

## What is Metabolic Efficiency and How Can Metabolic Efficiency Testing Help You?

Metabolic Efficiency Testing provides insight into your efficiency in utilizing fat stores as energy during exercise. Information received from various testing packages can be used to assist in the customization of individual exercise and nutrition strategies to improve performance, weight management, body composition and overall health. Based upon the testing protocol utilized, some of the following information can be obtained:

- Appropriate exercise intensities and nutrition strategies to improve fuel utilization
- Exercise recovery intervals to maximize fat adaptation
- Nutrition parameters to reduce the risk of GI distress during training
- Customized hourly energy intake during exercise
- Fuel utilization and partitioning at varying exercise intensities
- Nutrition coaching using test results to provide nutrition strategies to optimize daily and training nutrition

The concept of metabolic efficiency training was first introduced by Bob Seebohar, MS, RD and centers on controlling and optimizing blood sugar. When blood sugar is controlled with nutritional choices that emphasize consuming protein, fiber and healthy fat at nearly every meal and snack, the secretion of insulin is reduced. This is key as insulin plays a role in inhibiting the breakdown of fat (lipolysis) as well as indirectly stimulating the accumulation of fat in adipose tissue. Stabilizing blood sugar leads to a lower insulin level which promotes a greater amount of fat burning throughout the day.

An optimal metabolic profile may improve nutrient partitioning for energy use. Depending on size and gender, the average adult has 1200-2000 calories stored as carbohydrate (glycogen) in the liver, muscles and as blood glucose. These stores deplete quickly after about 2-3 hours of continuous, moderate effort exercise. Conversely, the body has anywhere from 30,000-80,000+ calories stored as fat. At rest, during light daily activities and lower intensity aerobic training sessions, the body primarily utilizes abundant fat stores rather than its carbohydrate stores for energy. As exercise intensities increase, the body shifts to using more carbohydrates and less fat as energy. The more metabolically inefficient an individual is, the more they will use carbohydrates at both lower and higher intensity levels of exercise, which increases the likelihood of 'burning out' quickly during training and/or needing to supplement with sports nutrition products possibly leading to GI distress. Following a high carbohydrate daily nutrition plan may also result in a higher dependence on carbohydrates in resting states as well. When a high carbohydrate meal is consumed, the body immediately begins to process it and in turn, downregulates fat oxidation. Adopting optimal fuel strategies may improve whole body fat oxidation allowing for enhanced utilization of internal fat stores to fuel higher intensity exercise. This reduces the rapid depletion of limited carbohydrate stores and the dependence on supplemental carbohydrate consumption during training and competition.

Metabolic Efficiency Testing utilizes indirect calorimetry to examine the physiological and nutritional status of an individual in order to validate and offer more accurate nutrition and exercise education and implementation strategies. There are two types of metabolic assessments: an incremental efficiency assessment and continuous assessment. The incremental assessment provides information regarding at what exercise intensity (power, pace, speed or heart rate) the body uses fat vs carbohydrate as the main fuel source and the point at which the body switches between the two nutrients. This assessment identifies whether an individual has a metabolic efficiency point (MEP) and it can be used any time during training and is generally reassessed every 8-12 weeks. A continuous assessment is used more commonly with endurance athletes to determine specific hourly nutrition needs during competition, is generally completed 1-4 weeks prior to competition and needs to be performed at specific competition intensity.

The primary purpose of the incremental test is to determine if the individual has a MEP (determined by plotting the % CHO and the % Fat at each 4-5 minute incremental stage with the corresponding heart rate, power or pace). If an MEP exists then you need to know the corresponding heart rate, power or pace at which it occurred. The primary data interpretation for an individual should also include an exercise prescription to enhance MEP (the MEP-D zone), total calories expended per exercise stage, total calories from CHO expended per stage and total calories from fat expended per stage. The administrator of the test ultimately determines how to best use this data in order to make it specific to each individual. If an MEP is present then the data is used to develop a nutrition and exercise strategy to improve fat oxidation below the MEP and then to gradually move the MEP to the right which is done by developing a balance of aerobic and anaerobic exercise training, manipulating macronutrient balance and altering training nutrition. If the individual lacks an MEP then the

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administrator would likely assess the individual's readiness to change and provide an initial nutrition intervention focused on stabilizing blood sugar and developing a proper exercise prescription. In either situation it is recommended the individual be reassessed every 8-12 weeks, but reassessment timeline should be correlated with the needs of the individual, their stage of change and health and performance goals.

For more information on the metabolic efficiency concept, please check out the links below:

<http://www.metabolicsciences.org/>

<http://www.irunfar.com/2014/01/metabolic-concepts-in-return-to-running.html>

<http://www.ultrarunning.com/features/metabolic-efficiency-becoming-a-better-butter-burner>

<http://www.livestrong.com/article/557726-eat-fat-to-burn-fat/>

## **EXERCISE SMARTER...NOT HARDER!**

To request an appointment please call (206) 706-7500 and a member of our team will be happy to assist you. Please note that fasting is required for all testing and should occur in a well rested state, meaning no hard efforts 2-3 days prior to testing.