

Thymalin — Research Summary

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1. What It Is

Thymalin is a preparation of natural thymic polypeptides extracted from calf/cattle thymus tissue by mild acid extraction, developed by Khavinson and Morozov at the St. Petersburg Institute of Bioregulation and Gerontology. Unlike a single-molecule synthetic peptide, Thymalin is a mixture of multiple small polypeptides, including the isolated dipeptide component L-Glu-L-Trp (marketed separately as Thymogen).

Proposed mechanism (from the originating research group): promotes differentiation of T-lymphocyte precursors and maturation of hematopoietic stem cells toward mature T-cells, shifts CD4/CD8 balance and lymphocyte proliferation toward younger-appearing values in aged subjects, and is proposed to enter cells and modulate gene expression via binding to DNA and histones — this gene-expression hypothesis is the originating group's own theoretical model and is not independently established.

2. Reported Effects in Research Literature

Thymalin has the most human observational data of any Khavinson-group bioregulator peptide, but nearly all of it originates from the same research network.

- Long-term elderly cohort study: Khavinson & Morozov (2003, same 266-subject cohort referenced in a related 2002 paper) reported a 2.0-fold decrease in mortality over 6-year follow-up in elderly subjects treated with thymalin (often in combination with epithalamin) versus untreated controls — a widely cited but single-group, non-independently-replicated finding.
- Cell-based mechanistic study (2020): Thymalin increased the T-cell maturation marker CD28 approximately 6.8-fold in human hematopoietic stem cells in vitro.
- A separate line of Khavinson-group research examined thymalin/thymus-peptide components' influence on gene expression relevant to COVID-19 pathogenesis, and proposed thymus peptides (including thymalin) as a candidate adjunct therapy for COVID-19 based on their immunomodulatory properties — this is a proposal/review, not a completed clinical trial.
- Isolated active component: The dipeptide L-Glu-L-Trp was isolated from Thymalin by reversed-phase HPLC and developed as a separate pharmaceutical (Thymogen), suggesting the originating group itself treats the crude extract's activity as attributable to specific isolable peptides rather than the whole extract uniformly.
- Research limitation: The research paradigm ("bioregulatory peptide therapy") is an active field in Russian gerontology with limited penetration into international research circles. The core claims — that short peptides can restore organ function and extend lifespan — are not supported by evidence meeting international clinical-trial standards; the mortality and longevity claims rest on a single research network's dated elderly-cohort studies without independent Western replication.

3. Clinical & Preclinical Study References

Morozov VG, Khavinson VK. "Natural and synthetic thymic peptides as therapeutics for immune dysfunction." *Int J Immunopharmacol*. 1997. PMID: 9637345

Khavinson VKh, Morozov VG. "Peptides of pineal gland and thymus prolong human life." *Neuroendocrinol Lett*. 2003. PMID: 14523363

Khavinson VKh, Morozov VG. "[Geroprotective effect of thymalin and epithalamin]." *Adv Gerontol*. 2002. PMID: 12577695

Khavinson VKh, Linkova NS, et al. "Thymalin: Activation of Differentiation of Human Hematopoietic Stem Cells." *Bull Exp Biol Med*. 2020. PMID: 33237528

Khavinson VK, et al. "Results and Prospects of Using Activator of Hematopoietic Stem Cell Differentiation in Complex Therapy for Patients with COVID-19." *Stem Cell Rev Rep*. 2021. PMID: 33575961

Regulatory/Safety Note: Thymalin is not approved by the FDA for any indication and has not undergone international-standard clinical trials. Its evidence base is dominated by a single Russian research network with limited independent replication.

This compound has not been evaluated by the FDA and is not intended to diagnose, treat, cure, or prevent any disease in humans or animals.
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