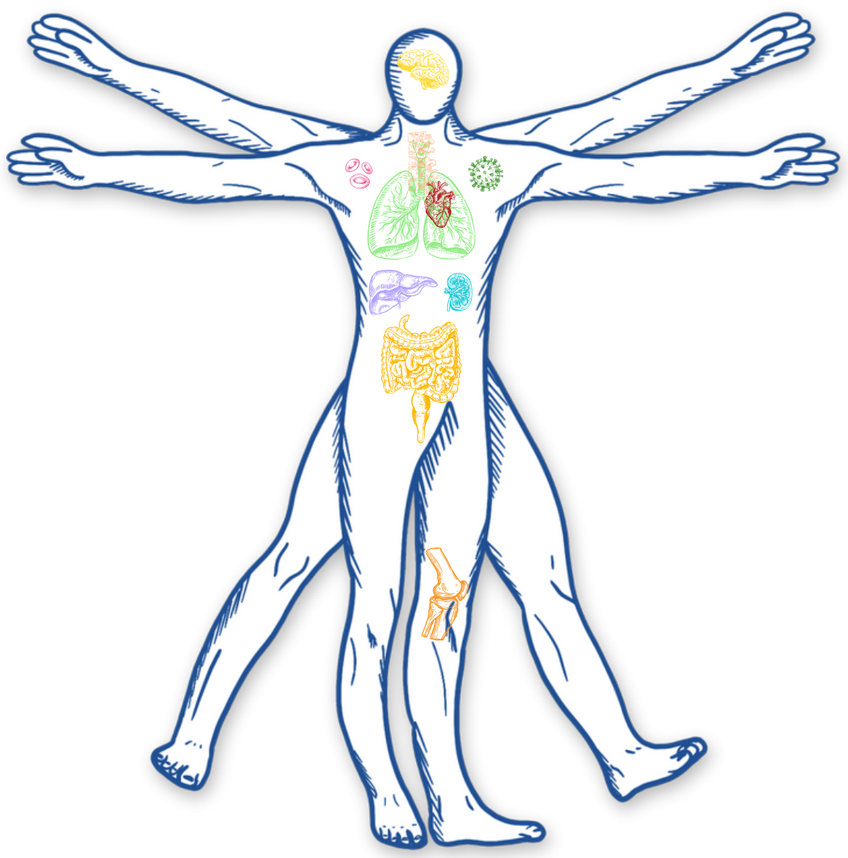
Earlier detection of disease: Changes in the age of specific organs could motivate an individual to more closely monitor and screen for diseases associated with that organ. Early detection of disease may be beneficial if found at a stage that is more treatable.

Improved health and lifestyle choices: Understanding the age of specific organs can help individuals make better lifestyle choices to improve organ health. For example, if a person's liver is aging faster than their chronological age, they may be motivated to adopt a healthier diet and lifestyle to improve liver function

How was this clock created and designed?

Most clocks have been trained by selecting relevant biological variables and putting them into a single score. For instance, PhenoAge used 9 blood-based biomarkers to create a score of aging. DunedinPACE used longitudinal analysis of 21 biomarkers.

SYMPHONYAge used a similar approach, splitting 130 biomarkers into 11 different organ systems.



Biological systems and biomarker mapping

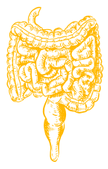
Common EBPs matched with particular organ systems

