Nutrition for Endurance Athletes

Fuel your passion

CAROLINA MULTISPORTS

Topics of Discussion

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ENERGY SYSTEMS

ATP-CP
Aerobic
Anaerobic

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TRAINING REQUIREMENTS

Macronutrients
Hydration

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RACE DAY CONSIDERATIONS

Energy Systems

- Adenosine triphosphate-Creatine phosphate (ATP-CP)
- Anaerobic
- Aerobic

ENERGY SYSTEMS

ATP-CP

- Last 1-5 sec.
- Depleted in 30 sec.
- Uses glycogen stored in muscles as fuel source.
- Used for race starts/finishes flying bike mounts, overtaking, etc.

ANAEROBIC

- Lasts 1.5-2 min.
- Primarily uses sugar as fuel source.
- Training aimed at tolerating/removing lactate.

AEROBIC

- Lasts for hours
- Kicks in after 2 min.
- Primarily uses fat as fuel source.
- Training aimed at making muscles more efficient at using oxygen.

ENERGY SYSTEMS

ATP-CP

1:6-1:10
Ex. After sprinting for 20 sec., you need 2–3.5 min. for recovery.

ANAEROBIC

1:1-1:2
Ex. Overtaking a rider for 1 min., you need to recover for 1-2 min. before the same effort again.

AEROBIC

Effort can last for hours.

These systems do not work independently of each other but rather one is more dominant than another at different intensities and durations.

Training Requirements

Carbohydrates

Carbohydrates are the most efficient fuel source because it requires less oxygen to burn.

- Fuels the Brain & Nervous Systems – If blood sugar levels drop, an athlete may have trouble concentrating and performing basic tasks.
- Preserves Protein – Diets low in carbohydrates break down protein and convert it to carbohydrates. Protein is a less desirable fuel source because is it needed for growth and repair of muscle tissue. A diet with sufficient carbohydrates help preserve lean muscle mass.
- Aid in Fat Metabolism – Even the leanest athlete has more than enough stored fat to fuel hours worth of training. However, carbohydrates are still required to utilize fat as a fuel source. Limited carbohydrate stores will limit fat metabolism.

