

# NUTRITION

## for PEAK Performance

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photography by Susan Peters

As you begin the second 500 meters of your 2,000-meter race, a heaviness engulfs your arms and quads — a gruesome sensation that has been showing up earlier each time you race. The bark of the coxswain is barely heard above the wail of your muscles. As the heaviness continues, the other boat begins to move past yours. You are pulling your hardest, but the boat feels dead in the water. You become frustrated and angry. You've been training harder than ever, so why is this happening?

This heaviness, or lack of energy, may come from the way you're eating — or not eating. Even athletes who realize the difference good nutrition makes between victory and defeat may fail to pay enough attention to their food intake until it's too late. Performance reflects training, training reflects work, and a high work intensity can only be achieved by muscles that are properly fueled. It's not only what rowers eat the night before a race that impacts performance — it's what they eat during their long months of training.

### Training #1 NEED

Plenty of carbohydrates. Carbohydrates and fats are the fuels that energize hard-working muscles. Muscles will burn both substances to generate energy, but carbohydrates are more easily broken down and thus more effective in recharging the body.

Fats and carbohydrates are extracted by the muscle, either from the bloodstream or from stores within the muscle itself.

However, the longer athletes exercise or the more intense that exercise becomes, the more muscles will tap into their own carbohydrate stores, called glycogen. For example, daily workouts of two hours at 80 percent of maximum output can deplete glycogen stores within three days without proper nutrition. This can lead to heavy legs and arms, lethargy and poor performance.

Diet and rest influence your ability to store glycogen. The effects of diet can be seen in the results of an experiment published in the article "Nutrition for Endurance Sport: Carbohydrate and Fluid Balance," by D.L. Costill and J.M. Miller, in the *International Journal of Sport Medicine*, 1, 2-14 (1980). Athletes eating a normal diet were asked to run for two hours a day. Small samples of muscle tissue were removed through a needle before and after their exercise, then analyzed for glycogen content. Muscle glycogen reserves dropped with each successive day of exercise, and by the third day, several athletes were physically exhausted and unable to exercise.

Athletes who ate high carbohydrate diets came close to replenishing their glycogen reserves. By the end of day three, reserves were nearly the same as on day one — and they failed to experience the pain and fatigue of their glycogen-deprived counterparts.

This research shows that one way to replenish muscle glycogen is by eating foods with a high carbohydrate content. High carbohydrate foods such as fruits, fruit juices, vegetables, cereals, pasta, breads, rice, corn and potatoes should be chosen instead of — not in addition to — high fat foods. Another lesson learned from this data is that rigorous training depletes glycogen; therefore, failure to replenish glycogen stores means that a rower may never train at his or her potential. To train at a high level, these stores must be re-supplied daily through proper nutrition and adequate rest.

### Training NEED #2

Keep hydrated. A deficiency of water will impair physical performance just as a low carbohydrate intake will.

However, there's one important difference — a low carbohydrate diet isn't life-threatening, but a water deficit is. The key is to replenish water lost in sweat during training. Athletes should make a conscious effort to drink a glass of water every two hours throughout the day, and not just in warm weather — indoor workouts and cold-weather training cause water losses, too.

Thirst is not very sensitive to the body's needs and thus is not a good barometer of water loss. A rower won't begin to crave liquid until after the body has lost 1-1/2 to 2 pounds of water, so if you are waiting until you feel thirsty to begin drinking water, you are waiting too long. In addition, thirst can be quenched prematurely, before body water losses have been replaced completely, which means rowers should not stop drinking just because they are not thirsty anymore!

One way to monitor water status is through body weight changes. For every pound of weight lost, 2 cups of fluid should be consumed. Another way to track water status is by urine color. As an athlete dehydrates, the urine concentrates and darkens. Drink enough water to keep the urine color pale yellow.

There is no need to consume carbohydrate-containing drinks before a race because pre-race carbohydrates are beneficial only for events lasting longer than one hour. However, carbohydrate drinks may be integrated into the pre-race meal if athletes are too nervous to eat solid food or want to boost the carbohydrate level of their diet. Furthermore, carbohydrate drinks may be useful to rowers who have trouble keeping weight on or who want a quick between-race snack. Sports drinks are advertised as replenishing electrolytes lost in sweat, but a balanced diet can accomplish the same objective without the extra cost.

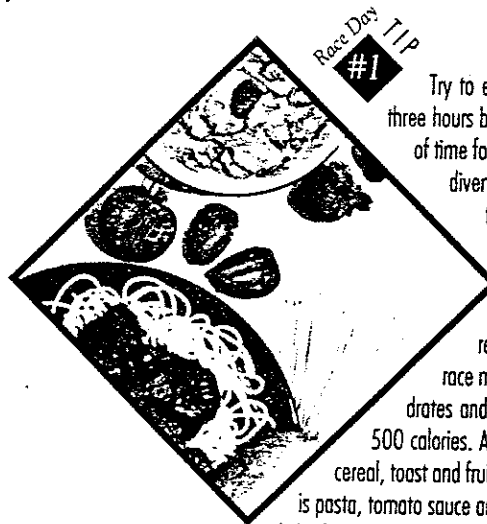
### Training NEED #3

Variety in the diet. Two factors make variety in the diet important. First, although scientists have identified 40-

plus nutrients (such as calcium, iron, vitamin D, vitamin C, etc.) known to be essential for human health, more are undoubtedly on the way. Until scientists can say with certainty that all essential nutrients are known, the best way to ensure that you are getting what you need is to offer the body a wide variety of nutrient sources and let it take what it needs.

