


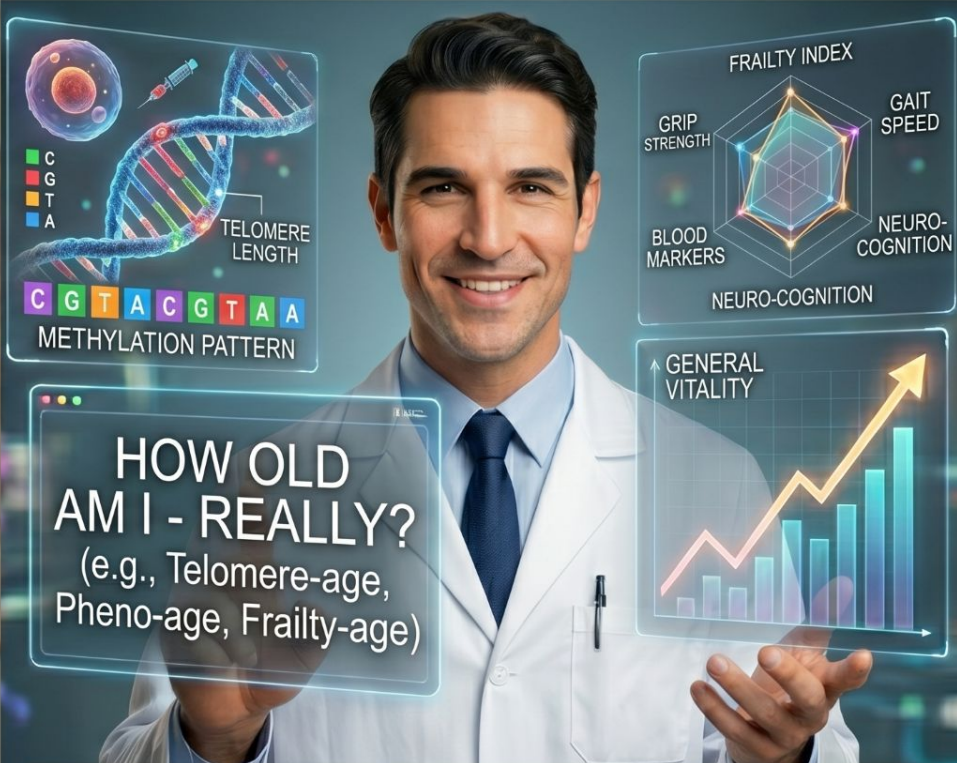
CHRONOLOGICAL AGE - THE YARDSTICK

BIOLOGICAL AGE - THE MANY YARDSTICKS



Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
21	22	23	24	25	26	27
28	29	30	31			

HOW OLD AM I - REALLY?
BASED ON CALENDAR DATE
A UNIFORM BUT LIMITED HORIZON



HOW OLD AM I - REALLY?
(e.g., Telomere-age, Pheno-age, Frailty-age)

DIVERSE BIOMARKERS PROVIDE MULTIPLE METRICS
FOCUSED ON FUNCTIONAL SOLUTIONS | ALL STUDIES USE DIFFERENT YARDSTICKS
CONFUSING, CONTRADICTIONARY RESULTS (THE TOWER OF BABEL PROBLEM)

The Molecular and Systemic Panel (Upstream Drivers)

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Focuses on cellular processes and biochemical signalling – (“The engine Room”)



Marker	Mechanistic Rationale	Clinical Context
GDF-15	Mitochondrial Dysfunction and integrated stress response	The “Check Engine Light:” signals somatic injury and mitochondrial stress
IGF-1	De-regulated m-Tor axis	Balance of Growth/Reproduction v Maintenance/Repair
DNA Methylation	Epigenetic Alterations	The Epigenetic Clock: Measures gene regulation entropy and the pace of ageing
IL-6	Cellular Senescence and SASP	Primary signal from ‘zombie’ cells that drives chronic inflammation
Hs CRP	Chronic Inflammation (“Inflammaging”)	Systemic liver response quantifying inflammatory load

Focuses on cellular processes and biochemical signalling – (“The engine Room”)



II. The Functional & Phenotypic Panel (Downstream Consequences)

Focuses on structural integrity and physical capacity ("The Chassis")

Marker	Mechanistic Rationale	Clinical Context
Hand Grip Strength	Loss of Proteostasis & Neuromuscular Integrity	Proxy for total body protein reserves and neural drive.
Muscle Strength	Sarcopenia & Stem Cell Exhaustion	Failure of satellite cell proliferation & mitochondrial energy.
Muscle Mass	Metabolic Reserve	Primary glucose "sink"; loss leads to insulin resistance.
Gait Speed	Integrative System Failure	The "6th Vital Sign"; measures neural/muscular coordination.
Timed-Up-and-Go	Dynamic Stability & Power	Reveals deficits in Type II muscle fibers (atrophy first).
Standing Balance	Neurodegeneration & Vestibular Decline	Readout of neural aging and proprioception speed.
Blood Pressure	Vascular Stiffness & Endothelial Dysfunction	Indicates loss of arterial elastin and collagen accumulation.
Cognitive Health	Neuroinflammation & Synaptic Plasticity	Signals integrity of the blood-brain barrier.
Frailty Index	Accumulation of Deficits	Model of systemic damage and loss of redundancy.

At-Home "Kit" Tests

Home markers requiring specific devices or mail-in collection kits.



Blood Pressure

Requires an automated upper-arm cuff (e.g., Omron). *Avoid wrist monitors; they are less accurate.*



Muscle Mass

Measured by a Smart Scale. *DEXA scans at clinics remain the gold standard.*



Hand Grip Strength

Requires a Digital Hand Dynamometer. Target: **Men >50kg, Women >30kg.**

DNA Methylation

Mail-in finger-prick kits from companies like *TruDiagnostic* or *Elysium Health*.



At-Home "Kit" Tests

These markers can be tested at home, but you'll need to buy a specific device or a mail-in collection kit.

- **Blood Pressure:** Requires an automated upper-arm cuff (e.g., Omron). *Avoid wrist monitors; they are less accurate.*
- **Hand Grip Strength:** Requires a **Digital Hand Dynamometer** (roughly \$30 online). Target for men is **>50kg**, women **>30kg**.
- **Muscle Mass:** Best measured by a **Smart Scale** (Bioelectrical Impedance), though a **DEXA scan** at a clinic is the gold standard for accuracy.
- **DNA Methylation (Epigenetic Clocks):** Companies like *TruDiagnostic* or *Elysium Health* send a finger-prick kit to your house. You mail it back for analysis.