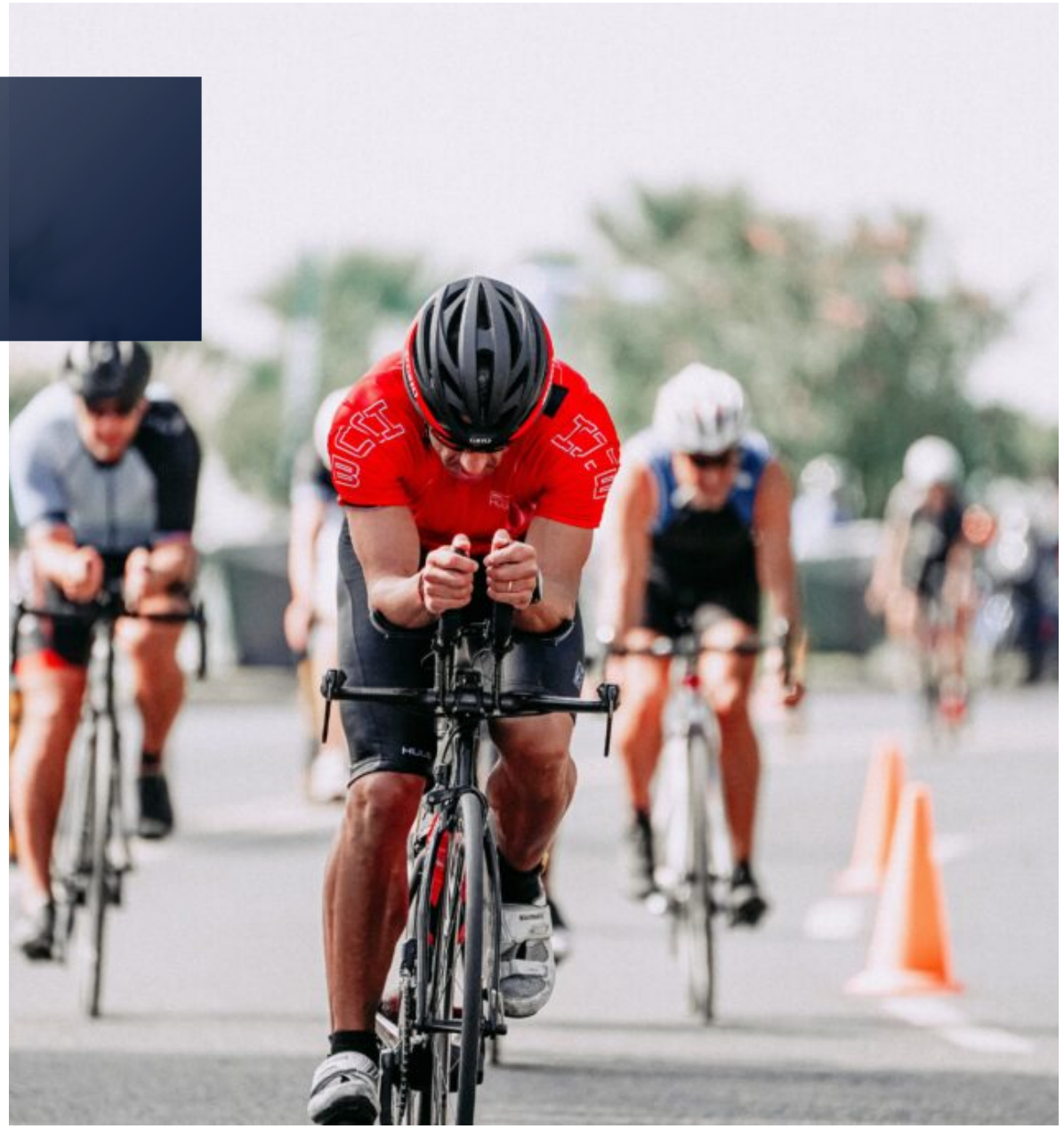
Daily Carbohydrate Recommendations

Daily Activity Level	Grams per Pound of Body Weight
Up to 90 min. Moderate Intensity	2.25 – 3.0
Greater than 90 min. Moderate to High Intensity	3.0 – 4.5
Greater than 3 hours Moderate Intensity	4.5 – 5.5+

Ex. A 150-pound athlete would need to consume at least 675 grams of carbohydrates during a given day if a 3-hour bike ride was scheduled.

Daily Calorie Recommendations

Daily Activity Level	Calories per pound of body weight	Race Distance
No Planned Training/Rest Day	12-15	Off Day
Up to 60 minutes – Moderate Intensity	15-18	Sprint Distance
High Activity of 1-3 hours/day	18-25	Olympic Distance
Very High Activity of 3+ Hours/day	25-30+	Long/Ultra Distance