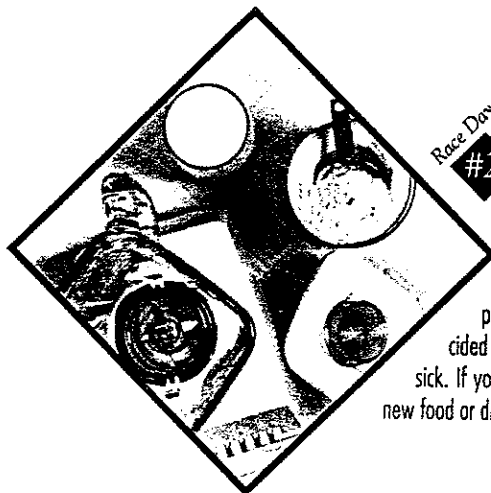
Secondly, the nutritional needs for healthy Americans — called recommended dietary allowances, or RDA's — have been determined on relatively sedentary individuals. Scientific studies have targeted the nutritional needs of athletes, but these values have not been used to determine RDA's. Therefore, athletes may need more of certain nutrients than the RDA levels suggest. Until the complete picture of the nutritional needs of athletes becomes more clearly defined, it is best to meet those needs with a variety of foods rather than with supplements (see sidebar). Eat a variety of foods from the five food groups: fruits, vegetables, meat or meat alternatives, dairy, and grains.

Assuming your training diet is in order, the next question is "what about race day?" There are specific guidelines you can follow to keep your glycogen stores replenished and your energy levels high.



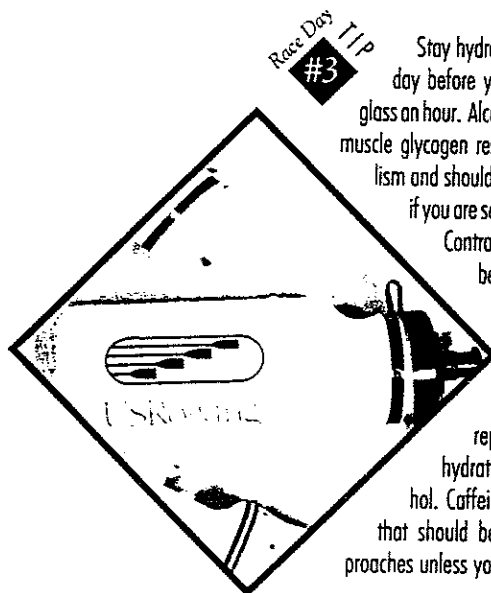
### Race Day TIP #1

Try to eat your pre-race meal at least three hours before race time, leaving plenty of time for digestion. Race-day jitters can divert blood away from the digestive tract and slow down digestive and absorptive processes, so allow plenty of time, if possible, for the nutrients to reach your bloodstream. The pre-race meal should be high in carbohydrates and low in fat — about 400 to 500 calories. A good breakfast could include cereal, toast and fruit; a nutritious afternoon meal is pasta, tomato sauce and bread. Keep your breakfast light if you are competing very early in the day and won't have three hours to digest a meal — you will be rowing on energy from last night's dinner and can load up on carbohydrates after the race.



### Race Day TIP #2

Do not experiment with new foods on race day. Your attention should be focused on the race, not on whether or not the "Super-Carbo" drink you just decided to try is going to make you sick. If you want to experiment with a new food or drink, do it in practice.



### Race Day TIP #3

Stay hydrated. Drink plenty of water the day before your race — as much as one glass an hour. Alcohol is a potent diuretic, impairs muscle glycogen restoration and energy metabolism and should be avoided during the season if you are serious about your performance.

Contrary to popular belief, alcoholic beverages are not good carbohydrate sources for post-race glycogen repletion. If you want to celebrate, first rehydrate with water and replenish glycogen with carbohydrate-rich food before taking alcohol. Caffeine is another potent diuretic that should be avoided as race time approaches unless you are accustomed to it.

## ◆ You Are What You Eat

### Putting Good Nutrition into Practice

#### Choose Carbohydrates

The key to keeping muscle glycogen levels high is to replace dietary fat with dietary carbohydrate. The following are a few suggestions for making the switch.

