LL-37 is an antimicrobial and immunomodulatory peptide. It can be found naturally as a component of the innate immune system. LL-37 has the ability to modulate the immune system and inflammatory response. It has broad spectrum microbicidal activity, combating a wide range of viruses, bacteria, and fungi. LL-37 has been shown to be a potent antiviral, protecting against a range of viruses, including Salmonella, Influenza, Herpes simplex, Adenovirus and human immunodeficiency virus (HIV). LL-37 also has noteworthy antibacterial and antifungal properties. It is able to combat multiple gram-positive and gram-negative bacteria, as well as wide-range of fungi such as Candida. Consequently, LL-37 is useful as a broad-spectrum treatment for infections. It can be used alone or in conjunction with antibiotics, peptides and other medications. It has also been shown to be effective in wound healing of venous leg ulcers.

Clinical Effects of LL-37
- Demonstrates immunomodulatory activity, mediating innate and adaptive immune response and including inflammation
- Protects and treats bacterial, viral, and fungal infections
- Shown to be more effective than antiviral drugs
- Activates stem cells
- Useful for wound healing, particularly healing of hard-to-heal and infected wounds
- Is able to combat antibiotic-resistant strains of bacterial pathogens
- Has significant activity against Lyme disease and co-infections and is synergistic with other peptides and antibiotics
- Enhances the immunomodulatory effects and activity of stem cells
- Excessive doses may contribute to pro-inflammatory signals that have a role in autoimmune conditions
- Breaks up biofilms at extremely low doses

Side effects:
Antimicrobial peptides like LL-37 are non-toxic up to defined concentrations. LL-37 has a range of effects that are concentration-dependent. When one LL-37 derivative (P60.4) was tested in rats, no toxicity profile could be established. Synthetic LL-37 has been successfully tested in clinical trials for wound healing, resulting in no negative side effects. It can produce a herxheimer effect so treatment should start at extremely low doses. Herxheimer can be minimized with other therapies including Thymosin Alpha 1, Thymosin Beta 4, Thymulin, BPC-157 as well as LDN, ozone, stem cells, antioxidants, etc.

Dosing protocol:
LL-37 is typically available as a lyophilized powder that is reconstituted in bacteriostatic sterile water or bacteriostatic saline. Lyophilized (un-reconstituted) LL-37 can be stored at 4 °C (39°F) for years.

LL-37 dosing can be prophylactic or therapeutic. Dosing quantity and frequency varies accordingly and is additionally dependent on the condition being treated. Typically, prophylactic use implies low doses administered at infrequent intervals. Studies show that patients can safely receive treatment for the duration of their lives. Therapeutic use involves generally higher dosing over short intervals until the condition being treated has improved. After this, prophylactic or maintenance administration can commence if necessary.
LL-37 administration can be intravenous, intramuscular, intraperitoneal, nasally, orally or subcutaneous. Consult your physician to create a dosing plan appropriate for your needs.

**Typical injected dosing:**
In a 5mg vial mix with 5cc of bacteriostatic water. Dosing should be started very low and titrated up slowly. Typical daily doses are usually in the range of 10 micrograms (0.01cc or #1 on the syringe) 5 days on and 2 days off for approximately a week then can be increased by 10 micrograms up to 50 micrograms (0.05cc or #5 on the syringe). If tolerated doses can be slowly titrated up to 100 micrograms (0.10cc or #10) or 150 micrograms (0.15cc or #15) 5 days per week, 3 weeks on and 3 weeks off. Vitamin D improves the effect of ll-37 so it is important to make sure the vitamin D level is optimized.

**References:**


