Athletic Nutrition Bytes: Fueling the Body for Competition

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Athletes are taught that being a part of a winning team requires discipline and attention to detail in the classroom, on and off the field, and in the food choices they put on their plate.

In today's frenetic fa(s)t-food world, the latter can prove to be one of their toughest challenges.

Fueling the body and mind helps student-athletes perform optimally in the classroom, in the weight room, and in competition.

Here at Michigan State, our strength/conditioning, sports medicine, and sports nutrition staffs work in concert to provide our athletes with guidelines to assist them in achieving peak performance and optimize their short and long-term health. These include strategies for losing excess body fat, adding lean (muscle) weight, meal/snack planning, timing of intake, and instructions on reading and interpreting food labels.

We take great care to insure that all of the nutritional components of our program (e.g., training table menus, travel meals, supplements, etc.) are carefully examined in order to give our athletes the very best advice for optimal performance.

Nutrition 101

While it goes without saying that food provides our calories, energy, muscle building properties, and recovery capabilities, many of the facts on proper nutrition tend to get lost in the hype and myths.

The headline nutrients – known as "macro-nutrients" — are carbohydrates (4 calories per gram), protein (4 calories per gram), and fat (9 calories per gram).

Here is some very basic, yet practical nutrient information that coaches should know and be able to relate to their athletes:

Carbohydrate – This nutrient is the royalty of energy production, as it provides the energy and fuel required during repetitive bouts of high-intensity exercise. It is stored in the form of glycogen in the muscles and the liver and is readily available when called upon. The major caveat, however, is that the body's storage tanks hold limited amounts of this fuel, thus predicating continual replenishment.

This is especially true of what used to be known as "complex carbs," (now referred to as "low-glycemic" carbs) such as whole grain cereals, pasta, brown rice, fruits, and vegetables. Simple sugars (or "high-glycemic"carbs), such as those found in processed items such as soda, candy,

snack foods, and even some starchy vegetables, may not provide the sustained level of energy release that is usually characteristic of complex carbs.

The carbohydrate classification models of complex/low glycemic and simple/high glycymic have been a topic of much debate and discourse in terms of blanket claims about their energy effects on every individual. People tend to respond and adapt to food nutrients at a rate and level dictated by a cascade of individual differences.

The glycemic index – which rates carbohydrate sources by the effect they have on blood sugar – was originally designed to help diabetics control their blood sugars. However, a multitude of factors play into this, including the amount of fiber it contains, how much is eaten, the amount of added fat, and the way it is prepared.

For more information on the glycemic index rating system, go to www.glycemicindex.com.

Without question, though, carbohydrates are the very best fuel for moderate and high-intensity exercise. Additionally, they are the primary fuel source for the brain and all of the vital functions that it exhaustively executes. The complex/low-glycemic variety might be a better choice over the long-haul, but the simple/high-glycemic variety do provide glucose more rapidly for immediate post-exercise intake and can be beneficial, especially when combined with a small amount of protein.

The complex carbs are vital soon thereafter, as they contain many essential vitamins and minerals – or, "micro-nutrients" — that aid in recovery and assimilating food sources for energy and muscle building. For instance, we know that carbohydrates can assist in sparing protein for muscle repair and growth, rather than allowing the body to use it as a primary energy source.

Recommendations for daily carbohydrate intake range from 50-60%, depending primarily upon activity level and calorie expenditure. Obviously, athletes engaged in strenuous training, practice, and competition will require the higher end recommendation – and possibly a bit more. This is especially true of the whole grain products, fruits, and vegetables, which we tell our athletes to get as much of as possible. This amounts to approximately 3 grams of carbohydrate per pound of body weight per day, which is a generous allotment, but is often needed by high-caliber athletes.

Protein — Some of the better sources for quality protein are lean meats, poultry, fish, eggs, low-fat dairy products, beans/legumes, and a variety of nuts. Since our muscles and hormones are constructed with protein components, these quality protein sources are extremely vital for histological (i.e., tissue) growth and repair.

Protein is comprised of any number of the 21 amino acids. Nine of the amino acids are termed "essential," due to the fact that we must obtain them from food. The remaining 12 are called "non-essential" because our bodies can produce them, if necessary.

A "complete" protein is one that contains at least 8-9 of the amino acid complex, and many of the foods mentioned above fall into that category.

Depending upon the scientific source you choose to embrace, daily allowances of protein for athletes range between .07 – 1 gram of protein per pound of body weight per day. On average, 15-25% of the daily caloric intake should be composed of lean, high-quality protein.

