Different nutrient and energy requirements for endurance and resistance athletes [1]

Dear Alice,

I am a second year Nutrition student and have a question about protein and endurance athletes. Why are their protein requirements greater than they are for resistance athletes? Is it because the muscle glycogen stores get depleted over a long period of time with intense exercise? If so, should they consume more carbohydrates than resistance athletes, with a low glycemic index prior to their workout?

Liiiisa

Answer

Dear Liiiisa,

You're on the right track, but athletes' protein, carbohydrate, fat, and calorie requirements can vary, depending on many factors. Athletes' needs depend on their fitness level, type of training, body size and composition, and performance goals.

Let's talk about endurance athletes first. They train aerobically for an hour or more at a time, which requires a lot of energy. Since muscles prefer to burn carbohydrates for fuel, serious endurance exercisers need plenty of these. The body stores carbs in muscle tissue (and the liver) as glycogen. Muscles use glycogen for fuel during exercise. When glycogen runs low, the body may resort to burning protein for energy. When this happens, endurance athletes' protein needs increase. Glycogen levels can diminish when exercisers work out at a moderate intensity for an extended period of time (90 minutes or more) without taking in any carbohydrates. These levels can remain low if people exercise day after day without eating enough carbs to replenish their supply. In either case, their bodies resort to utilizing protein for energy during workouts. This makes exercise tough; the result is fatigue. In running, this is referred to as "hitting the wall," and it's just like it sounds ? exhausting. Adding carbohydrates to your overall eating plan can help to prevent this from happening. Eating a snack just prior to exercise may be helpful, but does not entirely fuel that activity, because there won't be enough time to store those carbs as glycogen. It's the previous meals eaten that significantly contribute to glycogen levels. Research has shown that enzymes promoting glycogen storage hit their peak 1 to 2 hours after exercise. Having a carbo-licious snack during this time window can help stoke up glycogen stores and spare protein breakdown.
Resistance exercisers are those primarily involved in weight lifting activities. Without doing aerobic exercise, these folks typically don't burn as many calories as endurance athletes. Their protein needs depend on whether or not they are trying to build or maintain muscle mass.

The following is a general guide for protein and carbohydrate intake. A person's specific needs may vary depending on the duration and intensity of activity, fitness level, and body weight. A person's weight in kilograms (kg) is equal to his or her body weight in pounds divided by 2.2. For more details about dietary sources of carbohydrate and protein, check out Does carbohydrate become body fat? [2], Confused about carbs: What's a good carbohydrate choice? [3], and Do bodybuilders and other weightlifters need more protein? [4].

Using the information below and your body weight, you can calculate your daily protein intake recommendation:

<table>
<thead>
<tr>
<th>Activity level</th>
<th>Protein recommendation (grams protein per kilogram of body weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary individuals to light exercisers</td>
<td>0.8 g/kg</td>
</tr>
<tr>
<td>Recreational athlete</td>
<td>1.0 to 1.5 g/kg</td>
</tr>
<tr>
<td>High intensity endurance athlete</td>
<td>1.2 to 1.6 g/kg</td>
</tr>
<tr>
<td>Resistance training to maintain muscle mass</td>
<td>1.0 g/kg</td>
</tr>
<tr>
<td>Resistance training to increase muscle mass</td>
<td>1.5 to 1.7 g/kg</td>
</tr>
<tr>
<td>Estimated maximum protein requirement for all adults, regardless of activity level</td>
<td>2.0 g/kg</td>
</tr>
</tbody>
</table>

As far as calculating your recommend daily level of carbohydrate intake, there is a simple rule of thumb. Endurance athletes should consume 3 to 5 grams of carbohydrates per pound of body weight (6 to 10 g/kg). Fitness exercisers, including resistance trainers, should consume 2 to 3 grams of carbohydrates per pound of body weight (4 to 6 g/kg).
Besides carbohydrate and protein intake, it's also important for all athletes to consume enough total calories to fuel training as well as activities of daily living; otherwise, protein will still be burned as fuel instead of being used for muscle-tissue repair and other important functions. Resistance athletes trying to build muscle mass also have to take in sufficient calories to support muscle development. Hopefully this information will help as you hit the books and the gym!

Alice!
Category:
Cardiovascular/Aerobic Exercise [5]
Weight Training [6]

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Published date:
Nov 10, 2000
Last reviewed on:
Apr 07, 2009

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