I think a lot of good information has been mentioned already about proper hydration and the importance of proteins and carbohydrates. Also, performance and recovery nutrition depends on the individual and their activity/sport. I started looking into the role of fats as part of performance or recovery nutrition. My sense is that the research is still quite young in this area, and in general no strong conclusions may be made just yet. I thought I'd share what I did find out, because for me, the thought of fats as part of "recovery" is definitely non-conventional.

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Exogenous Omega-3 Polyunsaturated Fatty Acids (PUFAs) as Part of an Ergogenic and Recovery Plan to Counter Oxidative Stress and Exercise-Induced Inflammatory Response

Research has found elevated levels of oxidative stress and inflammatory response in athletes, well-trained individuals, or anyone that participates in chronic strenuous activity/exercise (including job-related) (Mickleborough, 2013). Intense physical activity creates micro-lesions in the muscle that naturally sets off the body's immune response (Santos et al., 2012). Repeated exposure to intense, strenuous exercise (especially without proper recovery time/management methods) has been shown to impair immune function, augment inflammation, and exacerbate muscle fatigue/soreness, structural damage to muscles, lactic-acid build-up, swelling, neutrophilia, and catabolism (Mickleborough, 2013). Without planning for adequate recovery, the local inflammatory response can develop into a chronic and systemic problem (Santos et al., 2012).

In the last few years, there has been some increased interest in exploring the role of the omega-3 polyunsaturated fatty acids (particularly eicosapentaenoic acid or EPA, and docosahexaenoic acid or DHA, both found in fish oil) for their ergogenic and therapeutic potential (Mickleborough, 2013).

Kreider et al. (2010) defined an ergogenic aid to be "any training technique, mechanical device, nutritional practice, pharmacological method, or psychological technique that can improve exercise performance capacity and/or enhance training adaptations (p. 1).

Among the many benefits of fish oil, omega-3 PUFAs have demonstrated anti-inflammatory and immunomodulatory effects (by influencing neutrophils or mature white blood cells, and macrophages) with regards to inflammation from exercise or over-exertion (Mickleborough, 2013). EPA and DHA appear to act as inhibitors (via substrate competition) of leukotrienes and cytokines by reducing their production from inflammatory cells (Mickleborough, 2013). Leukotriene is a chemical that the body produces during an inflammation response (e.g. contributes to hay fever and asthma symptoms) (MedicinteNet.com, 2012). Inflammatory cytokines are chemical messengers of the immune system controlling the release of cortisol, catecholamine, and stimulating the production of C-reactive protein in the liver (National Institute of Allergy and Infectious Diseases, 2008; Santos et al., 2012). C-reactive protein is a marker of overtraining (Santos et al., 2012).

Santos et al. (2012) studied the effects of n-3 PUFA supplementation (1000mg n-3 PUFA, 180mg EPA, 120mg DHA) on a group of 20 males from the 16th Regiment Field Artillery as they entered a boot camp regimen. The results of their study indicated a reduction of the presence of C-reactive proteins after 3 weeks of supplementation without changing total cholesterol and an attenuated inflammatory response induced by extreme exertional efforts (Santos et al., 2012).

Atashak et al. (2013) studied the effects of n-3 PUFA supplementation on a group of 20 handball athletes. Atashak et al. (2013) found that supplementing one week before an acute bout was helpful in the reduction of post-exercise oxidative stress by attenuating plasma malondiadehyde (MDA) levels. MDA is another marker of oxidative stress.

Gray, Chappell, McE Jenkinson, Thies, and Gray (2014) studied the effects of fish oil supplementation on a group of 20 active males with regards to muscle damage and soreness (markers of oxidative stress following intense eccentric exercise). After 6 weeks of 3.0g/day of fish oil, plasma thiobarbituric acid reactive substances (TBARS, a by-product of fat oxidation and an oxidative stress marker) were significantly reduced both 48 and 72 hours after an intense bout of eccentric exercise (Gray et al., 2014). However, the fish oil supplementation regimen was not able to prevent or ameliorate muscle soreness induced by exercise (Gray et al., 2014).

Other studies have likewise shown similar improvements, and research on the ergogenic and therapeutic properties of n-3 PUFAs is fairly new and ongoing. There has been some concern about supplement timing and duration negatively affecting performance especially a major tournament/game. Much more research needs to be done especially with more variations in demographic. Thus far, only athletes and persons who are extremely active (e.g. for their job) have been studied. Dosage and the therapeutic effects for sedentary people, women and children are still unknown. The perspective that n-3 PUFAs might play a part in recovery is somewhat nouveau and promising.

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