Athletes must be cognizant of not displacing the high-priority carbohydrates with excessive protein, or they will negate their primary energy source. This is why "more is not necessarily better" when it comes to protein intake.

A word of protein advice: Before you sprint down to your neighborhood supplement emporium to purchase a buggy full of the hyped-up protein concoctions, remember that no engineered, commercial product can match the quality and balance of good, old-fashioned food.

Most engineered, fancifully packaged protein products lack fiber, phytochemicals, and a whole cast of health-protective nutrients.

Sure, an occasional protein shake can serve a purpose when a hectic schedule and convenience are considerations, but don't ever believe that it is any better than a glass of low-fat chocolate milk. A turkey sandwich on whole wheat bread with a slice of low-fat cheese, a sliver of tomato, and topped with some spinach leaves would complement it very well. Throw in a piece of fruit and you've done your body a world of good – and probably at a fraction of the cost of store-bought protein supplements.

Fats – First off, fats are not necessarily the demons that the name implies. While it is true that excessive amounts of fat – primarily saturated (solid at room temperature) and trans fats (hydrogenated and partially hydrogenated oils) – are unhealthy, other fats serve vital functions.

Unsaturated fats (liquid at room temperature), such as those found in certain vegetable oils like canola and olive, as well as those derived from nuts, seeds and fish, can have numerous health benefits. Collectively, these make up the monounsaturated, polyunsaturated, and linoleic/alpha linolenic fat categories that aid in the health of all of the body's cells, can help reduce tissue inflammation, and have positive effects on the blood's viscosity.

The bottom line on fats: Try to limit them to a daily recommendation of 25-30% of the total daily caloric intake – and keep most of that in the unsaturated fat category.

Nutritional Coaching Point: Don't forget to drink plenty of water, as there is no more important nutrient. Water is truly "nature's supplement," and it should be a high-priority component in the daily nutritional plan. The usually recommended 8-10 twelve ounce glasses of water per day are a good start, but more may be necessary with athletes. Nancy Clark, MS, RD, recommends remembering ***W.U.T. for healthy hydration:**

W – (Body weight) — Weigh yourself before and after every practice, workout, and game, and replace each pound lost with 3 cups of fluid.

U – (Urine) – Monitor your urine for color, which should be clear or slightly yellow. Very dark yellow urine may indicate dehydration. Note: Vitamin supplements can also be culprits in producing dark yellow urine, so take that into account.

T – (Thirst) – Drink before you sense thirst. A person is typically 1% or more dehydrated by the time thirst sets in. It sounds insignificant, but staving-off dehydration must be a pro-active venture.

Final Rep: Read Those Food Labels

We instruct our athletes in the art of reading food labels, which hold crucial information in making educated decisions on food choices.

Let's look at the vitals on a food label from top to bottom:

Serving Size – Always start here in order to decipher how many servings the package contains. Don't be fooled into thinking that the entire package constitutes only one serving. Serving sizes are standardized to make it easier to compare similar foods and they are provided in familiar units: cups, pieces, etc., followed by the number of grams. Pay attention to the serving size — especially the total number of servings in the package — and then stay aware of the servings you are consuming.

Remember to factor that total when determining total calories and nutrient grams eaten

Total Calories/Calories From Fat – This line provides a measure of how much energy you derive from each serving. Remember: The number of servings you consume determines the amount of calories you actually take in. It is important to be especially wary of the fat calories in each serving, with extra caution given to saturated and trans fats.

The Nutrients – The top of the nutrient section shows some key nutrients that impact your health and are separated into two main categories: Under **Total Fat**, note the saturated fat and trans fat grams. These are both solid fats and they should be kept to minimal amounts, as research has consistently implicated them as major health concerns.

Cholesterol should also be on your watch list, and kept as far under the %DV (with consideration given to your total daily calorie consumption) if possible. The most prominent concern surrounding all of the above, of course, is cardiovascular disease.

Sodium has been linked to high blood pressure, thus excessive amounts should be avoided. Again, check the %DV and factor-in your total daily calories.

You will also be able to track protein, carbohydrate, fiber, and miscellaneous sugars in this section of the label.