Immune System

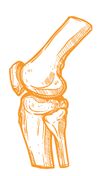
Musculoskeletal

Brain

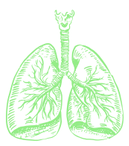
Kidney



Metabolic



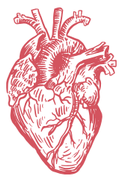
Inflammation



Lung

Liver

Blood



Heart

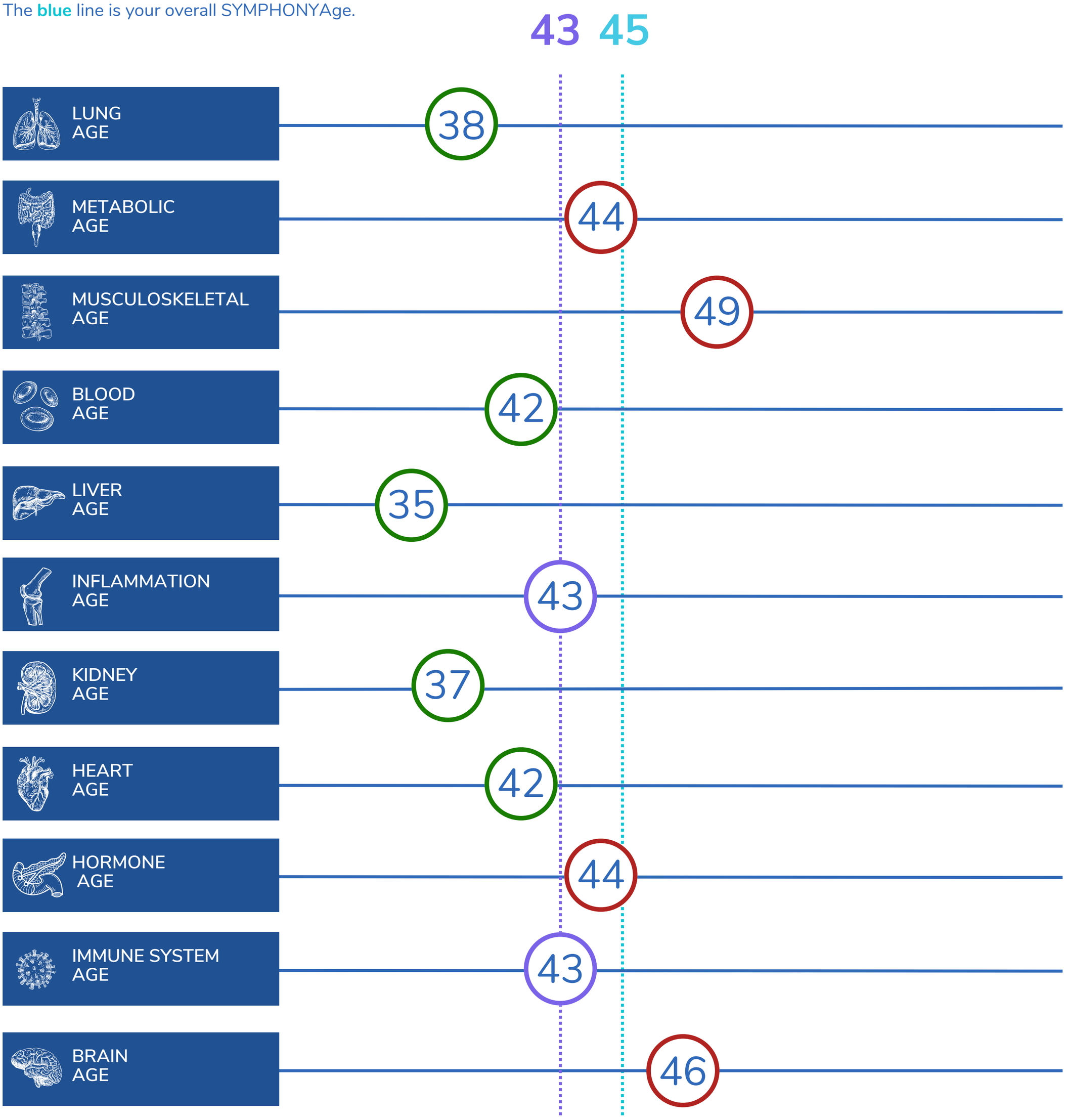
Hormone

Your Results.

The center bar serves as a baseline marker for your chronological age. Here you can see the difference between your organ ages versus your chronological age.

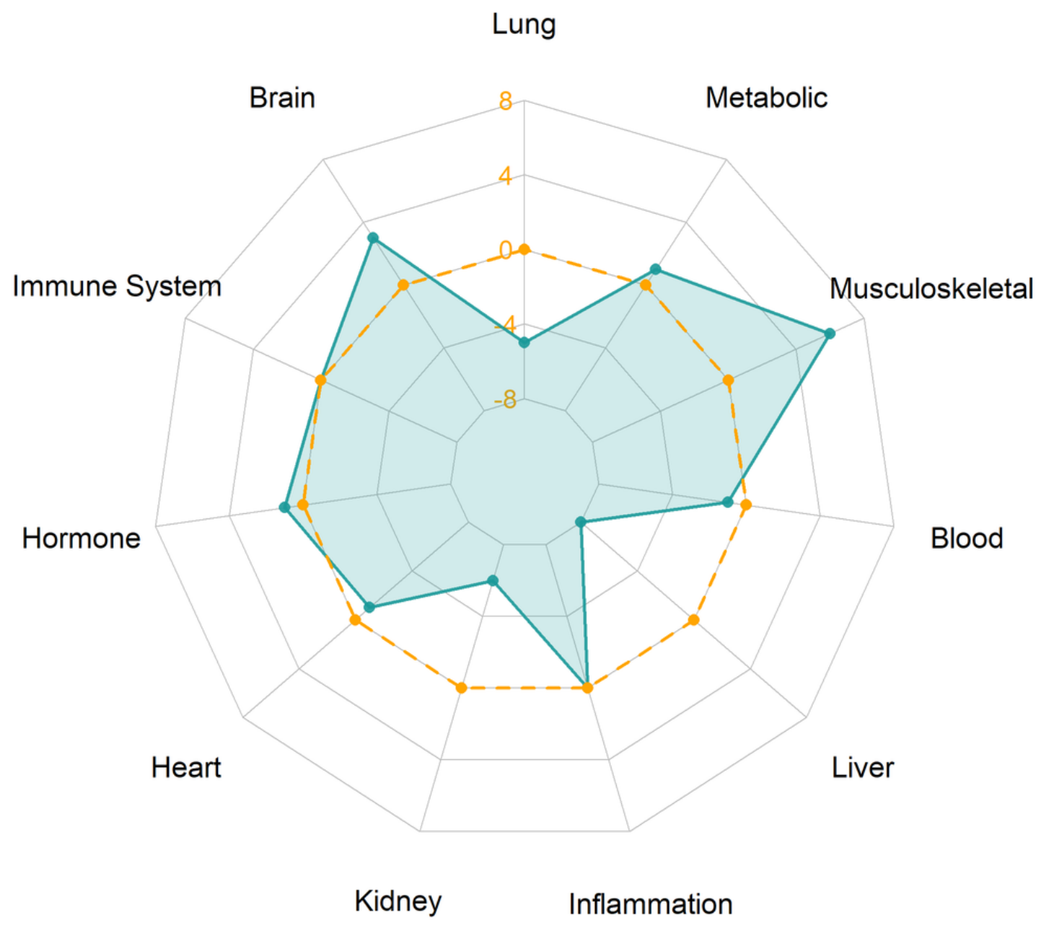
Green is less than your chronological age, **red** is more than your chronological age, and **purple** is equal to your chronological age. The **blue** line is your overall SYMPHONYAge.

CURRENT AGE	OVERALL SYMPHONYAge
43	45



SYSTEMS IMPACT

This is a radar graph containing all of the organ system scores together. Impact graphs are designed to illustrate the effects or consequences of various factors or actions within a system. In this case, the 11 organs. Here you can see the relationship between each organ and how they work and affect each other.



OVERALL SYMPHONYAge

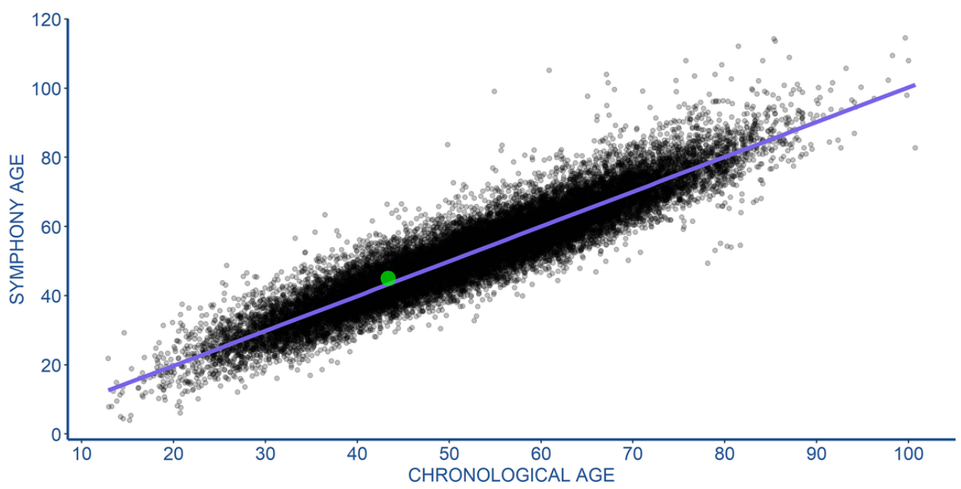
45

Taking into account all of your individual organ scores, this is what creates your overall SYMPHONYAge score.