Training Requirements

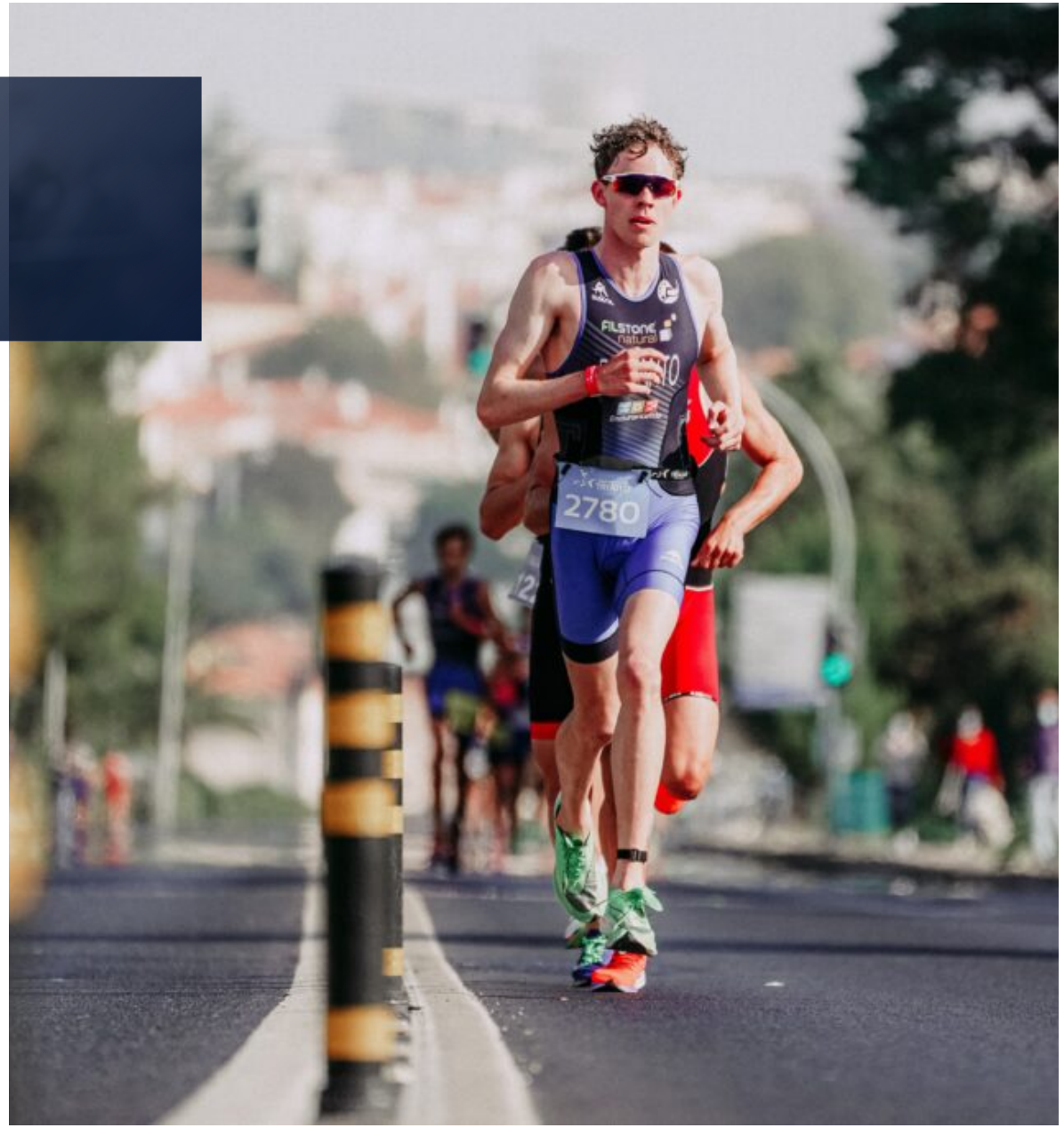
Protein

- The primary role of protein in the body is to support growth, maintenance, and repair of muscle tissues.
- Protein can be used as a fuel source after it is converted to carbohydrate.
- During the later stages of training/racing with glycogen stores are depleted, the body can supply up to 15% of its energy from the breakdown of protein.
- The body does not store excess protein. Once dietary proteins are met, excess protein is converted to either carbohydrate for immediate energy or fat to be stored for future energy needs.
- Protein needs can be met entirely through diet alone.

Daily Protein Recommedations

Daily Activity Level	Grams per Pound of Body Weight	Calories per Pound
Up to 60 minutes per day	0.5	1.1
1-2 hours	0.6	1.3
2-3 hours	0.7	1.5
3+ hours	0.8	1.8

Ex. A 150-pound athlete would need to consume at least 120 grams of protein to prepare for and adequately recover from a 3-hour bike ride.



