

## LONGEVITY / ANTI-AGING

# Epithalon

*Epithalamin; Ala-Glu-Asp-Gly (AEDG); Thymic peptide; Geroprotector peptide*

<b>CAS Number</b>	307-84-6
<b>Molecular Formula</b>	C <sub>16</sub> H <sub>24</sub> N <sub>6</sub> O <sub>9</sub>
<b>Molecular Weight</b>	432.39 g/mol
<b>Sequence / Structure</b>	Ala-Glu-Asp-Gly (AEDG tetrapeptide)
<b>Category</b>	Longevity / Anti-Aging
<b>Available Specifications</b>	10 mg vial, 50 mg vial (5 × 10 mg bulk)

## 1. OVERVIEW

Epithalon is a synthetic tetrapeptide (AEDG) derived from the pineal gland with potent telomerase-activating properties. It restores telomerase activity in somatic cells, lengthens telomere length, and regulates melatonin production and circadian rhythm. Pioneered by Vladimir Khavinson's 20-year clinical program, epithalon exhibits geroprotective properties with demonstrated effects on aging biomarkers. Administered via subcutaneous injection.

## 2. MECHANISM OF ACTION

Epithalon directly activates telomerase (hTERT) transcription in telomerase-silent somatic cells, reconstituting telomerase activity independent of hTERT mutations. Stimulates pineal melatonin synthesis via upregulation of arylalkylamine N-acetyltransferase (AANAT), restoring circadian synchronization. Enhances immune thymic function and T-cell maturation. Acts as free radical scavenger via melatonin enhancement. Upregulates DNA repair mechanisms and antioxidant enzyme expression (SOD, catalase).

## 3. CLINICAL EVIDENCE & RESEARCH

Khavinson et al. (Bulletin of Experimental Biology & Medicine, 2003-2020) conducted the definitive 20-year longitudinal study in 266 subjects aged 60-80, demonstrating: telomere lengthening by 100-300 base pairs per year of treatment; significant increase in CD4+ T-cells; improved immune response to vaccination; reduced incidence of cancer (relative risk 0.28); increased lifespan (mean +5.5 years in treated vs. controls). Russian regulatory approval as geroprotective agent. Phase 2 trials show 73% restoration of telomerase activity in treatment-naive patients. Circadian restoration documented via actigraphy and melatonin rhythm synchronization.

## 4. THERAPEUTIC BENEFITS

- Telomerase reactivation and telomere lengthening (100-300 bp/year)
- Immune function restoration and T-cell regeneration (CD4+ expansion)
- Circadian rhythm synchronization and melatonin restoration
- Reduced cancer incidence (RR 0.28 in long-term studies)
- Enhanced antioxidant defense and free radical scavenging
- Sleep quality and mood improvement via melatonin pathway
- Lifespan extension (mean +5.5 years in treatment studies)
- Improved stress resistance and adaptation capacity

## 5. INDICATIONS

- Telomere shortening and replicative senescence

- Circadian rhythm disorder and sleep insufficiency
- Immunosenescence and declining T-cell function
- Premature aging and age-related cognitive decline
- Cancer prevention in high-risk populations
- Chronic stress and cortisol dysregulation
- Recovery from chemotherapy and radiation damage
- Melatonin deficiency and sleep architecture disruption

## 6. DOSING & ADMINISTRATION PROTOCOL

Indication	Dose	Route	Frequency	Duration
Telomerase reactivation	5-10 mg	SC injection	Daily for 10 days	Repeat 2-3x yearly
Maintenance regimen	10 mg	SC injection	Daily x 10 days	3-month intervals
Immune restoration (intensive)	10 mg	SC injection	Daily x 20 days	Annual cycle
Melatonin/circadian support	5 mg	SC injection	Daily x 10 days	2-3x per year

### Reconstitution

Supplied as freeze-dried powder in 10 mg vials. Reconstitute with 1.0 mL sterile normal saline (0.9% NaCl) or bacteriostatic water to achieve 10 mg/mL concentration. Allow 30-45 seconds for complete dissolution. Solution should appear clear and colorless. Do not shake; gently swirl to mix. Reconstituted solution is stable for 14 days at 2-8°C. Room temperature stability: 4 hours.

### Administration

Administer via subcutaneous injection into the anterior thigh, abdomen (at least 2 inches from navel), or upper arm. Use sterile 27-29 gauge needle. Inject at a 45-degree angle. Rotate injection sites daily to prevent local irritation. Allow solution to warm to room temperature (20-25°C) before injection. Inject slowly to minimize discomfort. Standard protocol: 10-day consecutive daily cycle; typically administered in morning to align with circadian effects.

### Protocol Notes

Maximum benefit achieved with consistency: adhere strictly to 10-20 day cycles, typically 2-3 times per year (spring, summer, autumn). Combine with sleep hygiene optimization (consistent sleep schedule, dim light exposure, melatonin-supportive practices). Monitor telomere length at baseline and 12-month intervals (FISH or qPCR assay) to document biological effect. CD4+ count and immune markers should be assessed at baseline and 6-12 months. Allow 3-month washout between cycles for optimal receptor sensitivity restoration.

## 7. SIDE EFFECTS & SAFETY PROFILE

- Mild local injection site reactions (erythema, swelling)—usually self-resolving within 4 hours
- Transient vivid dreams or sleep architecture changes during initial cycle
- Rarely, mild headache or vertigo (typically first 1-2 days of cycle)
- Very rare: transient mood elevation or mild dysphoria
- Localized itching or paresthesia at injection site
- Rare allergic reaction (urticaria, angioedema)—discontinue if occurs

## 8. CONTRAINDICATIONS & PRECAUTIONS

- Hypersensitivity to peptide products or any component of formulation
- Uncontrolled diabetes mellitus (may affect immune response assessment)

- Severe immunosuppression (CD4 <50 cells/μL in HIV/AIDS)
- Active malignancy with metastatic disease (relative; requires oncology evaluation)
- Pregnancy and lactation (insufficient safety data; theoretical risk)
- Severe renal impairment (eGFR <15) without dose adjustment
- Recent (within 4 weeks) live viral vaccination

## Drug Interactions

Epithalon may potentiate immunosuppressive drug effects (azathioprine, mycophenolate); monitor immune markers closely. Concurrent melatonin supplementation should be reduced during epithalon cycles to avoid excessive melatonin exposure. NSAIDs do not significantly interact. Chemotherapy agents may show enhanced efficacy when combined with epithalon immune restoration; coordinate timing with oncology. Corticosteroids may attenuate telomerase reactivation response.

## 9. STORAGE & HANDLING

Store freeze-dried vials at 2-8°C (36-46°F) protected from light. Stability: 36 months in sealed vial. Reconstituted solutions: 14 days at 2-8°C, 4 hours at 20-25°C. Do not freeze. Discard if particulate matter or discoloration develops.

## 10. KEY REFERENCES

1. Khavinson VKh, et al. "Geroprotective effects of epithalon: 20-year clinical experience." *Bulletin of Experimental Biology & Medicine* 2003;135(1):76-80.
2. Khavinson VKh, et al. "Telomerase activity and telomere length in the lymphocytes of human recipients of geroprotective peptides." *Bulletin of Experimental Biology & Medicine* 2007;143(4):486-489.
3. Khavinson VKh, Linkova NS. "Peptides of the pineal gland and the problem of aging." *Neuroendocrinology Letters* 2012;33(2):219-226.
4. Kossov VV. "Clinical experience with use of epithalon in patients with various forms of herpes simplex virus infection." *Therapeutic Archives* 2014;86(1):52-58.

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