Any value that sits inside the **orange circle** is decelerating or decreasing your overall SYMPHONYAge. Any value that sits outside the **orange circle** is accelerating or increasing your overall SYMPHONYAge.

POPULATION

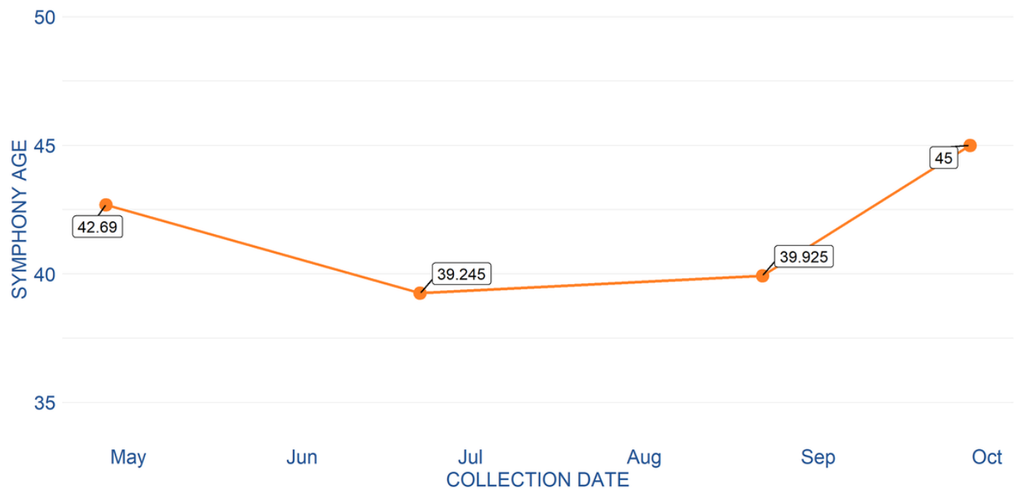
53rd Percentile



This is a population graph; each black dot represents a member of our cohort. The green dot is where you lie.

Your SYMPHONYage is higher than **53.74%** of the population at your same calendar age.

OVER TIME

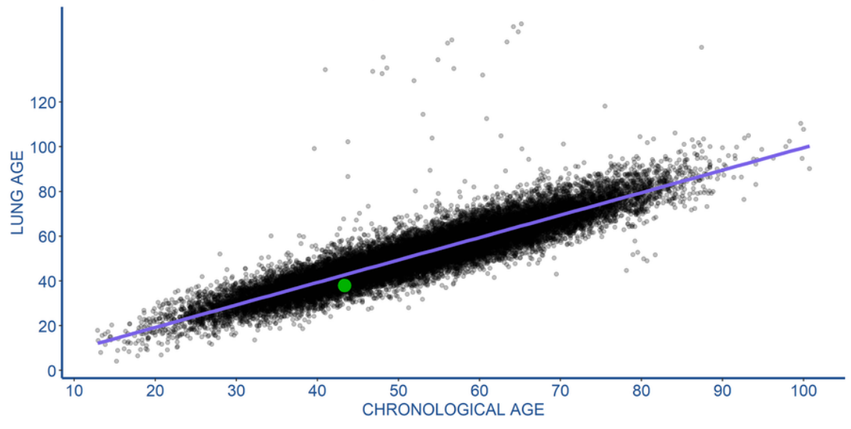


In this comprehensive timeline graph, each data point represents a distinct sample taken at various time points. The x-axis is the date(s) on which your sample was taken, and the y-axis is the result from that sample. With this, you can see your changes over time.

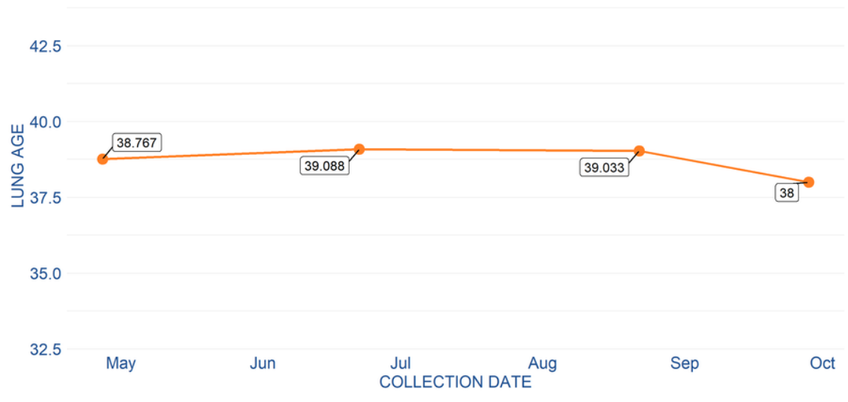
LUNG | 12th Percentile

Your **Lung Age** is higher than **12.85%** of the population at your same calendar age.

