

# The Functional Rejuvenation Standard

Absurd Health Institute · Conceptual research essay · 362 words

## Abstract

Molecular target engagement, cellular activity, structural improvement and clinical benefit are different levels of evidence. This paper proposes a functional rejuvenation standard that requires claims to identify which level has actually changed. It prioritizes independent measures of organ performance, durability, patient experience and treatment harms.

## A younger marker is not a restored life

The language of rejuvenation is often applied to changes in DNA methylation, plasma proteins, inflammatory markers or cellular appearance. These are important research signals, but patients live through strength, mobility, cognition, organ reserve, independence and freedom from illness. We propose a *functional rejuvenation standard* that requires researchers to specify which form of aging has changed and whether benefits extend beyond the chosen marker.

## A layered evaluation

A credible result should separate target engagement, cellular performance, tissue architecture, organ function, clinical outcomes and durability. A treatment may improve one layer without reaching the next. An eye therapy that improves visual function can be valuable without proving whole-body age reversal. A senolytic that decreases inflammatory markers may not reduce falls or cardiovascular events. A new nerve fiber is not necessarily a functioning circuit. These distinctions protect both scientific inference and patient expectations.

## The challenge of measuring real improvement

Functional outcomes can be affected by training, placebo effects, concurrent treatments and regression toward the mean. Improved performance may not prove a particular biological mechanism. Durable assessment therefore requires appropriate comparison groups and long follow-up, and often condition-specific outcomes. For older adults, avoiding a hospitalization or retaining independence may matter more than moving an abstract age score by several years.

## What it would change

The standard should make clinical and website claims more precise: 'improved a methylation signature in cultured cells,' 'improved axon regrowth in mice,' and 'improved human mobility' are different statements. A technology can be promising at one stage without being dismissed for not yet meeting the last. What should end is the casual collapse of every stage into the word 'rejuvenated.'

## A clinical thought experiment

Suppose an intervention decreases a predicted biological age by several years but produces no consistent improvement in everyday activity, clinical disease or recovery after illness. That can be reported as a biomarker response, but not as demonstrated functional rejuvenation. If another intervention improves independence and healing without changing the clock, it has achieved an outcome of genuine value.

## What would discriminate among explanations

The standard should require pre-specified clinical outcomes and transparent follow-up. Different diseases justify different endpoints; there is no single functional test appropriate to all organs. Long-term safety can outweigh modest short-term gains. This evidence hierarchy lets early discoveries remain interesting without converting them into premature clinical advertising.

## Selected scientific readings

Oh HSH et al. (2025). Plasma proteomics links brain and immune system aging with healthspan and longevity. Nature Medicine.

<https://www.nature.com/articles/s41591-025-03798-1>

Lu Y et al. (2020). Reprogramming to recover youthful epigenetic information and restore vision. Nature.

<https://www.nature.com/articles/s41586-020-2975-4>

Pyrkov TV et al. (2021). Longitudinal analysis of blood markers reveals progressive loss of resilience and predicts human lifespan limit. Nature Communications.

<https://www.nature.com/articles/s41467-021-23014-1>

Evidence note: a proposed conceptual synthesis. These papers do not establish a novel clinical diagnosis, validated rejuvenation treatment or human lifespan benefit.