MOTS-c

Purity: >98% (HPLC on request) I Molecular Formula: C101H152N28022S2. C2HF302. Molecular Weight: 2288.6 g/mol I Sequence: MRWQEMGYIFYPRKLR

DESCRIPTION:

Human mitochondrial DNA (mtDNA) encodes 37 known genes, including 2rRNAs, 22 tRNAs and 13 polypeptide subunits of the electron transport chain (ETC) complexes. Recent work has revealed that the rRNA loci contain small open reading frames (ORFs) that can be transcribed and translated into short peptides called mitochondrial-derived peptides (MDPs), which have biological activity. MOTS-c is a mitochondrial-encoded peptide with 16-aa's encoded within the 12S rRNA locus of mtDNA in human cells.

MOTS-c can translocate into the nucleus in response to metabolic stress and regulation of adaptive nuclear gene expression. This allows the peptide to promote resistance of metabolic stress by upregulating the mitochondrial genome. Upregulating these genes encourages mitochondrial biogenesis. MOTS-c inhibits the methionine-folate cycle resulting in purine synthesis, increase in PCG-la (a key regulator of energy metabolism), and AICAR (5-Aminoimidazole-4-carboxamide ribonucleotide) accumulation which activates AMPK (5'- adenosine monophosphate-activated protein kinase).

This acts as an energy sensor by monitoring the ratio of AMP and ATP. AMPK restores homeostasis by initiating catabolic processes for ATP production in case of energy deficits. In addition, literature suggest that MOTS-c decreases insulin resistance and increases GLUT4 uptake in muscle.

The peptide is mainly used for weight loss (regulating muscle and fat metabolism) and energy (cell survival in toxic conditions). MOTS-c is consistently used by sports performance athletes to enhance one's

performance. It also displays a promising effect in longevity. The Japanese long-lived people (population with the longest lifespan in the world) have demonstrated a phenotypic expression and biological link between MOTS-c and an extended lifespan.

PROTOCOL:

Content & Potency: Provided as a 5mg lyophilized vial

Vial reconstitution: 0.5ml 0.9% NSS for injection

Suggested dosage: Inject 10mg (1ml or 100units) subcutaneously once weekly (Inject content of vial within 5 minutes after reconstitution)

CLINICAL RESEARCH:

The Mitochondrial-Derived Peptide MOTS-c Promotes Metabolic Homeostasis and Reduces Obesity and Insulin Resistance

Mitochondria are known to be functional organelles, but their role as a signaling unit is increasingly being appreciated. The identification of a short open reading frame (sORF) in the mitochondrial DNA (mtDNA) that encodes a signaling peptide, humanin, suggests the possible existence of additional sORFs in the mtDNA. Here we report a sORF within the mitochondrial 12S rRNA encoding a 16-amino-acid peptide named MOTS-c (mitochondrial open reading frame of the 12S rRNA-c) that regulates insulin sensitivity and metabolic homeostasis.

Its primary target organ appears to be the skeletal muscle, and its cellular actions inhibit the folate cycle and its tethered de novo purine biosynthesis, leading to AMPK activation. MOTS-c treatment in mice prevented age-dependent and high-fat-diet-induced insulin resistance, as well as diet-induced obesity. These results suggest that 1 mitochondria may actively regulate metabolic homeostasis at the cellular and organismal level via peptides encoded within their genome.

Lee, Changhan & Zeng, Jennifer & G. Drew, Brian & Sallam, Tamer & Martin-Montalvo, Alejandro & Wan, Junxiang & Kim, Su-Jeong & Mehta, Hemal & Hevener, Andrea & Cabo, Rafael & Cohen, Pinchas. (2015). The Mitochondrial-Derived Peptide MOTS-c Promotes Metabolic Homeostasis and Reduces Obesity and Insulin Resistance. Cell metabolism. 21. 443-454.