



## Thymulin

### About

Thymulin is a thymic peptide studied for its role in supporting immune regulation, enhancing immune cell activity, and reducing inflammation to promote resilience against illness.

\*These products are for research use only and are not intended for human consumption, medical use, therapeutic use, or diagnostic purposes. They are not to be used in foods, drugs, cosmetics, dietary supplements, or any products intended for humans or animals. Peptides are not sterile, have not been tested for safety or efficacy in humans, and must not be injected, ingested, inhaled, applied to the skin, or administered in any form. No product sold is intended to treat, cure, mitigate, or prevent any disease.

## What's Included

- One vial included, concentration: 100mg/8mL
- One vial will last approximately 1 month

### Reconstitution kit

- 2 x (20) 29-30G subq needles
- (1 ) 5 mL syringe
- (1) 25G needle with syringe
- (1) 10 mL bacteriostatic water

### Clinical Research Potential Benefits:

- May help strengthen immune system function
- May reduce inflammation and promote immune balance
- May support T-cell development and white blood cell activity

### Clinical Research Suggested Use:

- Draw up 20 units (2.5mg) into the syringe
- Administer daily in the AM
- Duration: 1 month
- Reconstitute: add 8mL of bacteriostatic water into the lyophilized powder vial
- Injection type: subcutaneous injection

## Reconstitution & Administration\*

\*Instructions start on page 2

## Thymulin Reconstitution

One

Prepare

**STEP 1:** Remove plastic covers, clean vial and bacteriostatic water top with alcohol pad for 15 seconds

**STEP 2:** Using the large syringe from your administration kit, pull out 8mL of Bacteriostatic water

- It may take a few repetitions to load your syringe with the 8mL with no air pockets

**STEP 3:** Once you've loaded your syringe, slowly inject the 8mL of Bacteriostatic water into your Thymulin vial:

- On its side to not damage the bonds of the product
- Do not shake, gently swirl if needed
- Allow the solution to sit for at least 5 minutes

**\*Supplies:** 5 mL syringe (large), 25G needle, Bacteriostatic water, Thymulin vial, Alcohol pad

Two

Pull

**STEP 1:** With the smaller needle draw up 20 units of the Thymulin into the small syringe from your kit

**\*Supplies:** 29G-30G subcutaneous syringe with needle (small), Alcohol pad

Three

Inject

**STEP 1:** Clean the injection area with an alcohol pad

**STEP 2:** Inject subcutaneously (see pg 3)

- Repeat daily in the AM for 1 month
- Duration: 1 month
- One vial lasts approximately 1 month

## Injection Steps

### Subcutaneous Injection steps:

#### 1 Choose & Clean the Injection Site

- Use the abdomen (3 inches from the belly button), thigh, or upper arm. Rotate sites to prevent irritation. Clean the area with an alcohol swab and let it dry.

#### 2 Inject

- Pinch 1 to 2 inches of skin, insert the needle at a 90° angle, and slowly push the plunger down.

#### 3 Remove the Needle & Dispose

- Pull the needle out at the same angle, apply light pressure with gauze (don't rub), and dispose of the syringe in a sharps container.

#### 4 Monitor for Reactions

- Mild redness or soreness is normal. Seek medical help if you experience severe pain, swelling, or an allergic reaction.

### Intramuscular Injection steps:

#### 1 Choose & Clean the Injection Site

- Use the thigh (vastus lateralis), upper arm (deltoid), or glute (ventrogluteal or dorsogluteal muscle).
  - Rotate sites to prevent soreness. Clean the area with an alcohol swab and let it dry.

#### 2 Inject

- Stretch the skin taut, hold the syringe like a dart at a 90° angle, and insert the needle quickly and smoothly. Slowly push the plunger down to inject.

#### 3 Remove the Needle & Dispose

- Pull the needle straight out, apply light pressure with gauze (don't rub), and dispose of the syringe in a sharps container.

#### 4 Monitor for Reactions

- Mild soreness or redness is normal. Seek medical help if you experience severe pain, swelling, or an allergic reaction.

## Thymulin Mechanism of Action

- **Immune Modulation:**
  - T-Cell Differentiation and Activation:
    - Thymulin is essential for the maturation and differentiation of T-lymphocytes in the thymus.
  - It enhances the activity of cytotoxic T cells (CD8+) and helper T cells (CD4+), boosting immune surveillance and response.
  - Enhancement of Natural Killer (NK) Cell Activity:
    - Increases the cytotoxic activity of NK cells, improving innate immune defense against infections and tumors.
  - Regulation of Cytokine Production:
    - Thymulin modulates the production of key cytokines such as interleukin-2 (IL-2) and interferon-gamma (IFN- $\gamma$ ), both critical for robust immune responses.
- **Neuroendocrine-Immune Axis:**
  - Interaction with Hormonal Systems:
    - Thymulin operates at the intersection of the immune and endocrine systems.
    - Its activity is influenced by zinc ions (Zn<sup>2+</sup>), which are necessary for its biological activity. Thymulin binds zinc to form an active complex that interacts with immune cell receptors.
  - Feedback with Hypothalamic-Pituitary-Adrenal (HPA) Axis:
    - Thymulin influences the HPA axis by modulating the release of hormones such as cortisol, which can suppress excessive immune responses and inflammation.
- **Anti-Inflammatory Effects:**
- Regulation of Inflammatory Mediators:
  - Thymulin downregulates pro-inflammatory cytokines, reducing excessive inflammation in conditions like autoimmune diseases or chronic inflammation.
- T Regulatory (Treg) Cell Promotion:
  - Enhances the activity of Treg cells, which help maintain immune tolerance and prevent autoimmune reactions.
- **Cellular Receptor Activation:**
- Binding to Thymulin Receptors:
  - Thymulin interacts with specific receptors on T-cells, monocytes, and other immune cells, triggering intracellular signaling cascades that modulate their activity.
- Signal Transduction Pathways:
  - Activates pathways like JAK/STAT and MAPK, which are involved in cell survival, proliferation, and cytokine production.