Review

Applicability of Exercise Immunology and Inflammation Research to Sports Nutrition: Updated Findings

Katsuhiko SUZUKI

Faculty of Sport Sciences, Waseda University

ABSTRACT

This review focused on various types of physical deconditioning, including strenuous exercise- and/or training-induced immunosuppression, organ damage, inflammation, and fatigue. It also discussed recent reports regarding nutritional approaches that could likely contribute to the prevention or early recovery of these deconditioning changes, along with our recent research on the mechanism of approach for physical deconditioning. First, I discussed the potential benefits of ketogenic diet. Energy metabolism is a critical factor in endurance capacity, and the ketogenic diet is capable of optimizing energy metabolism by controlling the energy source, namely carbohydrate restriction and fat utilization, and in turn resulting in weight reduction, endurance performance, and anti-fatigue effects. Next, I discussed antioxidants. Vitamin C or polyphenol are exogenous antioxidants which are frequently used against oxidative stress caused by high-intensity exercise or training. However, simultaneously there are also confirmed reports of their adverse effects such as muscle and liver damage. Sulforaphane is a phytochemical which promotes Nrf2 to induce endogenous antioxidant defense mechanisms in living organisms; its preventive effects on organ damage and inflammation were confirmed recently. Then, I discussed proteins. Various types of proteins are used in the sports nutrition field, among which I introduced immune protein here. It is expected to aid not only as muscle-composing substances for muscle recovery or hypertrophy but also provide possible organ-protective effects against pathogens and inflammation. Though leucine is an essential amino acid effective in muscle strengthening, leucine metabolite HMB has a muscle hypertrophy effect, but is low in bioavailability and unsuitable for rapid muscle recovery after exercise. I explained our findings with regards to the confirmed synergistic effects following the immediate ingestion of HMB-free acid after exercise which has good intestinal absorption. Some of them require further evidence accumulation before they can be used at sports fields. Therefore, some issues and challenges regarding these supplements were discussed.

Keywords: immunity, inflammation, antioxidant, anti-inflammatory substance, functional food