Population



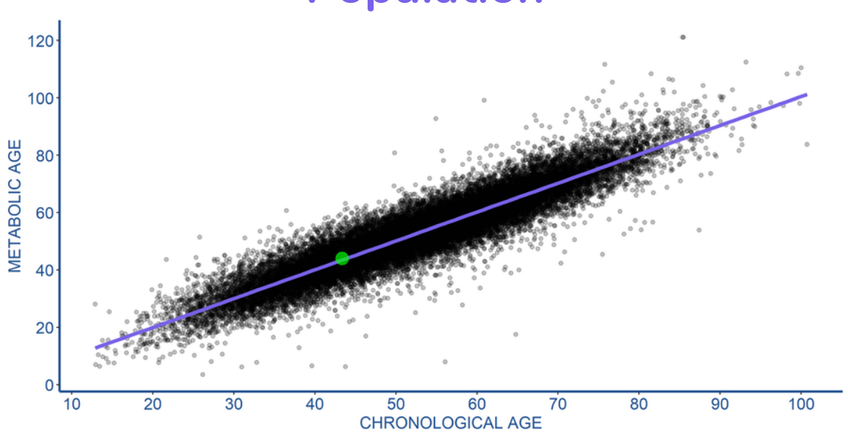
Changes Over Time



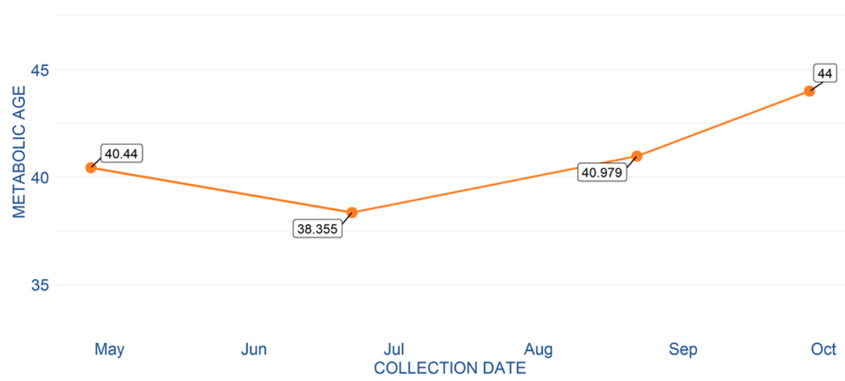
METABOLIC | 44th Percentile

Your **Metabolic Age** is higher than **44.1%** of the population at your same calendar age.

Population



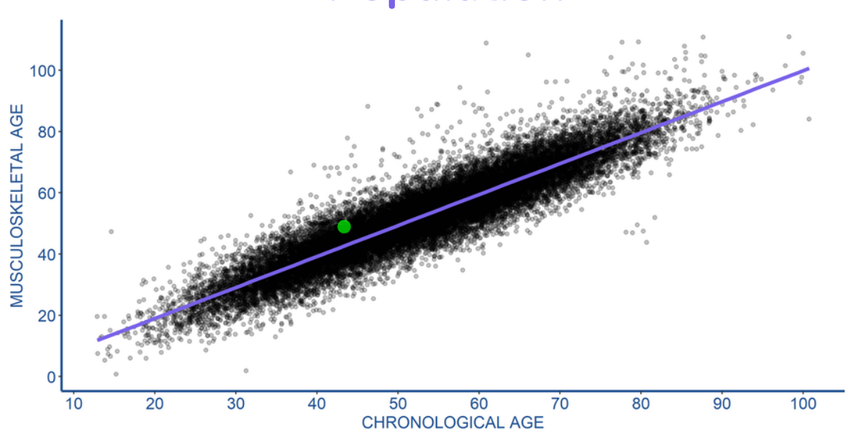
Changes Over Time



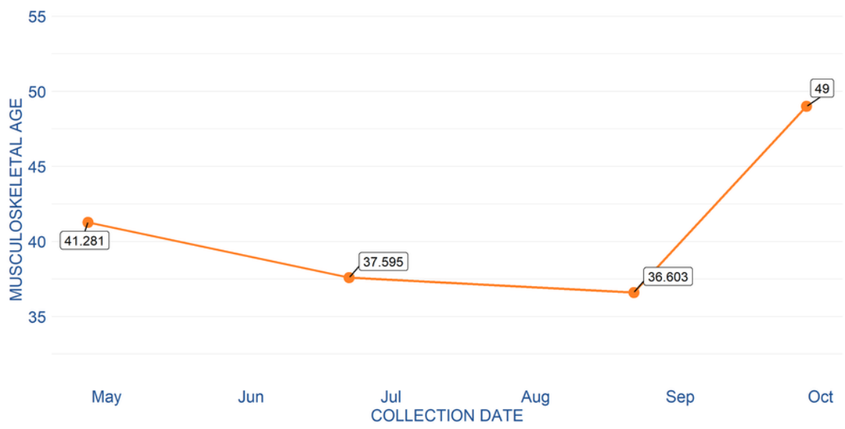
MUSCULOSKELETAL | 82nd Percentile

Your **Musculoskeletal Age** is higher than **82.26%** of the population at your same calendar age.

Population



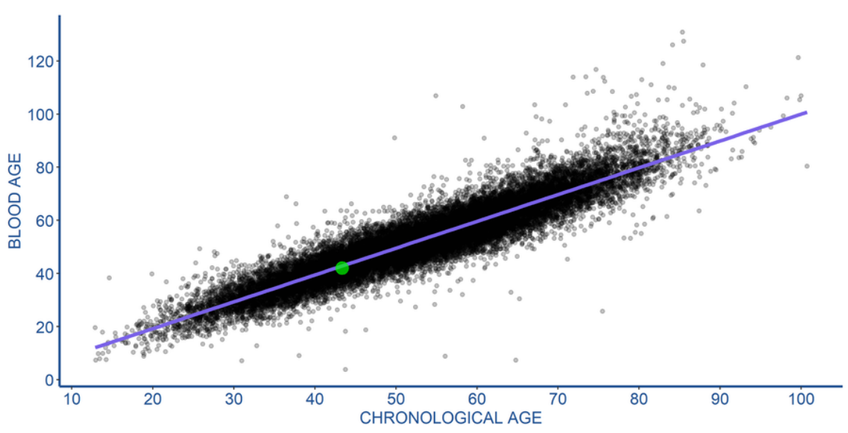
Changes Over Time



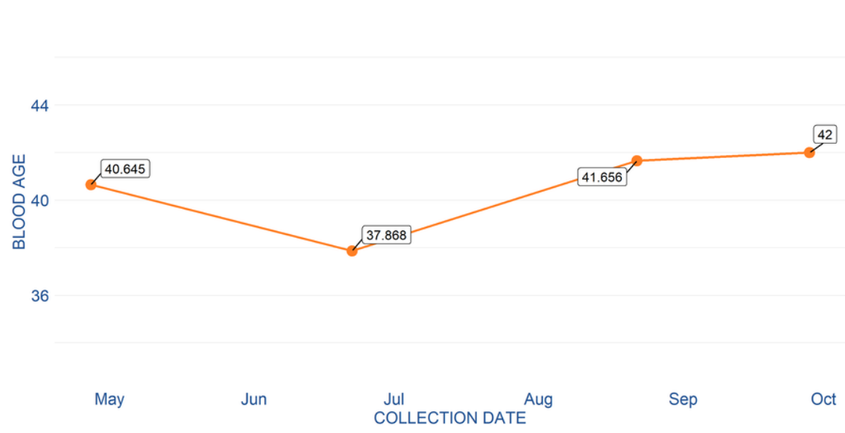
BLOOD | 33rd Percentile

Your **Blood Age** is higher **33.32%** of the population at your same calendar age.