#### INSTEAD OF:

cream cheese, butter

cheese omelet

cheese sauce, alfredo sauce

whole milk

fried chicken

thin crust, double cheese

#### TRY:

jam, jelly on toast, bagels

pancakes, waffles

tomato sauce on pasta

skim milk

baked, skinned chicken

thick crust, vegetarian pizza

## ◆ Food for the Short Run:

### Eating Between Meals

Many athletes eat three meals a day, and then some. For those in-between times, don't be caught with no alternative but a burger or doughnut. Be prepared for a hunger attack or a well-deserved snack. Some easy-to-carry suggestions:

bagels, apples or oranges, crackers, pretzels, graham crackers, bottles of fruit juice, water bottle

## ◆ Tips for Quick and Healthy Weekday Dinners

Fast food can come from your own kitchen just as quickly as it's put under the heat lamps at a local chain. And there's a distinct advantage — the fast food made at home may be lower in fat and higher in nutrients than that purchased. One way to cook fast food at home is to have a batch of cooked grains and meat or meat alternatives that you've prepared ahead of time — maybe during the weekend — waiting in the refrigerator. For a fast meal, heat the grains and meats in the microwave while you steam some frozen vegetables. You'll have a healthy dinner in a matter of minutes.

### Prepare ahead by fixing, then refrigerating:

**Grains:** cook a batch of pasta or rice (rice cookers do the job in 15 minutes, if you prefer fresh).

**Meat or Meat Alternatives:** saute some chicken in soy sauce and ginger; quick-cook some beef strips in onions and marinade; make a pot of curried lentils. Beans, which are a prime source of protein for vegetarians, can be time-consuming to cook, but lentils are the quickest to prepare (about 30 minutes).

If you find yourself out and about with no food source but the local fast food spot, take heart — fast food is not necessarily unhealthy food, and there are choices you can make to minimize fat and maximize carbohydrates. For example, eat two hamburgers instead of one super deluxe burger; choose a salad instead of french fries; try pancakes instead of a sausage-and-egg-biscuit; have a thick-crust pizza topped with vegetables, or spaghetti and meat sauce instead of fried chicken; choose juice or 2% milk instead of a soft drink.

## ◆ Daily Eating Inventory

Although your exact food needs will vary according to sex and size, there are some general guidelines for attaining a well-rounded diet. Mentally check each day to see if you've eaten at least:

— 4 servings of vegetables (1/2 cup of broccoli equals one serving)

— 4 servings of fruits (1 apple equals one serving; 6 ounces of juice also equal one serving)

— 3 servings of dairy products (4 servings for men; 1 cup of milk or 1 ounce of cheese equals one serving)

— 5 to 6 ounces of high-quality meat or meat alternatives (1 ounce of meat or fish, or 1/2 cup of beans equals one serving)

Maintain body weight and replenish muscle glycogen with plenty of carbohydrates.

## ◆ Are Nutrient Supplements Necessary?

As long as athletes eat a balanced diet and meet their energy needs, nutrient supplements are unnecessary. The exception may be iron for female rowers of any age, and teenaged rowers both male and female. Good sources of iron are lean beef, pork and tuna (animal products contain easily absorbed, or "heme," iron), green-leafy vegetables, iron-enriched cereals and iron-enriched breads (plant products contain poorly absorbed, or "non-heme," iron). Coffee and tea should be avoided near mealtime because these inhibit iron absorption. Foods containing Vitamin C, such as citrus fruits, tomatoes and potatoes, will increase iron absorption when eaten along with non-heme, iron-containing foods.

If you suspect you may have an iron deficiency, have your blood analyzed for serum ferritin. A low serum ferritin means

the body's iron stores are being robbed, and some research suggests this may impair athletic performance.

Avoid mega-dosing on any one nutrient — including iron — unless under a physician's direction. Mega-dosing overwhelms the digestive system and reduces the absorption of other nutrients. The best way for a rower to meet his or her needs for vitamins and minerals is to meet his or her calorie needs. Eating more high-quality calories means getting more vitamins and minerals. Lastly, remember that a nutrient supplement cannot make up for a poor diet.

## ◆ If You Are a Strict Vegetarian

Carefully selected vegetarian diets are healthy, low in fat and high in carbohydrates. A vegetarian athlete can compete on equal ground with his or her meat-eating competitors. However, there are some key nutritional issues for a vegetarian athlete:

— **complementing protein sources?** The book *Laurel's Kitchen*, by L. Robertson, C. Flinders and B. Godfrey, explains that certain food combinations, such as beans and rice, seeds and beans, or milk and grains, can improve the quality of vegetable protein. However, a volume called *A Vegetarian's Sourcebook*, by Keith Akers, offers a different perspective. Akers' book suggests that the notion of eating two foods together to generate more protein has been proven true only for laboratory rats. His book claims that vegetables alone can be sufficient sources of protein.

The bottom line from these conflicting sources implies that vegetarians should meet all their calorie needs and eat a balanced diet of grains, beans, vegetables and other non-meat items to ensure adequate protein.

— **meeting calcium needs.** Try calcium-fortified soy milk or calcium-fortified orange juice, or eat larger amounts of calcium-rich plants, such as turnip greens, broccoli and kale.

— **meeting iron and Vitamin B12 needs.** Iron sources are described in the nutrient supplement sidebar; Vitamin B12 sources are fortified breakfast cereals, fortified yeast, and fortified soy milk.

— **eating enough calories.** Vegetarian diets tend to be high in carbohydrates, but may be low in caloric density. Be sure your appetite is satisfied by food calories, not food volume.

— **All vegetarians should be in contact with a registered dietician or nutritionist to make sure their diet is adequate.**

