### Coenzyme Q10: Ubiquinone-10 and Ubiquinol-10

#### Nano-colloid delivery system enhances absorption & increases bioavailability

#### Bioavailability of CoQ10

<table>
<thead>
<tr>
<th>Condition Associated Decline of Ubiquinol</th>
<th>Clinical Outcomes</th>
<th>Bioavailability of CoQ10</th>
</tr>
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<tr>
<td>Decreased mitochondrial function in other neurological tissue in patients with neurological conditions associated with oxidative stress</td>
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<td>CoQ10 observed in children with trisomy 21 (Down syndrome), were both improved</td>
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<td>Supranuclear mitochondrial function in other neurological tissue</td>
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#### CoQ10 therapeutic levels

- **Heart**: 1 mg/gram tissue, wet weight
- **Liver**: 0.5 mg/gram tissue, wet weight
- **Muscle**: 0.1 mg/gram tissue, wet weight
- **Brain**: 0.1 mg/gram tissue, wet weight
- **Kidney**: 0.1 mg/gram tissue, wet weight
- **Adrenal**: 0.1 mg/gram tissue, wet weight
- **Cholesterol**: 0.1 mg/gram tissue, wet weight
- **Lung**: 0.1 mg/gram tissue, wet weight

#### Ascorbate and Ubiquinol

- Ascorbate is a water-soluble vitamin that functions as a cofactor for enzymes involved in glycolysis and lipolysis. It is also involved in the synthesis of CoQ10.
- Ubiquinol (CoQ10) is a reducing form of CoQ10 that is synthesized in the cell's mitochondrial matrix and transported across the mitochondrial membrane to function in the electron transport chain.

#### Condition Associated Decline of Ubiquinol

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#### Improvement of Biomarkers

- **Improved mitochondrial function**
- **Increased bioavailability**
- **Decreased oxidative stress**
- **Improved cognitive function**
- **Greater energy production**
- **Reduced inflammation**
- **Improved cellular repair**

### Nano-colloid Delivery System

- **Enhanced absorption**: Nano-colloids are tiny droplets of CoQ10 that are designed to be easily absorbed by the body. They are able to penetrate the mucus mesh and easily diffuse across the unstirred water layer, allowing for increased bioavailability.
- **Increased bioavailability**: Nano-colloids have been shown to significantly improve the bioavailability of CoQ10, especially in patients with reduced absorption.

### Clinical Outcomes

- **Increased bioavailability** has a positive impact on clinical outcomes, such as improved mitochondrial function and reduced oxidative stress.
- **Decreased oxidative stress** is critical to achieving and maintaining these levels.

### Key Points

- **CoQ10** is a critical coenzyme involved in cellular energy production and antioxidant defense.
- **Ubiquinone-10** and **Ubiquinol-10** are the two forms of CoQ10 that are important for cellular function.
- **Nano-colloid delivery system** enhances absorption and increases bioavailability.

#### References