A Multivitamin Slowed Biological Aging (But Only for These People)

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A new Harvard study measured biological age at the DNA level. The results are specific and useful.

You may have seen the headlines: multivitamins slow biological aging. Most of the coverage got the headline right but the story wrong.

Yes, a daily multivitamin slowed biological aging in a rigorous, two-year randomized controlled trial out of Harvard. But the finding that actually changes what you should *do* with this information was buried three pages into the results: the effect was concentrated almost entirely in people whose biology was already aging faster than their calendar age. For people aging normally, there was essentially no effect.

That distinction matters. Here's what the data actually shows, and what it means for you.

Why This Study Is Worth Your Attention (Most Supplement Research Isn't)

Most supplement research is observational, meaning researchers track what people already take and look for patterns. Useful, but easy to get wrong. This one is a **randomized controlled trial**, the gold standard of clinical research, where participants are assigned to take a supplement or a placebo and neither they nor the researchers know who got what. That design eliminates most of the noise that makes supplement headlines so hard to trust.

The trial is called COSMOS (the COcoa Supplement and Multivitamin Outcomes Study) and it’s one of the largest prevention trials ever run, enrolling 21,442 adults. This epigenetic aging analysis drew on a subset of 958 participants (482 women, 476 men), mean age 70, tracked over two years with blood samples at baseline, year one, and year two.

Your Biological Age and Your Birthdate Are Not the Same Number

To understand what this study found, you need to know what it measured. The researchers used five different epigenetic clocks (tools that estimate biological age based on DNA methylation patterns, the chemical modifications to DNA that accumulate as we age). Unlike your birthdate, these clocks reflect how fast your body is actually aging at the cellular level, and what they show has been linked to real health outcomes (chronic disease risk, mortality) across large, long-term studies.

Not all five clocks are equal. The two that showed statistically significant effects from multivitamin use (PCGrimAge and PCPhenoAge) are second-generation clocks specifically trained to predict mortality risk. They’re the most clinically meaningful of the five tested. The three older, first-generation clocks showed no significant effect.

What the Multivitamin Actually Did

Compared to placebo, people taking a daily multivitamin (Centrum Silver) showed a real, measurable slowing of biological aging on those two clocks, a difference of roughly 2.7 to 5.1 months of deceleration over two years. The effect held up across multiple sensitivity analyses, which matters: it suggests this is a real signal, not statistical noise.

Cocoa extract, the other intervention tested in COSMOS, showed no significant effect

on any of the five clocks, despite demonstrating cardiovascular benefits in other COSMOS analyses. Lead researcher Howard Sesso, MD, of Harvard T.H. Chan School of Public Health, explained why that gap is actually informative: “The five epigenetic clocks tested may not be as mechanistically relevant for cocoa extract-specific benefits already seen for cardiovascular disease death, hypertension, and inflammaging. Epigenetic clocks based on specific organs, systems, or mechanisms may be more directly related to the randomized cocoa extract intervention. We plan to dig deeper.”

Translation: the clocks are powerful tools, but they don’t capture everything, and what they miss tells us something too.

The Plot Twist: It Depends on Where You’re Starting

Here’s what most of the coverage skipped. When the researchers looked at people by their biological age at baseline, the effect on PCGrimAge was dramatically stronger in people with *accelerated* biological aging, meaning their DNA methylation age was running older than their chronological age. For the normal-aging group, the effect was small and not statistically significant. A similar pattern held for PCPhenoAge and DunedinPACE, a third-generation clock that measures pace of aging.

When we asked Dr. Sesso about the importance of this distinction, he was measured, as good scientists tend to be: “It is an important distinction, but not the only one. It raises important questions about how we assess biological aging in a consistent way with clinical implications.” He added that further evaluation of the COSMOS data is needed, and that “we must better translate a 4-month slowing in biological aging for taking a multivitamin versus placebo over 2 years to outcomes we can understand.”

In other words: the clocks moved. We don’t yet know exactly what that movement means for your health over time. That’s not a reason to dismiss the finding, it’s a reason to keep looking closer.

