

RANDOMISED CONTROLLED PILOT TRIAL

Hydrogen-rich water and biomarkers of ageing

A six-month study in adults aged 70 and over, published in Experimental Gerontology (2021).

The research question

Could daily hydrogen-rich water influence selected molecular, brain-metabolism and physical-function markers associated with ageing?

Study at a glance

40 older adults

Twenty women and twenty men; mean age 76.0 years. Participants were aged 70 or older.

Six months

Parallel-group randomised controlled pilot trial registered as NCT04430803.

Hydrogen-rich water

0.5 litres daily, reported at 15 ppm dissolved hydrogen.

Control drink

0.5 litres daily with 0 ppm hydrogen.

What the researchers measured

The study assessed a broad set of outcomes: blood-based molecular markers, telomere length, DNA methylation, brain metabolites, cognition, physical function, body composition, resting blood pressure, facial skin features, sleep and health-related quality of life.

Important context

This was explicitly a pilot trial: it was designed to explore signals and inform larger research, not to prove that hydrogen water slows ageing or extends life.

RESULTS AFTER SIX MONTHS

Several promising signals - alongside many neutral outcomes

P = 0.049**TELOMERE LENGTH**

Interaction favoured HRW: 0.99 to 1.02 vs control 0.92 to 0.79.

P = 0.040**TET2 EXPRESSION**

Increase was greater with HRW than control.

P = 0.01**CHAIR-STAND TEST**

Lower-body functional performance improved more with HRW.

Other reported signals

Brain-metabolite measures

Compared with control, HRW increased selected choline, N-acetylaspartate (NAA) and creatine measures in specific brain regions ($P < 0.05$). These are surrogate metabolic measurements, not direct evidence of better cognition or prevention of neurodegenerative disease.

Overall DNA methylation

The direction favoured HRW, but the treatment-by-time interaction was not statistically significant ($P = 0.166$). A trend should not be presented as a confirmed effect.

No significant between-group differences

The researchers reported no significant differences for most other measured outcomes, including cognitive functioning, body composition, resting blood pressure, facial skin features, sleep outcomes and health-related quality of life.

What the results mean

This small trial identified biological and functional signals worth testing again. It did not demonstrate slower biological ageing as a whole, improved cognition, disease prevention or longer lifespan.

EVIDENCE IN CONTEXT

Why this study is interesting - but not definitive

Key limitations

- **Very small sample**
Only 40 people were randomised, so estimates are imprecise and vulnerable to chance findings.
- **Pilot design**
Pilot trials are exploratory and are not normally powered to establish broad clinical effectiveness.
- **Many outcomes tested**
Testing numerous biomarkers and endpoints increases the possibility that some statistically significant results occur by chance.
- **Surrogate markers**
Telomere length, TET2 expression and brain metabolites are research markers. Changes do not automatically translate into better health or longer life.
- **Short duration**
Six months cannot establish whether any differences persist or affect ageing, disability, disease or mortality over years.
- **Specific protocol**
The findings relate to 0.5 L/day at a reported 15 ppm in adults aged 70+. They cannot be assumed for other products, concentrations or populations.

Balanced conclusion

The study provides early human evidence that hydrogen-rich water may influence selected ageing-related biomarkers and chair-stand performance. Larger, preregistered and adequately powered trials are needed before claims about anti-ageing benefits can be made.

Original study

Zanini D, Todorovic N, Korovljev D, et al. The effects of 6-month hydrogen-rich water intake on molecular and phenotypic biomarkers of aging in older adults aged 70 years and over: A randomized controlled pilot trial. *Experimental Gerontology*. 2021;155:111574. DOI: 10.1016/j.exger.2021.111574.

[READ THE FULL STUDY](#)

PubMed PMID: 34601077 | Trial: NCT04430803

HEALTH NOTE

This educational summary is not medical advice. Hydrogen-rich water is not proven to slow ageing, extend lifespan or prevent disease, and it should not replace medical care, exercise, nutrition, sleep or other established healthy-ageing measures.