Sample label for Macaroni & Cheese

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250 — Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

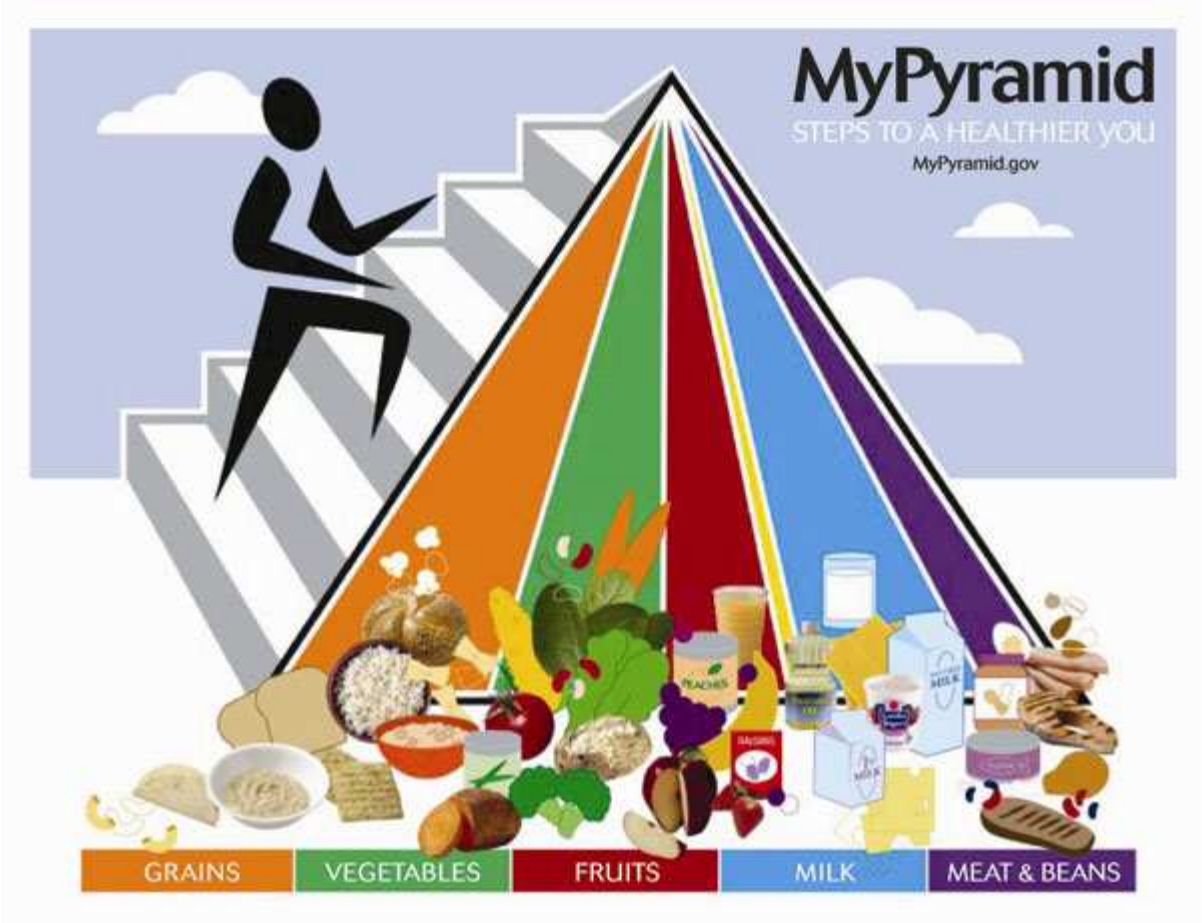
Get Enough of These – Many Americans do not eat enough foods rich in dietary fiber, nor the nutrients that are found in fiber-rich foods. These include vitamin A, vitamin C, calcium, and iron. Eating enough of these nutrients can improve your health and help reduce the risk of certain diseases and other ailments. Fruits, vegetables, whole grain products, beans, and certain nuts promote healthy bowel function and lower the risk of heart disease and some types of cancer.

Footnote on %DV (Percent Daily Value) – When examining the information on %DV at the bottom of the food label, keep in mind that these percentages are based upon what the product contains per the requirements of 100% of a 2,000 calorie daily diet. Athletes, for the most part, exceed and need much more than 2,000 calories per day. So, when using those values to determine if you are within the suggested parameters for both the good and not-so-good lines, be sure to do the math that takes your personal calorie intake into account.

TIP FROM THE TRENCHES

Climbing MyPyramid to Nutritional Success – The U.S. Department of Agriculture has renovated the food pyramid (check illustration) to keep in-step with recent nutritional scientific findings. The MyPyramid construct presents a more balanced, healthier overall approach to dietary guidelines, and is well-worth examining very closely for use as a nutritional template.

And the most palatable course it serves-up is the fact that every individual can customize his/her own plan according to age, sex, weight, height, and level of physical activity.



Go to www.mypyramid.gov for an entire menu of nutritional information, suggestions, and build your own personal pyramid.

(*Source: Nancy Clark's Sports Nutrition Guidebook, 3rd edition, Human Kinetics, Champaign, IL 2003)

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