The Nutritional Gap Theory: Why Some People Benefit and Others Don’t

The study offers a good explanation for why some people responded and others didn’t. In a subset of 166 people, lower levels of carotenoids, folate, and lutein were consistently associated with accelerated biological aging at baseline. And it was those same nutrients that improved most in accelerated agers who took the multivitamin.

This isn’t entirely surprising. A **2024 analysis published in *The Lancet Global Health*** estimated that more than 5 billion people globally don’t consume enough essential micronutrients from food. The COSMOS data adds texture to that number: nutritional gaps don’t just show up as deficiency symptoms. They may show up in how fast you’re aging at the cellular level.

What this study suggests is that a multivitamin functions less like a longevity tool and more like a nutritional safety net. If your diet is consistently varied and whole-food based, the evidence here doesn’t give you a strong signal. If it isn’t, or if stress, sleep disruption, restricted eating, or midlife metabolic shifts have eroded your nutritional status, filling those gaps may be where the biology actually changes.

What This Study Can’t Tell You (And Why That Honesty Matters)

A few things worth naming before you order a case of Centrum.

The multivitamin used was Centrum Silver, provided by Pfizer Consumer Healthcare. Study infrastructure was also supported by Mars Edge for the cocoa arm. The researchers note that funders had no role in trial design, data collection, or analysis, and the findings held across independent testing, but it's worth knowing.

The study population was 89% white with a mean age of 70. What that means for someone in their 40s or 50s is still an open question. And as Dr. Sesso noted, changes in epigenetic clocks don't automatically mean changes in clinical outcomes: "This clinical trial alone does not mean people should start taking them without considering the need in the background of a healthy lifestyle and/or favorable nutritional status."

So What Does the Lead Researcher Actually Recommend?

COSMOS and the earlier **Physicians' Health Study II** have already shown real clinical improvements (reduced cancer risk, slower cognitive decline, lower lung cancer incidence) with long-term multivitamin use in older adults. The epigenetic findings help explain *why* those benefits showed up.

Dr. Sesso's bottom line: "Those that take a simple, broad multivitamin should continue to do so. The COSMOS trial and the Physicians' Health Study II have already given us improvement in clinical outcomes with long-term multivitamin use in older adults; these epigenetic data provide suggestive mechanisms of effect."

He is not saying everyone should start. He is saying the people already taking one now have more reason to continue than they did before this study. That's a more useful sentence than anything in the headlines.

How to Know If This Applies to You

If your biological age is tracking close to your chronological age and your diet is

solid, the evidence here doesn't give you a strong reason to act. If you're not sure where you stand, here's how to start thinking about it.

Formal epigenetic clock testing is available commercially through companies like **TruDiagnostic** and **Elysium**, with costs ranging from $300 to $500 and results that vary by methodology. Not everyone needs to go there.

Biological age proxy tests: Closer-to-home signals worth paying attention to: chronic fatigue that sleep doesn't resolve, slower recovery from illness or injury, metabolic irregularities on standard bloodwork, or consistent nutritional gaps you can identify through honest diet tracking. None of these are a verdict. But they're the kind of signals that warrant a conversation with your doctor and possibly a closer look at whether your biology is running ahead of your calendar. Grip strength, gait speed, and VO2 max are among the most well-validated functional markers of biological age. Each has been independently associated with healthspan, mortality risk, and, in emerging research, epigenetic aging. And all three can be assessed at home: gait speed with a measured hallway and a timer, **grip strength** with an inexpensive dynamometer, and VO2 max through estimated protocols on most modern **fitness wearables**.

TL;DR: The Study Breakdown:

- **A Harvard RCT found a daily multivitamin modestly slowed biological aging,** but the effect was dramatic in people whose biology was aging faster than their chronological age, and nearly absent in those aging normally.

- **The epigenetic clocks that moved are the ones trained to predict mortality risk,** making this a more meaningful signal than typical supplement research, but clinical translation is still being established.

- **The likely mechanism is nutritional gaps, not the supplement itself.** Lower levels of carotenoids, folate, and lutein were tied to accelerated aging, and those are what improved most with the multivitamin.

- **The researcher's bottom line:** if you're already taking one, keep going. If you're not, address your diet and lifestyle first. A multivitamin is a safety net, not a strategy.

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