Intense physical activity increases the production of free radicals and reactive oxygen species (ROS) in the body. These highly reactive molecules cause an imbalance in the body’s natural antioxidant system, known as oxidative stress. Oxidative stress can damage proteins, lipids, and DNA in muscle cells and can also cause inflammation. This can result in several damaging effects including muscle fatigue and soreness and activation of inflammatory pathways that have negative impact on muscle performance.

“Mitochondria are cellular organelles known as the “powerhouse” of all cells. They play a crucial role in muscle performance, where they are responsible for generating energy in the form of ATP—Adenosine Tri Phosphate, through the utilization of carbohydrates and fats. Muscle cells have the highest content of mitochondria than any other cell due to their high level of cellular activity.”

Mitochondria generate a significant number of ROS during cellular activity, making them susceptible to high levels of oxidative stress. This can lead to an imbalance in the redox of energy utilization and can cause mitochondrial dysfunction.

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During and after physical activity, the muscles are subjected to high levels of inflammation due to the increased levels of ROS. Inflammation stimulates the release of several pro-inflammatory markers. In a recent double-blind placebo study, Baralic et al. (2015) investigated the anti-inflammatory and antioxidant effects of AstaReal® astaxanthin. A group of 40 young soccer players were divided into 2 groups (astaxanthin vs. placebo) and tested for the inflammatory marker CRP after 90 days. The results concluded that astaxanthin supplementation combined with physical training significantly decreased the expression of the pro-inflammatory marker CRP. This was accompanied by an improvement in the prooxidant/antioxidant balance in the blood plasma.
Other clinical studies have shown that AstaReal® astaxanthin improves muscle performance. In a 2011 study, Earnest et al. investigated astaxanthin efficacy on muscle performance. 14 competitive cyclists performed a 20 km maximal cycling test after a 2 hour pre-exhaustion ride. The test was carried out 28 days before and after supplementation of 4mg/d of AstaReal® astaxanthin or placebo. The results showed significant improvement in the group treated with AstaReal® astaxanthin, who performed 121 seconds faster after the treatment period compared to the placebo group.

Furthermore, astaxanthin was shown to improve muscle endurance by enhancing muscle lipid metabolism thus increasing aerobic endurance. A 2007 study by Aoi et al. demonstrated that astaxanthin enhanced lipid metabolism in muscles by protecting the mitochondrial proteins that are responsible for fatty acid regulation.

Benefits of Natural Astaxanthin for Muscle Performance:

- Boosts muscle endurance and recovery
- Lowers lactic acid and fatigue
- Reduces muscle damage and inflammation
- Protects mitochondria and enhances fat metabolism by improving mitochondrial functions

References & Selected Publications

1. Ivana Baralic et al. Evidence-Based Complementary and Alternative Medicine, Volume 2015, Article ID 783761, 9 pages

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