THE NUTRITIONAL CLOCK

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ABSTRACT
The nutritional clock is all about the importance of nutrients consumption timing in relation to exercise. The important thing about diet or nutrients is not what you are eating but when you are eating. The necessity of Pre-workout, Intra-workout, and the Post-workout nutrients, are the serious question mark. The purpose of this writings is simply to make the people aware not only about the nutrition but also its correct timing to consume it.

INTRODUCTION
Nutritional Clock is about the appropriate amount and types of nutrients consumed at appropriate time. You can consume the protein of an entire chicken, but if your muscles are not receptive at that particular time, the protein will be wasted. There are three phases of nutritional clock: (1) Energy Phase (2) Anabolic Phase (3) Growth Phase. All these phases are quintessence for the development of good muscles.

Key words: Nutrition al Clock, Energy phase, Anabolic, Growth, and Exercise.

The Phases of Nutritional Clock:

(1) ENERGY PHASE
This phase is to release sufficient energy to drive muscle contraction. Most athletes consuming carbohydrates during exercise both to (a) prevent depletion of muscle glycogen, which helps to extend endurance (b) to maintain blood glucose levels, which helps to delay fatigue. Research has shown when you consume carbohydrates with protein, will be able to spare muscle glycogen and achieve greater muscular endurance, blunt the rise in the catabolic hormone Cortisol (thereby reducing muscle damage).

Hormonal Changes
The most important regulatory hormones during exercise are insulin and cortisol. In the absence of nutritional supplementation, insulin levels decline during intense exercise and cortisol begin to rise.

Effect on the Protein Pool
During sustained exercise, a net protein loss occurs. Because an increased use of BCAAs serve as precursors for synthesis of glutamine. Glutamine being most abundant amino acid in muscles plays an important role in providing fuel for the immune system. During intense exercise due to its depletion our immune system is compromised.
(2) ANABOLIC PHASE

The switch that turn off the catabolic machinery and turns on the anabolic machinery is insulin. First let’s consider what happens once we stop exercising. ATP and CP levels are depleted, muscle glycogen depleted, rise in cortisol, free radicals are generated will attack muscle cells. Glutamine and BCAA depleted. Elevated blood flow post exercise supports the rapid removal of metabolic byproducts and faster nutrient and oxygen delivery. Blood flow quickly returns to its normal resting level, even though the recovering muscle still requires greater oxygen and nutrient delivery. The first forty-five minutes immediately following exercise (anabolic phase) is the metabolic window. The anabolic phase is the 45 minutes window following a workout that initiates the repair of damaged muscle protein and replenishes muscle glycogen stores. After exercise muscle cells are extremely sensitive to the anabolic effects of the hormone insulin. Insulin resistance is a condition that dramatically slows muscle glycogen recovery, repair of existing muscle and synthesis of new muscle.

Timing and Glycogen replenishment

Carbohydrates supplement immediately after exercise, stored twice as much as muscle glycogen in a two-hour recovery period as when they took the same supplement two hours later.

Timing and Protein synthesis

In order for protein synthesis to occur, amino acids must be transported into the cells to repair, rebuild and remodel muscle protein. When amino acid levels of the blood are depleted, amino acids are release from the muscle and muscle protein synthesis decline.

Timing and Increased Muscle Mass

You must consume all of the critical nutrients in the right proportions while the metabolic window is open. The two conditions for muscle growth are metabolic sensitivity and nutrient optimization.

(3) GROWTH PHASE

Extends from the end of anabolic phase to the beginning of next workout. It is the times when muscle enzymes are involved in (a) increasing the number of contractile proteins and the size of muscle fibers (b) helping the muscle fully replenish muscle glycogen depleted during the energy phase. Consumption of carbohydrates and protein is essential to maintain optimal muscle growth. Essential of muscle growth is the maintenance of positive nitrogen balance. Recommended daily allowance (RDA), protein intake should be 0.8 grams per kg of body weight. When protein is ingested, lean body mass is increased. When supplementation does not occur, blood insulin levels will remain low and blood cortisol levels will be elevated. Muscle glycogen depletes, protein degradation occurs, continued damage from free radicals and suppression of the immune system.

Ratio of Carbohydrates and Protein 1:5 (after workout).
Ratio of Carbohydrates and Protein 4:1 (Pre-workout).
Table-1 growth phase

<table>
<thead>
<tr>
<th>Rapid Segment first four hours after a workout:</th>
<th>Sustained segment- the next 16-18 hours after a workout:</th>
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<tr>
<td>Maintain increased insulin sensitivity.</td>
<td>Maintain positive nitrogen balance and stimulate protein synthesis.</td>
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<tr>
<td>Maintain the anabolic state.</td>
<td>Protein turnover and muscle development promoted.</td>
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**Conclusion**

The sum and substance of this paper is to aware the fitness lovers and health conscious people to get more output with a systematic input through their dramatically nutrition timing. Correct nutrients with the correct timing can make them away from delayed onset muscle soreness, fatigue, injury and the most important their satisfaction level will never be decline. As all the athletes love to see a striking changes with the help of exercise and this is merely possible when they stick with the nutritional clock.

**References**

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