Population



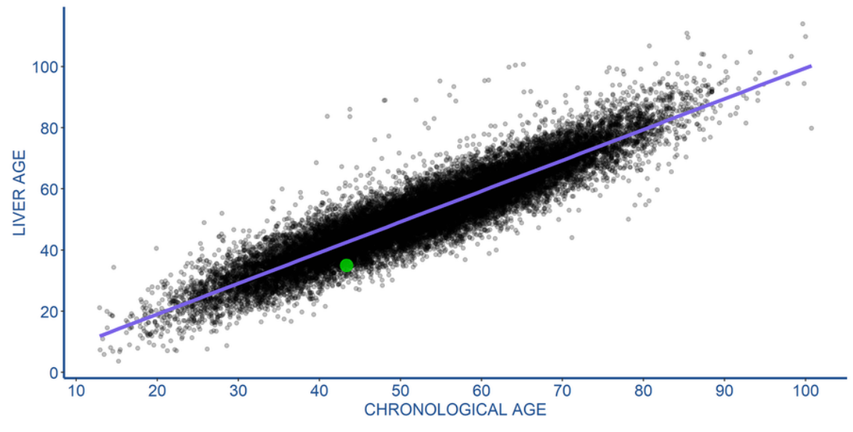
Changes Over Time



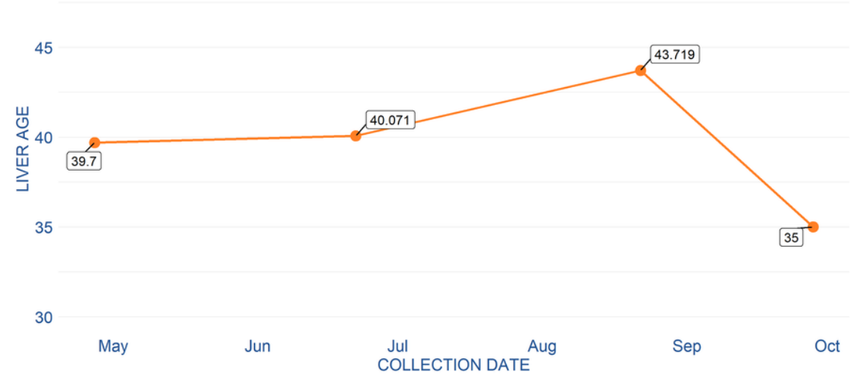
LIVER | 4th Percentile

Your **Liver Age** is higher than **4.62%** of the population at your same calendar age.

Population



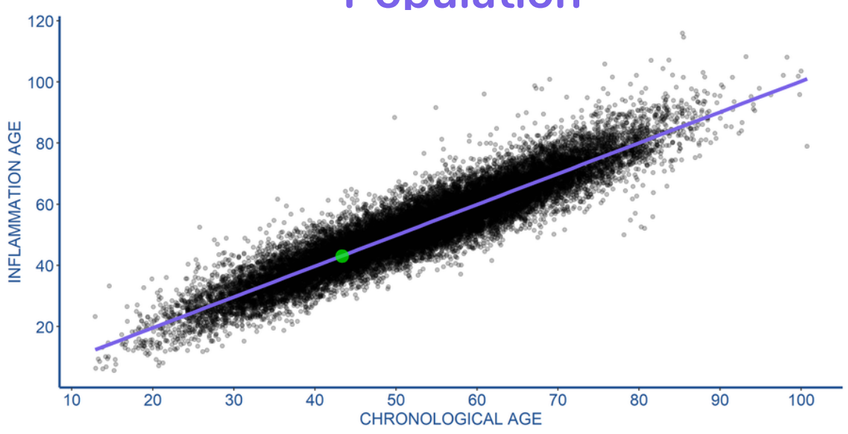
Changes Over Time



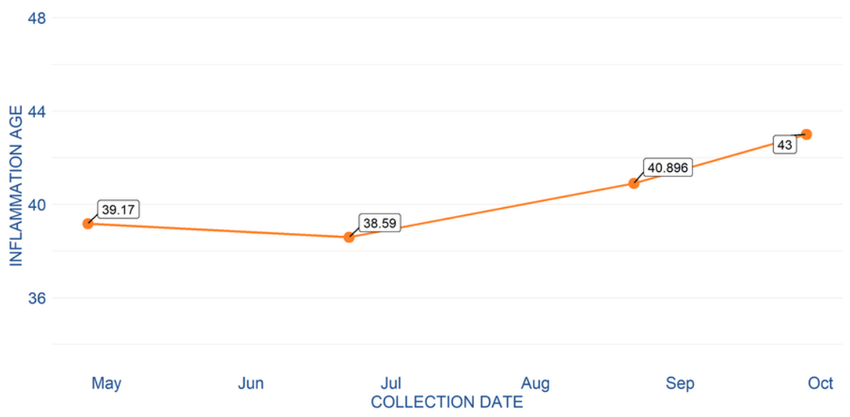
INFLAMMATION | 39th Percentile

Your **Inflammation Age** is higher than **39.22%** of the population at your same calendar age.

