

# POST WORKOUT RECOVERY

Maximizing post workout recovery is extremely important for all athletes.

Whether an athlete's forte is endurance sports or body building, optimizing post workout nutrition is the most powerful mechanism to ensure accelerated muscle growth, recovery or performance.

After working out your body naturally increases its output of testosterone and growth hormone producing the perfect environment for protein synthesis and glycogen storage. Working out the correct formula to maximize glycogen storage and protein synthesis, while decreasing protein breakdown, requires an understanding of the underlying science. This article is an attempt to decipher the tons of literature about post workout recovery and supporting the various products that claim to do the job better than the next.

There are three key factors that will rapidly increase recovery and growth after training or competition.

**1. Supply of carbohydrates**

**2. Supply of amino acids**

**3. High insulin levels to stimulate glycogen storage and uptake of aminos into muscles**

The following information is sourced from Rasmussen et al., published in the Journal of Applied Physiology (1), which discusses rates of protein synthesis under several different conditions. It shows how spending a little time and money on the small things can benefit you tremendously in the long run.

1. At rest, with increased insulin levels, protein synthesis is increased by about 50% when compared with normal insulin levels.

2. At rest with high amino acids in the blood, protein synthesis increased by 150% when compared with normal levels of amino acids in the blood.

3. After weight training, protein synthesis increased by 100% versus pre training values.

4. After weight training with high levels of amino acids in the blood protein synthesis increased by 200% versus after weight training with normal blood amino levels.

5. After weight training with high amines in the blood and high insulin in the blood, protein synthesis increased by 400% versus normal post workout amino acid and insulin levels. (2,3)

**These results show the importance of getting post training nutrition right.**

It has been known for some time that insulin is one of the most anabolic (building) substances in our bodies. Insulin is responsible for pushing or accelerating the absorption and utilization of amino acids and carbohydrates. It has recently been discovered that it also plays a role in the regulation of post workout protein breakdown. In other words it not only helps build muscle, it also reduces muscle tissue breakdown. (4)

One of the best things about insulin is that it's free! It is secreted naturally when there are fluctuations in our blood sugar levels. By providing your body with **carbohydrates** in high amounts directly after training, insulin is naturally released to help push glucose and amino acids into muscle to begin the recovery process including protein synthesis and glycogen accumulation.

The carbohydrates used in the studies are glucose polymers, glucose, dextrose or a combination of all three. These are simple carbohydrates, all in powdered form, allowing maximal absorption in a minimal time frame. What has been shown is that by ingesting carbohydrates in liquid form you not only replenish glycogen stores quickly you also trigger the release of insulin and decrease the rate of muscle tissue breakdown.(5)

When we talk about protein for post training, we must look at its rate of digestion. There is no point in providing crude proteins, such as meats, after training as they can take between two and four hours for the amino acids to be released from the protein and absorbed into the blood stream. Like our choice of carbohydrate, our choice of protein must have an extremely fast rate of absorption. The only protein sources with very fast rates of absorption are either free form amino acids powders, which increase blood

serum levels in 10-15 minutes after consumption, or extremely high quality protein powders such as Ionised Whey or Whey Protein Concentrate.

At this stage it is worth pointing out that non essential amino acids are not needed for this process and if only essential amino acids are supplied, the rate of protein synthesis is the same (1,3). Numerous studies have also shown high concentrations of BCAAs play a big role in post training muscle recovery.(6) This means that drinking a shake with 30 grams of protein has no more benefit than taking the equivalent in essential amino acids (around 5g). In fact, it may even be detrimental as the absorption rate and supply to the muscles from even the highest quality protein powder is slow when compared to free form amino

acids. It makes sense. We provide our body with simple carbohydrates as they are absorbed and utilized most efficiently. Why wouldn't we use the most efficiently absorbed protein – free form amino acids?

In the study by Rasmussen et al. an extremely interesting factor emerges. After weight training with high levels of amino acids and insulin in the blood, protein synthesis increased by 400%. The drink used contained 36gm of carbohydrates to increase insulin, but only 6gm of protein! Essential amino acids and BCAAs were present in the correct amounts, in an easily assailable form, adding up to only 6gm of protein. You therefore don't need 50gm of protein powder with your carbohydrates – you only need the

correct amino acids in 5-10gm servings!

Another important point is that if you have a large crude protein meal that includes carbohydrates, it can encourage the release of glucagon. Glucagon can facilitate a smaller insulin release and also cause gluconeogenesis (the conversion of amino acids to glucose). So, in effect we provide less insulin and less of an anabolic environment if we eat too much protein with carbohydrates after training. To avoid this happening, take in simple carbohydrates with simple free form amino acids.

The above data demonstrates the validity of the following plan of attack for maximizing and optimizing post workout nutrition to increase recovery and muscle gains. The plan is divided into two groups, the first being Power Based Sports such as weight lifting, bodybuilding, sprinting or any event considered anaerobic. The second group is Endurance Based Sports such as triathlon, long distance running, rugby, soccer or any event considered aerobic.

Power based athletes have less carbohydrate burn and muscle trauma than endurance athletes, therefore a post nutrition plan needs to consist of a moderate intake of carbohydrate with essential amino acids, including branch chain amino acids and glutamine.

- **5gm of Essential Amino Acids**
- **5gm Branched Chain Amino Acids**
- **0.75g per kg of body weight of Glucose Polymer or Dextrose (eg 75gm for a 100kg athlete)**
- **High quality protein powder (30-50gm in water)**

This regime will allow the simple carbohydrates and amino acids to elevate blood levels within 10-15 minutes to immediately begin the recovery process. The shake will then allow the slow release of

amino acids over the next hour.

Endurance athletes have a high carbohydrate burn which depletes the body of stored glycogen, a high loss of electrolytes such as sodium and potassium and studies have shown plasma levels of Vitamin C and E low in many endurance athletes, as well as a real need for BCAA supplementation. We therefore look at providing a high intake of carbohydrate over a few hours to limit stomach discomfort, and moderate amounts of vitamins and BCAAs.

- **5gm of Essential Amino Acids**
- **5gm Branched Chain Amino Acids**
- **0.75g per kg of body weight of Glucose Polymer or Dextrose (eg 75gm for a 100kg athlete)**
- **0.5 to 0.75g per kg of body weight of Glucose Polymer or Dextrose (eg 75gm for a 100kg athlete)**
- **Vitamin C**
- **Vitamin E**
- **Glutamine**

This will allow the simple carbohydrates and amino acids to elevate blood levels within 10-15 minutes to immediately begin the recovery process. The second amount should allow the body's carbohydrate levels to return to adequate levels, restoring muscle stores of glycogen.

## REFERENCES

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