Training Requirements

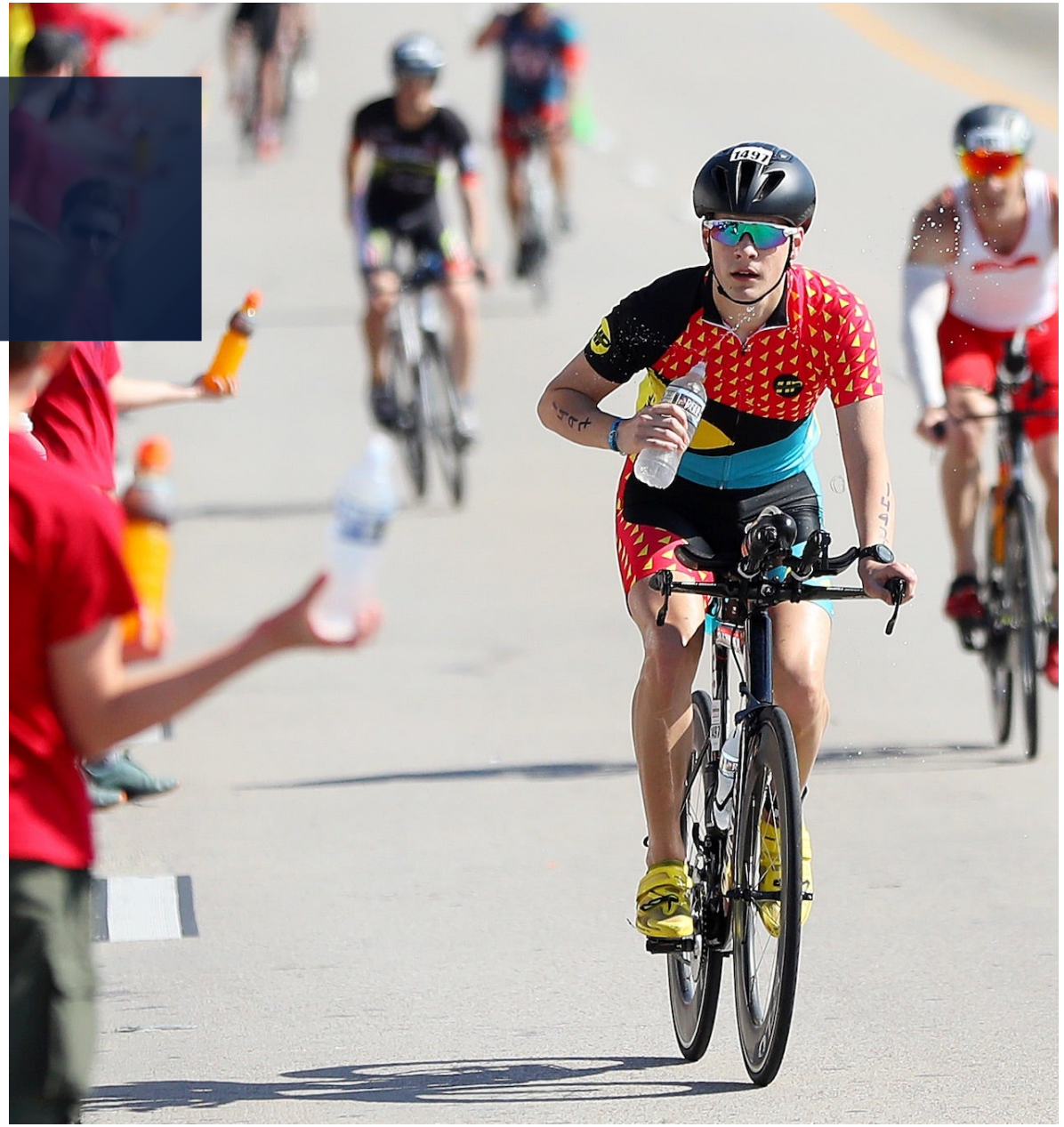
Fat

- Fat is a significant fuel source for the body at rest, and during low intensity, long duration training/racing conditions.
- Fat is important to the following functions:
  - It is the most energy dense macronutrient. (It provides 9 calories per gram as opposed to only 4 calories per gram of either carbohydrates or protein.)
  - It provides the building blocks for hormones.
  - In helps with the absorption of vitamin A, D, E, and K.
  - It maintains healthy skin and cell membranes.
  - It cushions and protects delicate internal organs.