Population



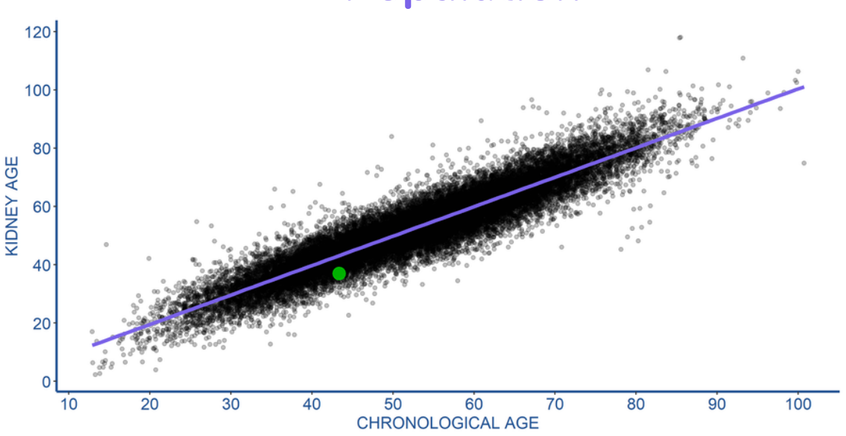
Changes Over Time



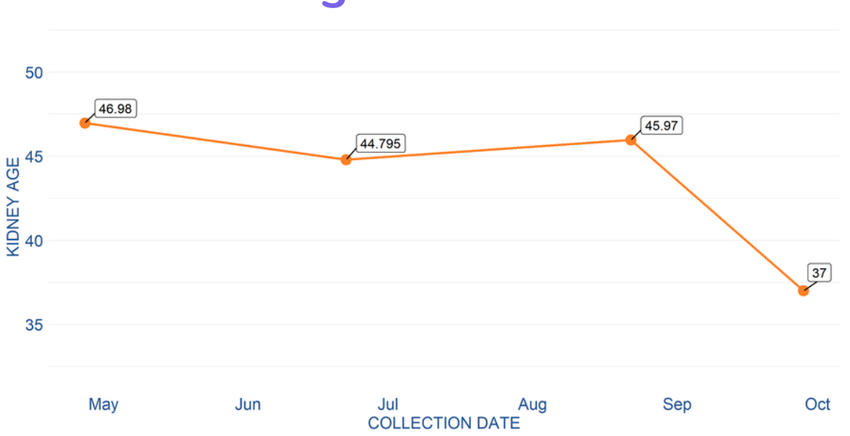
KIDNEY | 6th Percentile

Your **Kidney Age** is higher than **6.87%** of the population at your same calendar age.

Population



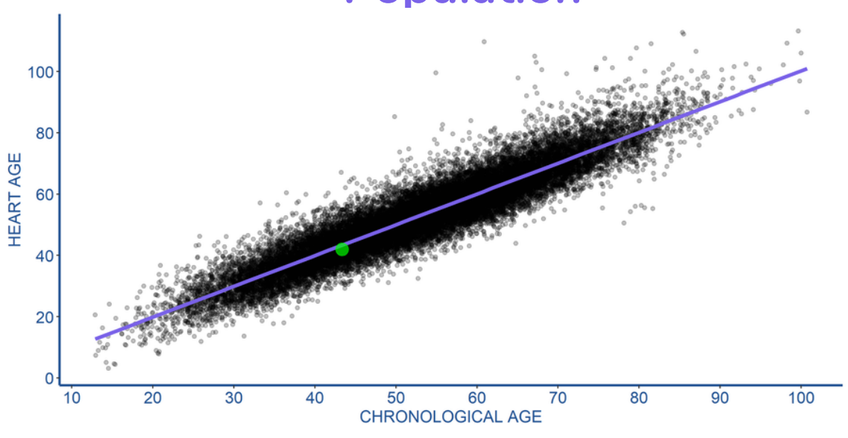
Changes Over Time



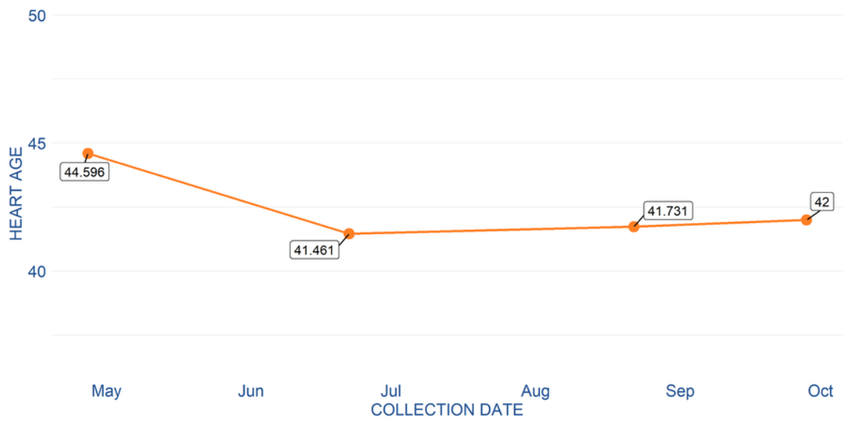
HEART | 30th Percentile

Your **Heart Age** is higher than **30.19%** of the population at your same calendar age.

