Q: When I visited with you in the summer you had mentioned how you will add various aminos (i.e. glutamine, taurine, etc..) to an individuals post workout shake based upon their body composition and blood work results. I was wondering if you use supplements such as magnesium or r-form alpha lipoic acid with the post workout shake to aid in glucose disposal...if so I was wondering what protocols you have found to be most effective with your athletes?

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A: An important goal of the athlete's everyday diet is to provide the muscle with substrates to fuel the training program that will achieve optimal adaptation for performance enhancements. In reviewing the scientific literature on post-exercise glycogen storage since 1991, the following guidelines for the training diet are proposed. Here is the formula that I used with my athletes, for a 190lbs+ athlete multiply these dosages by 2:

Dextrose…………………………………… 40g
Whey protein……………………………… 20g
L-glutamine……………………………… 5g
Taurine…………………………………… 1g
Magnesium (citrate)…………………….. 250mg
R-Alpha lipoic acid……………………… 100mg
D-pinitol……………………………….... 50mg

Athletes should aim to achieve carbohydrate & protein intakes to meet the fuel requirements of their training program and to optimize restoration of muscle glycogen stores and favor anabolism (muscle building) between workouts. You're training program breakdown muscles and makes you tired, the recovery strategy will make you leaner and stronger. There is no such thing as overtraining, weak recovery program will lead to overtraining. General recommendations can be provided, preferably in terms of grams of any macronutrients per kilogram of the athlete's body mass, but should be fine-tuned with individual consideration of total energy needs, specific training needs and feedback from training performance. It is valuable to choose nutrient-rich carbohydrate foods and to add other foods to recovery meals and snacks to provide a good source of protein and other nutrients. These nutrients may assist in other recovery processes and, in the case of protein, may promote additional glycogen recovery when carbohydrate intake is suboptimal or when frequent snacking is not possible. My athletes should begin carbohydrate intake as soon as practical after their workouts (within 20 minutes) to maximize the effective recovery time between sessions. There may be some advantages in meeting carbohydrate intake targets as a series of
snacks during the early recovery phase, but during longer recovery periods (24 h) the athlete should organize the pattern and timing of carbohydrate-rich meals and snacks according to what is practical and comfortable for their individual situation. Carbohydrate-rich foods with a moderate to high glycaemic index provide a readily available source of carbohydrate for muscle glycogen synthesis, and should be the major carbohydrate choices in recovery meals. The post-workout meal is the most important of the day for any athlete. Based on scientific and empirical data we redefined how the muscle recovers. Any good formula will contain a 2:1 ratio of carbohydrate to protein. Not any kind of carbs, you should stick with DEXTROSE or MALTODEXTRINE to speed-up muscle glycogen replenishment and rebuild muscle protein after exercise (prevention of catabolism). You should also use antioxidants to reduce post-exercise muscle damage and glutamine to keep the immune system efficient. Athletes should achieve a carbohydrate intake that provides sufficient fuel to sustain the training and the season. The main goal of a solid post-workout meal is to achieve changes in lean body mass (for hockey players during the season we like to keep their body fat between 7-10%) Although the traditional school of hockey has focused on carbohydrate intake for immediate match preparation (you know about the old myth of having pasta the night before...), top players should adapt their carbohydrate intake on a daily basis to ensure adequate fuel for training and recovery between games. For players with an aggressive skating style, there is strong evidence that dietary intake (post workout shake) that restore muscle glycogen levels can enhance performance during games. This will also benefit intensive training, such as twice daily practices (lift followed by practice on ice). The diet should promote strategic intake of carbohydrate and protein after high intensity training sessions to optimize the adaptations and enhance recovery.

I use the **Alpha lipoic acid** because it is involved in cellular energy production, its chief role as a dietary supplement may be as a powerful antioxidant. The body appears to be able to manufacture enough alpha-lipoic acid for its metabolic functions (as a co-factor for a number of enzymes involved in converting fat and sugar to energy), but the excess levels provided by supplements allow alpha-lipoic acid to circulate in a "free" state. In this state, alpha-lipoic acid has functions as both a water- and fat-soluble antioxidant. This unique ability of alpha-lipoic acid to be active in water and lipid compartments of the body is important because most antioxidants, such as vitamins C and E, are effective in only one area or the other. For instance vitamin C is usually restricted to the interior compartment of cells and the watery portion of blood, while vitamin E embeds itself in the fatty portion of cell membranes. Adding to the potential importance of alpha-lipoic acid is its role in the production of glutathione, one of the chief antioxidants produced directly by the body. The natural R isomer of alpha–lipoic acid may provide enhanced antioxidant activity, energy production, and general metabolic function, the R form of alpha-lipoic acid has 3 times the potency of the basic form of alpha-lipoic acid.

In both humans and experimental animals, dietary induced **Magnesium** deficiency is correlated with insulin resistance. The magnesium in the post-workout blend is involved in the interaction of more than 300 enzyme reactions in the body. Magnesium is needed as a co-factor for several enzymes to help convert carbohydrates, protein, and fat into energy. Due to the role of magnesium in conducting nerve impulses, supplements have
been promoted for support of heart function. A few studies have suggested a potential role for magnesium supplements in energy metabolism by showing an increased exercise efficiency in endurance athletes.

An increase in lean body mass with a decrease in body fat is the product of a specific training and consistent eating habit. Players should be educated against the energy intake versus the energy expenditure. Low energy coming from food intake can causes disturbances to metabolic, hormonal, and immune system in short it will affect negatively the overall performance.


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