Daily Fat Recommedations

	Grams per Pound of Body Weight
Daily Fat Requirement	0.5

Ex. A 150-pound athlete would require about 75 grams per day.



Training Requirements

Hydration

- Water is vital to life and performance.
- Total body mass is 60 % water.
  - 83% of lungs.
  - 79% of muscle mass.
  - 73% of brain & heart.
  - 31% of bones.
- As the body becomes dehydrated, various body functions are affected. Both body and blood volume decreases. As a result:
  - Less nutrient rich, oxygenated blood reaches the brain and muscles.
  - The heart must work harder to pump thicker blood.
  - Slowed circulation doesn't allow the body to cool itself or remove metabolic by products and waste.
  - Gastrointestinal stress increases due to delayed stomach emptying.
- **CAUTION**: You can drink too much. First, too much water in the stomach sloshes around causing discomfort and possible vomiting. Second, low blood sodium can lead to serious health consequences.

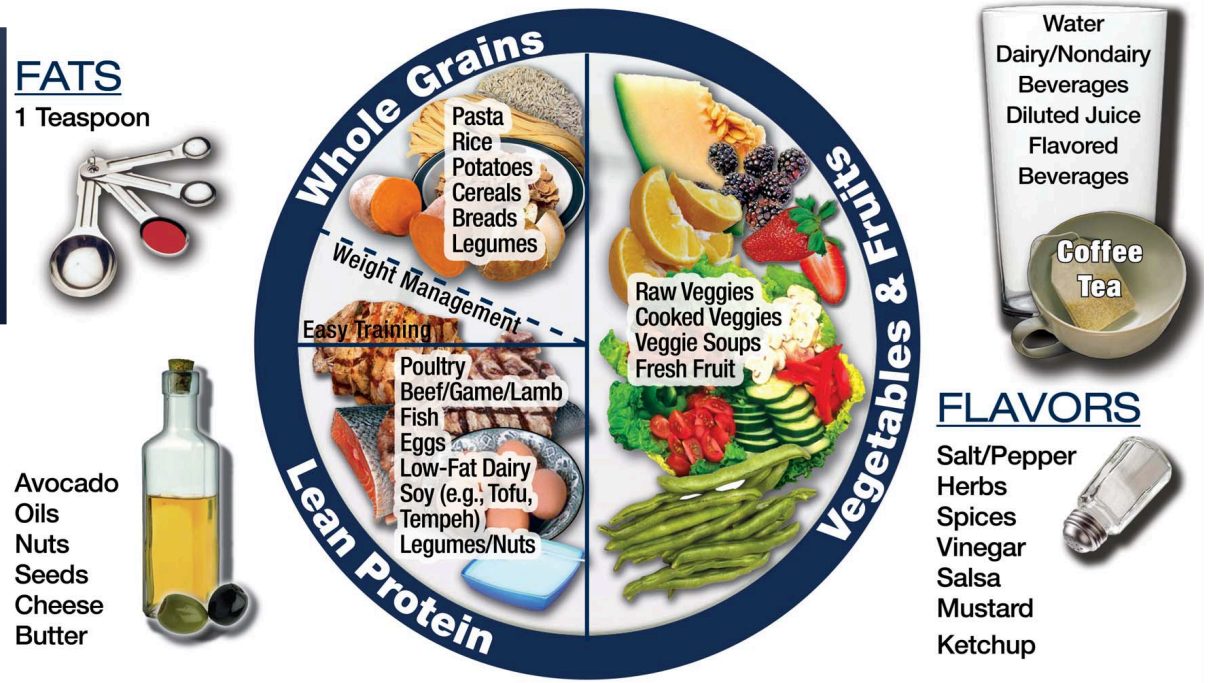
Daily Fluid Intake Recommendations

Fluid Intake	Amount
Daily	Half Body Weight in Ounces Ex. 150 lbs. = 75 oz
2 hours before Training	16-20 oz
15-30 minutes before training	6-10 oz
During Training	4-10 oz every 15-20 minutes
After Training	20-24 oz per pound of body weight lost