Population



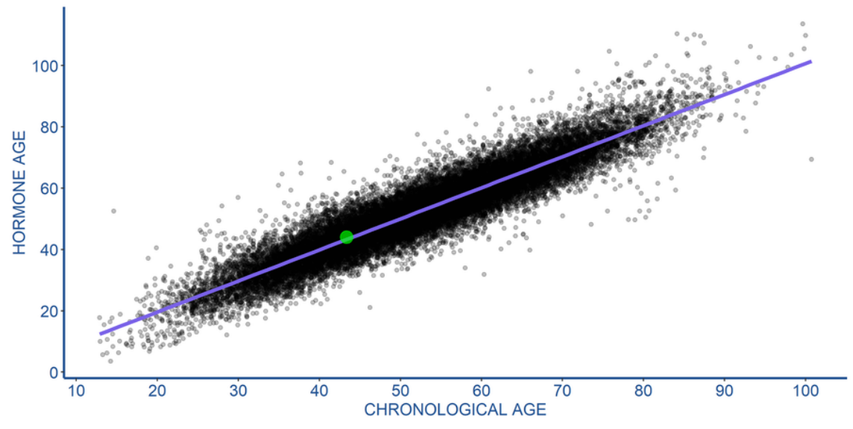
Changes Over Time



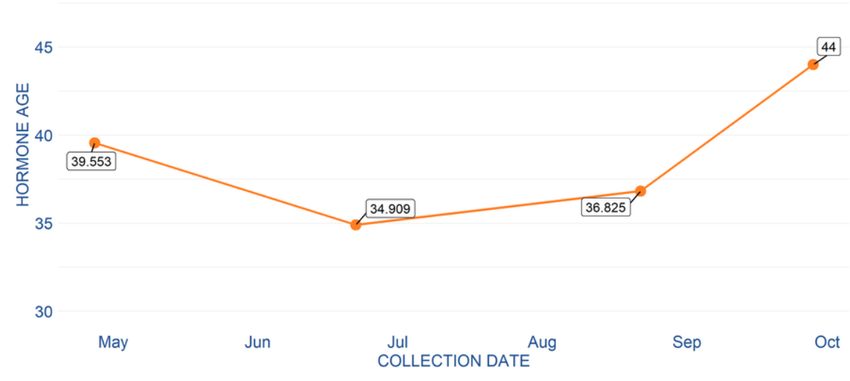
HORMONE I 44th Percentile

Your **Hormone Age** is higher than **44.23%** of the population at your same calendar age.

Population



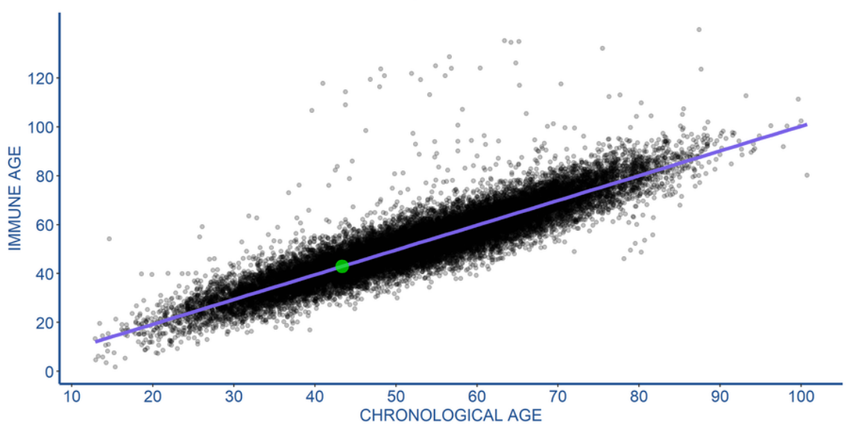
Changes Over Time



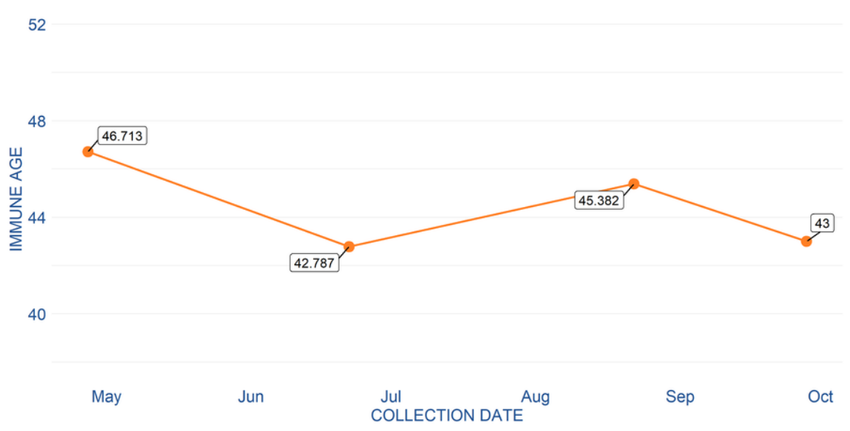
IMMUNE SYSTEM I 43rd Percentile

Your **Immune System Age** is higher than **43.09%** of the population at your same calendar age.

Population



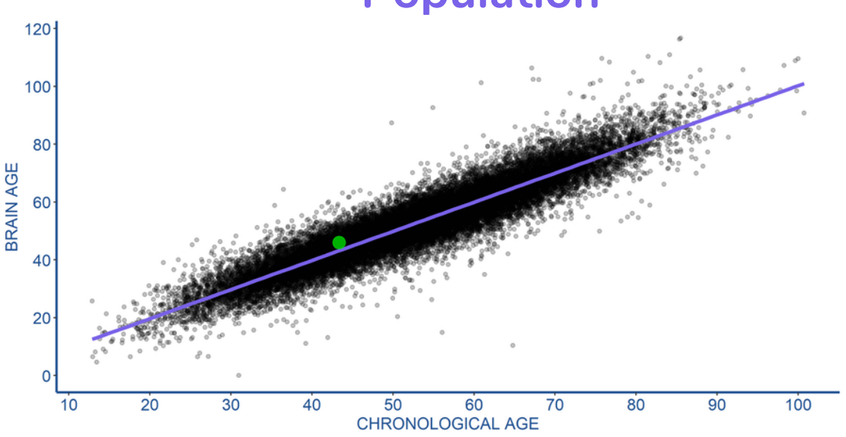
Changes Over Time



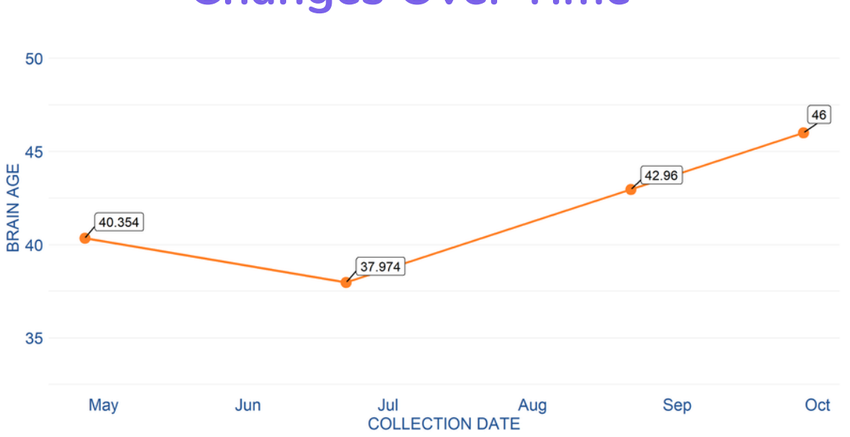
BRAIN I 63rd Percentile

Your **Brain Age** is higher than **63.51%** of the population at your same calendar age.

