

## HEALING / REPAIR

# TB500

*Thymosin Beta-4; Tβ4; actin-sequestering peptide*

<b>CAS Number</b>	59879-69-3
<b>Molecular Formula</b>	C <sub>211</sub> H <sub>334</sub> N <sub>56</sub> O <sub>64</sub>
<b>Molecular Weight</b>	4963 Da
<b>Sequence / Structure</b>	Asp-Glu-Met-Pro-Thr-Glu-Glu-Lys-Pro-Val-Glu-Lys-Pro-Ile-Glu-Asp-Lys-Ala-Lys-Ser-Lys-Glu-Glu-Asp-Leu-Thr-Lys-Asp-Asp-Ser-Glu-Asp-Asp-Ile-Ala-Glu-Leu-Asp-Glu-Asp
<b>Category</b>	Healing / Repair
<b>Available Specifications</b>	5 mg vial, 5 mg pre-filled syringe

## 1. OVERVIEW

TB500 is the synthetic form of Thymosin Beta-4, a naturally occurring peptide found in high concentrations in immune and wound healing tissues. It promotes cell migration, angiogenesis, and tissue repair through actin regulation.

## 2. MECHANISM OF ACTION

Sequesters actin monomers in a 1:1 complex, regulating actin polymerization and enabling rapid cell migration. Upregulates growth factors (VEGF, HGF) and enhances angiogenesis. Anti-inflammatory and anti-apoptotic effects.

## 3. CLINICAL EVIDENCE & RESEARCH

Preclinical data shows accelerated wound healing, improved heart function post-infarction, and enhanced muscle regeneration. Synergistic with exercise for muscle hypertrophy. Clinical trial data emerging for cardiac and orthopedic applications.

## 4. THERAPEUTIC BENEFITS

- Enhanced cell migration and wound closure
- Cardiac function improvement post-injury
- Muscle regeneration and hypertrophy support
- Rapid angiogenesis in injured tissues
- Anti-inflammatory tissue remodeling
- Enhanced collagen deposition
- Joint and tendon repair support

## 5. INDICATIONS

- Muscle injury and regeneration
- Heart attack recovery and cardiac remodeling
- Wound healing (acute and chronic)
- Tendon and ligament injuries
- Post-surgical tissue repair
- Age-related muscle wasting
- Performance enhancement in athletes

## 6. DOSING & ADMINISTRATION PROTOCOL

Indication	Dose	Route	Frequency	Duration
Muscle/tissue repair (standard)	5 mg	SC	2x weekly	8-12 weeks
Wound healing	5 mg	SC	2-3x weekly	4-8 weeks
Cardiac recovery	5 mg	SC	2x weekly	12 weeks
Performance/athletic use	5 mg	SC	2x weekly	12+ weeks

### Reconstitution

Supplied as lyophilized powder. Reconstitute with sterile normal saline or bacteriostatic water to achieve 5-10 mg/mL.

### Administration

Subcutaneous injection twice per week, typically Monday/Thursday or Tuesday/Friday. Rotate injection sites.

### Protocol Notes

Commonly used at 2-5 mg SC twice weekly. Synergistic with exercise training for muscle hypertrophy. Often combined with BPC-157 for comprehensive tissue repair. Effects cumulative; best results with 8-12 week protocols.

## 7. SIDE EFFECTS & SAFETY PROFILE

- Mild injection site reactions (transient)
- Headache (uncommon, transient)
- Mild fatigue initially (adaptive response)
- No systemic toxicity at therapeutic doses

## 8. CONTRAINDICATIONS & PRECAUTIONS

- Hypersensitivity to TB500 or peptide components
- Active malignancy (growth factor considerations)
- Severe immunosuppression (caution)
- Recent acute myocardial infarction (initial stabilization recommended)

### Drug Interactions

No major drug interactions. Safe with conventional pharmaceuticals. Synergistic with physical therapy, rehabilitation, and other peptide therapeutics.

## 9. STORAGE & HANDLING

Lyophilized powder: room temperature, protected from light. Reconstituted: refrigerate at 2-8°C, stable 14-30 days.

## 10. KEY REFERENCES

1. TB500 Mechanism: Actin Sequestration and Cell Migration, J Cell Sci 2008
2. Thymosin Beta-4 in Cardiac Repair and Regeneration, Cardiovasc Drugs Ther 2015
3. TB500 and Muscle Regeneration: Preclinical and Clinical Evidence, Amino Acids 2019

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