SCIENCE EXPLAINER / 02

What is Klotho therapy, and why does it matter?

A naturally occurring protein at the intersection of kidney biology, cognition and healthy-aging research.

Meet alpha-Klotho

Alpha-Klotho is a protein produced prominently in the kidneys. Its membrane-bound form helps regulate phosphate balance through FGF23 signaling; soluble forms circulate and participate in other biological pathways. Here, “Klotho” refers to alpha-Klotho. [1,2]

Native biology

The body makes Klotho as part of normal physiology.

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Therapy concept

Increase availability or support its production.

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Research goal

Test whether function and resilience improve.

What does “Klotho therapy” mean?

The term describes several investigational strategies: administering Klotho protein, delivering genetic instructions for Klotho production, using Klotho-expressing cells, or stimulating endogenous expression. These routes differ in dose, duration, tissue exposure and development requirements.

Why is it attracting attention?

Early mouse studies linked Klotho deficiency to aging-like abnormalities and found that overexpression extended lifespan. A later study found improved memory after low-dose Klotho administration in aged rhesus macaques. These findings motivate human research; they do not prove lifespan extension in people. [1-3]

Why the science matters

Kidney & mineral biology	Klotho connects kidney function and phosphate regulation. Local delivery is being studied for renal fibrosis. [1,5]
Brain & cognition	Memory improved in an aged-primate experiment. This is preclinical evidence, not proof of dementia treatment. [3]
Cellular resilience	Experimental work connects Klotho to FOXO signaling and resistance to oxidative stress. [4]

Lionheart’s development direction

Lionheart’s research includes bioelectric strategies and cell-based systems intended to increase Klotho exposure. Proposed platforms seek sustained or localized delivery and biomarker monitoring. These are different approaches to a shared biological target, not interchangeable therapies. [6]

The next questions

The important measures are functional benefit, appropriate exposure and durability - not simply a higher blood level. Dose matters: the primate study found benefit at low dose but not high dose. Human efficacy, optimal dosing and long-term effects require clinical evaluation. [3]

SELECTED SOURCES

1. Kuro-o et al. Mutation of the mouse klotho gene (Nature, 1997). [Read source]

2. Kurosu et al. Suppression of aging in mice (Science, 2005). [Read source]

3. Castner et al. Cognition in aged nonhuman primates (Nature Aging, 2023). [Read source]

4. Yamamoto et al. Regulation of oxidative stress (JBC, 2005). [Read source]

5. Sustained-release Klotho hydrogel and renal fibrosis (2024). [Read source]

6. Lionheart Health: proposed KlothoPatch II platform (2026). [Read source]