People who engage in regular physical activity have reduced risk of hypertension, heart disease, diabetes, osteoporosis, depression, anxiety, sleep problems, and frailty. In addition, exercise reduces the risk of weight gain and obesity, and it reduces the risk for stroke. Exercise may also reduce certain kinds of cancer.

**Diet**
An optimal diet for a person who is in an exercise program is a diet based on the dietary guidelines. Physical activity helps to curb appetite, and as activity progresses, research shows that active individuals will spontaneously eat more. Over time, exercising individuals will be able to maintain their energy balance and not gain weight as they age.

**Energy Needs**
There are increased energy demands due to increased physical activity. If weight loss is a goal, maintaining the same level of intake as before activity was begun will result in weight loss. Heavier activity will result in increased food intake. This, in turn, means that they are spontaneously getting more nutrients in their diet: proteins, vitamins, and minerals.
The daily energy needs of an athlete depend on his/her activity factor. High level of sustained activity can double the daily energy required for BMR and activity. Weight maintenance indicates adequate caloric intake.

Calories are an important factor but are not to worry very much over because normal appetite regulation will enable individuals to adjust their intake, depending on what their energy expenditure dictates. If a person starts an exercise program, his/her appetite will generally increase to meet the body’s extra needs and, in this way, the individual will be able to maintain weight.

<table>
<thead>
<tr>
<th>Source/System</th>
<th>When in Use</th>
<th>Examples of an Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP</td>
<td>At all times</td>
<td>All types</td>
</tr>
<tr>
<td>Phosphocreatine (PCr)</td>
<td>All exercises initially; extreme exercise thereafter</td>
<td>Shotput, jumping</td>
</tr>
<tr>
<td>Carbohydrate (anaerobic)</td>
<td>High-intensity exercise, especially lasting 30 seconds to 2 minutes</td>
<td>200-yard (20 meter) sprint</td>
</tr>
<tr>
<td>Carbohydrate (aerobic)</td>
<td>Exercise lasting 2 minutes to 4-5 hours; the higher the intensity, the greater the use</td>
<td>Basketball, swimming, jogging</td>
</tr>
<tr>
<td>Fat (aerobic)</td>
<td>Exercise lasting more than a few minutes; greater amounts are used at lower exercise intensities.</td>
<td>Long-distance running, long-distance cycling; much of the fuel used in a brisk walk is fat</td>
</tr>
<tr>
<td>Protein (aerobic)</td>
<td>Low quantity during all exercise; moderate quantity in endurance exercise; especially when carbohydrate fuel is lacking</td>
<td>Long-distance running</td>
</tr>
</tbody>
</table>
**Supplements**
An exercise program combined with supplemental protein or micronutrients has no benefit over exercise alone in increasing aerobic capacity, muscle strength, and function. To date, nutritional manipulation has no added benefit on performance.

**Athletes**
Typical protein needs for athletes ranges from 1.2 to 1.6 g/kg body weight. For endurance athletes, about 10% of energy comes from protein and would benefit from increased intake. Untrained subjects undergoing endurance training need about 1 to 1.2 g/kg/d, which is above the RDA of 0.8 g/kg body weight.

**Body Building**
In the initial stages of body building when a lot of new tissue is being built, intake around 1.8-2.0 g/kg body weight is recommended. Resistance exercise seems to exert an anabolic effect and allows for better protein utilization. Once the desired muscle mass is achieved, protein intake need not exceed twice that of the RDA.

**Older Adults**
A subset of about 20 to 25% of older men and women may not be getting the RDA for protein. For them (and the very frail, or with denture problems and poor food intake) increased protein intake is recommended when they are starting an exercise program. Protein should be from food sources, not from supplements. Milk shakes and other dairy-based foods can be used as protein supplements.

**Toxicity**
There could be a toxicity risk when people consume too much protein (over 2.0 g/kg/d). An excessive load of protein represents a stress on the kidneys. This is even more of a concern with the elderly, when kidney activity decreases. So, it is important to realize that very high protein diets will result in overworking the filtration system of the kidneys.
### “Appropriate” Activities for Carbohydrate Loading:

- Marathons
- Long-distance swimming
- 30-k runs
- Triathlons
- Soccer
- Long-distance canoe racing
- Cycling events

### “Inappropriate” Activities for Carbohydrate Loading:

- Football games
- 10-k runs
- Walking and hiking
- Most swimming events
- Basketball games
- Weight lifting
- Most track and field

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To promote healthier lives through research and education in nutrition and preventive medicine.

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**Division of Education**

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