Recovery

- In order to reap the benefits of training, athletes must adhere to a smart recovery plan. Nutrition and sleep are the top two factors that can accelerate the recovery process.
- Goals for the recovery process are to:
  - Replenish muscle and liver glycogen stores.
  - Restore fluid.
  - Restore electrolyte balance.
  - Stimulate protein synthesis.
- In order to enhance recovery, athletes should consume a meal containing carbohydrates and protein within 30 min. – 2 hours after completed training or racing. A recovery drink is encouraged if your appetite and you're not able to eat a well-balanced meal within that timeframe.
- The optimal ratio of carbohydrates to protein is 3:1 – 4.1.
- Whole foods are preferred over processed foods for nutrient density and other naturally vitamins and minerals.
- Fluids and electrolytes should be replaced with 20 oz. of fliud for every pound in body weight lost.

Nutrition at Home



25% Protein (30% for weight management)

50% Vegetables & Fruits

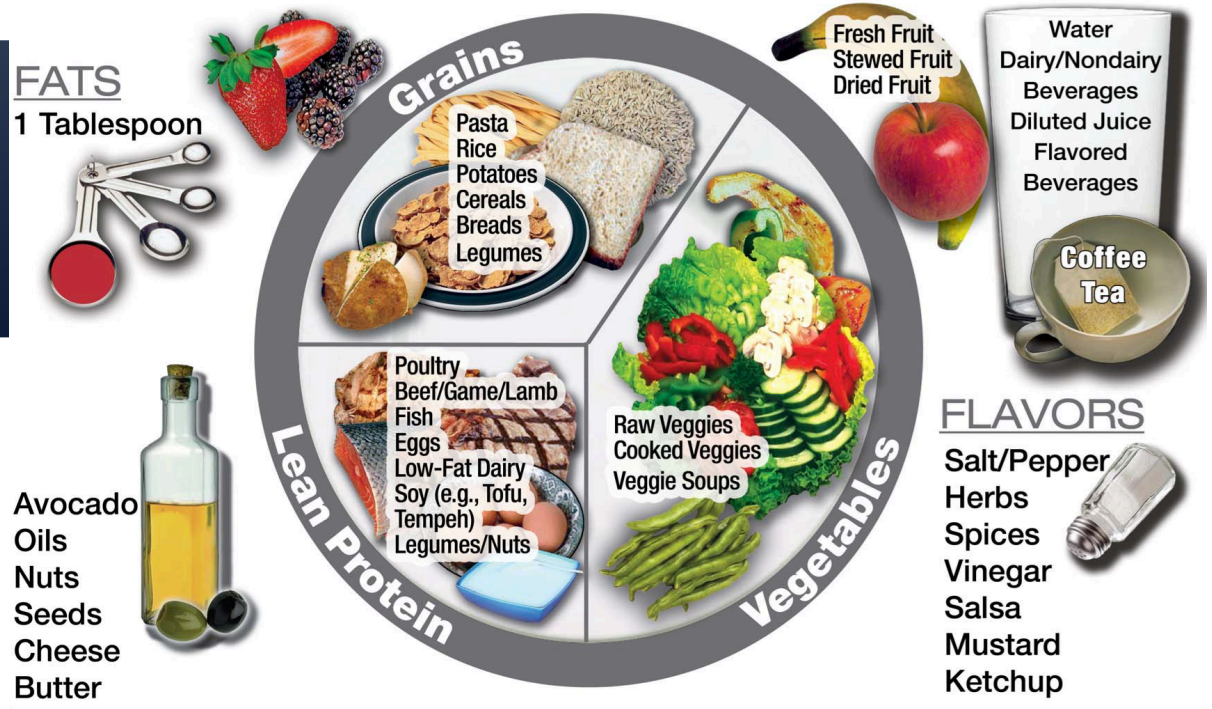
25% Whole Grains (20% for weight management)