Population

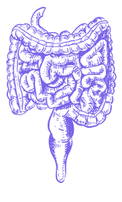


Changes Over Time



Systems Related Biomarkers and Diesease

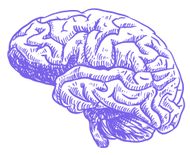
METABOLLIC



Biomarkers:
PCSmoking-packyears, Previous Diabetes, C-Reactive Protein, Glucose-Fasting, HDL-Cholesterol, LDL-Cholesterol, Triglycerides, Interleukin-6, BMI, Waist circumference

Disease:
Cognitive Function, Physical Function, Total Comorbidities, Diabetes, and Cataract

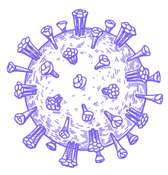
BRAIN



Biomarkers:
Homocysteine, BDNF (serum), Clusterin, Stroke, Total mental status summary score, Total cognition summary score, Immediate word recall, Delayed word recall, Total word recall summary score, Serial 7s

Disease:
Cognitive Function, Leukemia, and Cataract

IMMUNE SYSTEM



Biomarkers:
Eosinophil Count, Lymphocyte Count, Monocyte Count, Neutrophil Count, Percent Basophils, Percent Eosinophils, Percent Lymphocytes, Percent Monocytes, White Blood Cell Count, Myeloid Dendritic cells (DC-M) Percentage, Plasmacytoid, Dendritic Cells (DC-P) Percentage, NK Cells: CD56HI Percentage, NK Cells: CD56LO Percentage, CD16- Monocytes Percentage, CD16+ Monocytes Percentage, B Cells Percentage, CD8+ T Cells: Central Memory (CM) Percentage, CD4+ T Cells: Central Memory (CM) Percentage, CD8+ T Cells Percentage, CD8+ T Cells: (TemRA) Percentage, CD4+ T Cells: (TemRA) Percentage, CD4+ T Cells Percentage, IgD+ Memory B Cells Percentage, IgD- Memory B Cells Percentage, CD8+ T Cells: NaÔve Percentage, CD4+ T Cells: NaÔve Percentage, T Cells Percentage, Naive B Cells Percentage, CD8+ T Cells: Effector Memory (Tem) Percentage, CD4+ T Cells: Effector Memory (Tem) Percentage, Natural Killer (NK) Cells Percentage, Monocytes Percentage, Dendritic Cells Percentage

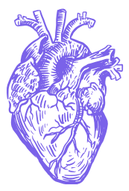
Disease:
Cognitive Function, Leukemia, Lung Cancer, and Coronary Heart Disease

HORMONE

Biomarkers:
IGF-1, DHEAS

Disease:
Thyroid Disease, Arthritis, Leukemia, and Breast Cancer

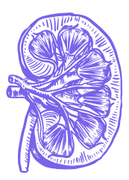
HEART



Biomarkers:
Shortness of breath while awake, PCcomponents of Grimage, Previous High Blood Pressure, Previous Heart Attack, Previous Stroke, Homocysteine, BMI

Disease:
Physical Function, Total Comorbidities, Lung Cancer, Coronary Heart Disease, Diabetes, Thyroid Disease, and Cataract

KIDNEY



Biomarkers:
Albumin, Urea Nitrogen, Chloride, Bicarbonate, Creatinine, Cystatin C, Potassium, Sodium

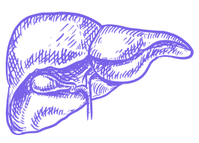
Disease:
Cognitive Function, Physical Function, Total Comorbidities, Leukemia, Diabetes, Arthritis, and Cataract

INFLAMMATION

Biomarkers:
Ferritin, C-Reactive Protein, Transforming Growth Factor Beta, Interleukin 10, Interleukin 1 Receptor Antagonist, Interleukin 6, Tumor Necrosis Factor Receptor 1

Disease:
Cognitive Function, Physical Function, Total Comorbidities, Coronary Heart Disease, Diabetes, Arthritis, and Cataract

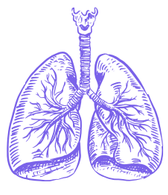
LIVER



Biomarkers:
Albumin, Alkaline Phosphatase, ALT, AST, Bilirubin, Total Protein

Disease:
Cognitive Function, Leukemia, and Cataract

LUNG



Biomarkers:
Peak expiratory flow, Bicarbonate, Chronic lung disease, Shortness of breath while awake, Persistent wheezing, cough, or bringing up phlegm, PCSmoking-packyears

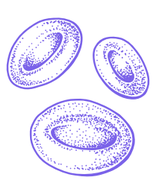
Disease:
Lung Cancer, Coronary Heart Disease, and Thyroid Disease

MUSCULOSKELETAL

Biomarkers:
Vitamin D3, Dehydroepiandrosterone sulphate, IGF-1, Arthritis, Height, Weight, BMI, some diff-mobility, hand grip strength maximum measurement, semi tandem balance test time, timed walk test time, hand grip strength-left hand hand grip strength-right hand, had back problems, some diff-stoop/kneel/crouch, diff-stoop/kneel/crouch, diff-walk one block, diff-walk sev blocks, some diff-walk one block, some diff-walk sev blocks, diff-climb sev flt stair, diff-climb one flt stair, some diff-clmb sev flt str, some diff-clmb 1 flt stair, diff-get up fr chair, some diff-get up fr chair, diff-reach/extnd arms up, some diff-rch/xtnd arms up, diff-lift/carry 10lbs, some diff-lift/carry 10lbs, side-by-side balance test time, full tandem balance test time, Sum of 7 different functional tests, Combination of all balance scores

Disease:
Physical Function, Total Comorbidities, Diabetes, and Arthritis

BLOOD



Biomarkers:
Ferritin, Hematocrit, Hemoglobin, Mean Corpuscular Hemoglobin, Mean Corpuscular Hemoglobin Conc, Mean Corpuscular Volume, Mean Platelet Volume, Platelet Distribution width, Platelet Count, Red Blood Cell Count, Red Cell Distribution, Width

Disease:
Leukemia and Cataract