

PATIENT INFORMATION

MOTS-c

Mitochondrial-Derived Peptide • Alchemy Compounding Pharmacy

INVESTIGATIONAL EVIDENCE MOTS-c has biologically interesting metabolic and exercise-related research, but therapeutic benefit and long-term safety from exogenous MOTS-c in humans are not established. This leaflet distinguishes research findings from proven clinical indications.

What is MOTS-c?

MOTS-c is a 16-amino-acid mitochondrial-derived peptide encoded within mitochondrial DNA. It has been studied as a signalling molecule involved in communication between mitochondria and the rest of the cell, particularly during metabolic stress.

How Does It Work?

Laboratory and animal research suggests that MOTS-c can influence cellular energy handling and metabolic-stress responses. Under metabolic stress it can move to the nucleus and affect gene expression through pathways that include AMPK and stress-response signalling. These mechanisms are scientifically plausible but do not, by themselves, establish a therapeutic effect in people.

MECHANISM IS NOT AN INDICATION A mitochondrial or metabolic mechanism does not prove that MOTS-c treats diabetes, fatigue, excess weight, poor exercise performance, ageing or any other condition.

What Does the Evidence Support?

Foundational studies reported improvements in metabolic homeostasis, insulin sensitivity and physical performance after exogenous MOTS-c in animal models. A 2021 study also found that naturally occurring (endogenous) MOTS-c increased with exercise in young men; that human observation did not test therapeutic MOTS-c injections.

Human therapeutic evidence is still evolving. A registered Phase 2a study (NCT07505745) is evaluating investigational MOTS-c for insulin sensitivity in adults with prediabetes and overweight/obesity. A registered study should not be interpreted as proof of benefit until results are available and clinically assessed.

Potential Areas of Research Interest

- Glucose handling, insulin sensitivity and metabolic homeostasis.
- Skeletal-muscle metabolism and metabolic flexibility.
- Exercise adaptation, physical function and healthy-ageing biology.
- Cellular responses to metabolic and oxidative stress.

Alchemy Compounding Pharmacy Presentation

Product detail	Alchemy MOTS-c pen
Total contents	120 mg
Pen volume	3 mL
Concentration	40 mg/mL

Dose & Frequency

PATIENT-SPECIFIC PRESCRIBING Dose and frequency for an Alchemy compounded MOTS-c pen must follow the individual prescription and dispensing pharmacy label. The pen concentration does not establish a generic regimen, and animal or research-study schedules should not be extrapolated to an individual patient.

What is the Best Time of Day?

There is no robust human evidence showing that exogenous MOTS-c works better in the morning, before exercise or at bedtime. Timing should follow the patient-specific prescription and be chosen consistently with the clinical plan and tolerability.

How Long Should Treatment Continue?

There is no validated universal MOTS-c treatment cycle or evidence-based on/off schedule for routine clinical use. Preclinical schedules should not be translated directly into human treatment plans.

DURATION OF TREATMENT Use a defined clinical rationale and planned review point. Continuing or repeating treatment should depend on clinician reassessment, tolerability and measurable response rather than an automatic recurring cycle.

Possible Side Effects & Safety Considerations

A definitive adverse-effect profile for compounded MOTS-c has not been established in humans. In its 2026 compounding safety review, FDA stated that it had not identified human exposure data for MOTS-c drug products and highlighted uncertainty about immunogenicity, peptide-related impurities and product characterisation. Important considerations therefore include:

- Local irritation or discomfort can occur with injected compounded products, although a MOTS-c-specific frequency is not established.
- Allergic or immune reactions are possible with peptide products; MOTS-c-specific immunogenicity risk is not adequately characterised.
- Unexpected systemic effects, medicine interactions and effects in people with significant illness remain incompletely characterised.
- Long-term safety is unknown, and human pregnancy or breastfeeding safety has not been established.

SEEK MEDICAL ADVICE New, persistent or significant symptoms require medical review. Symptoms suggesting a serious allergic reaction require urgent medical attention.

Who Requires Particular Caution?

Particular caution is appropriate during pregnancy or breastfeeding, with a history of serious drug hypersensitivity, significant kidney or liver disease, active serious illness, metabolic disease requiring medication, or a complex medicine/supplement regimen. The clinician should assess the rationale, uncertainty and monitoring needs before treatment.

Clinical Review & Monitoring

- Define the treatment goal and relevant baseline symptoms or measurements before treatment.
- Review current medicines, major medical conditions and allergy history where clinically indicated.
- Assess tolerability and objective response at a planned review point.
- Reconsider treatment if meaningful benefit is not demonstrated or adverse effects develop.

Important

MEDICALLY SUPERVISED CARE Compounded MOTS-c should not be represented as a proven treatment for diabetes, weight loss, fatigue, athletic performance, recovery or healthy ageing. Patient counselling should clearly distinguish established evidence from proposed or investigational uses.

Clinical references

Lee C et al. Cell Metab (2015); Kim KH et al. Cell Metab (2018); Reynolds JC et al. Nat Commun (2021); ClinicalTrials.gov NCT07505745; U.S. FDA, Safety Risks Associated with Certain Bulk Drug Substances for Use in Compounding (reviewed 2026).