

TB-500

Thymosin Beta-4 Fragment (Ac-LKKTETQ)

Physician Reference | Compounded Peptide Therapy

Overview

TB-500 is a synthetic peptide corresponding to the active region of Thymosin Beta-4 (TB4), a naturally occurring protein present at high concentrations in platelets, wound fluid, and regenerating tissues throughout the body. The specific fragment (amino acids 17-23, sequence Ac-LKKTETQ) contains the actin-binding domain responsible for TB4's principal biological activity.

Unlike BPC-157, which exerts primarily localized effects at the site of administration, TB-500 is understood to act systemically via circulation, making it relevant for recovery protocols that require broad musculoskeletal and vascular support. It is administered through licensed compounding pharmacies under physician supervision.

Classification	Synthetic heptapeptide (7 amino acids); Thymosin Beta-4 fragment
Sequence	Ac-LKKTETQ (amino acids 17-23 of Thymosin Beta-4)
Natural source protein	Thymosin Beta-4; found in spleen, thymus, lung, platelets, and wound fluid
Primary mechanism	Actin-binding domain activation; promotes cell migration, differentiation, and vascular support
Distribution	Systemic via circulation
Administration routes	Subcutaneous injection (primary); intranasal formulations under investigation
Compounding status	Available through licensed 503A compounding pharmacies under physician order

Mechanism of Action

TB-500's core mechanism centers on the actin-binding domain within the Ac-LKKTETQ sequence. Actin dynamics are fundamental to cellular movement, tissue repair, and vascular remodeling. Key downstream effects include:

- Cell migration promotion** Enables mobilization of endothelial cells, keratinocytes, and stem cells to injury sites
- Stem cell maturation support** Facilitates differentiation of progenitor cells involved in tissue regeneration
- Angiogenesis and vascular remodeling** Supports new blood vessel formation and capillary growth in healing tissue
- Anti-inflammatory modulation** Reduces pro-inflammatory cytokine expression in injured and recovering tissue
- Muscle fiber repair** Demonstrated activity in cardiac and skeletal muscle repair models

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- **Flexibility and connective tissue support** Preclinical evidence suggests improvement in connective tissue remodeling

Because TB-500 circulates systemically rather than remaining localized, its effects can extend across multiple tissue compartments simultaneously, distinguishing it from site-specific peptide interventions.

Clinical Applications and Preclinical Evidence

Research on TB-500 and its parent molecule Thymosin Beta-4 includes cell studies, animal models, and tissue-specific investigations. The following areas have demonstrated preclinical evidence:

- **Wound healing** Accelerated closure and tissue regeneration in dermal wound models
- **Cardiac muscle repair** Thymosin Beta-4 administration following induced myocardial injury improved functional outcomes in animal models
- **Skeletal muscle recovery** Reduced repair time and improved contractile function following muscle injury
- **Hair follicle growth** Thymosin Beta-4 fragment activity observed in follicular regeneration models
- **Nerve tissue support** Preliminary evidence for neuroprotective effects via cell migration and anti-inflammatory pathways
- **Systemic inflammation reduction** Relevant for patients with multi-site or diffuse inflammatory burden

TB-500 vs BPC-157: Mechanism Comparison

Understanding the distinction between TB-500 and BPC-157 is important for appropriate protocol design. These peptides are complementary rather than interchangeable:

TB-500 (Systemic)	BPC-157 (Localized)
Systemically distributed via circulation	Acts at or near site of administration
Actin-binding; promotes cell migration	VEGFR2 activation; angiogenesis
Supports broad muscle recovery and flexibility	Targeted tendon, ligament, and joint repair
Reduces systemic and vascular inflammation	Reduces local inflammatory cytokines
Thymosin Beta-4 fragment origin	Gastric juice peptide origin

For patients requiring both localized tissue repair and systemic recovery support, combining these agents is an increasingly discussed approach in regenerative medicine contexts. See the Giovane Medical Stacked Protocol Overview for the combination framework.

Patient Candidate Profile

TB-500 may be appropriate for physician consideration in the following patient profiles:

- Athletes and active adults with multi-site musculoskeletal injury or diffuse recovery needs
- Patients with systemic inflammatory conditions affecting recovery trajectory
- Post-orthopedic procedure patients where vascular support and broad tissue repair are goals
- Individuals with poor circulation or impaired angiogenesis as a component of slow healing
- Patients whose recovery plans would benefit from systemic complement to localized interventions (e.g., alongside BPC-157)

TB-500 is not a replacement for surgery, physical therapy, or standard-of-care treatment. It is intended as an adjunct within a physician-supervised, structured recovery protocol.

Safety Considerations

TB-500 shares the general preclinical safety profile seen with Thymosin Beta-4 fragments. Relevant considerations for physician review:

- No acute toxicity identified in animal studies across a range of doses and durations
- Theoretical consideration As with any peptide that broadly promotes cell growth and migration, theoretical oncological risk cannot be excluded in the absence of long-term human data; this should be factored into risk-benefit assessment for patients with oncologic history
- No large-scale controlled human clinical trial data available
- Compounded formulation quality Purity, potency, and sterility are dependent on the compounding pharmacy; physician should verify USP compliance of sourcing pharmacy

Physician judgment regarding risk-benefit is essential. As with all compounded peptide therapies, informed consent documentation is recommended.

Regulatory Context

FDA status	Not an FDA-approved drug; no indication on file; available through 503A compounding under physician prescription
Scheduled status	Not a DEA scheduled substance
Research status	Active area of preclinical and translational research; human trial data limited
Sourcing guidance	Unregulated consumer products (sold as supplements or research chemicals) carry quality and safety risks; physician-ordered compounded formulations are the appropriate pathway

For prescribing or physician partnership programs, contact the Giovane Medical clinical team.

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