Less fats

Easy Training – Weight Management

- An easy day may contain just a workout or tapering without the need to load up for competition with nutrients and energy.
- Easy day meals may also apply to athletes trying to lose weight and athletes requiring less energy to the nature of your sport.

Nutrition at Home



25% Protein

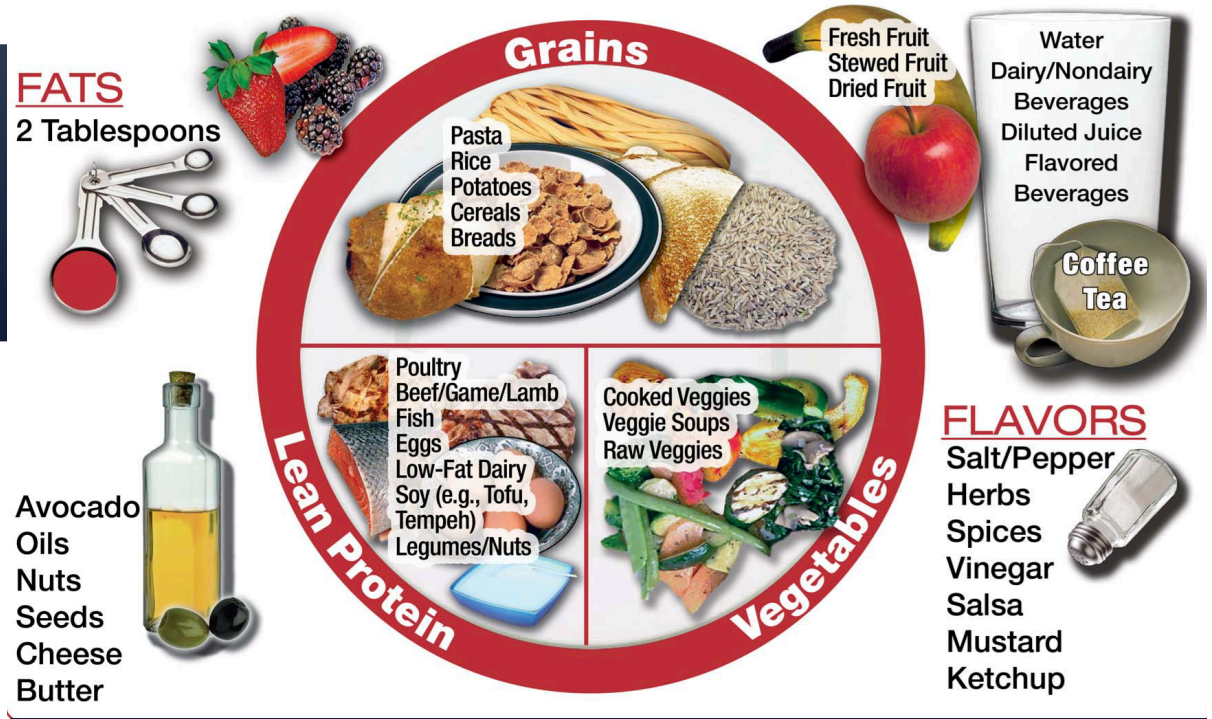
37.5% Vegetables & Fruits

37.5% Whole Grains (20% for weight management)

Moderate

- A moderate day may be one where you train twice but focus on technical skill in one workout and on endurance in the other.
- The moderate day should be your baseline from where you adjust your pate down (easy) or up (hard/race.)

Nutrition at Home



25% Protein

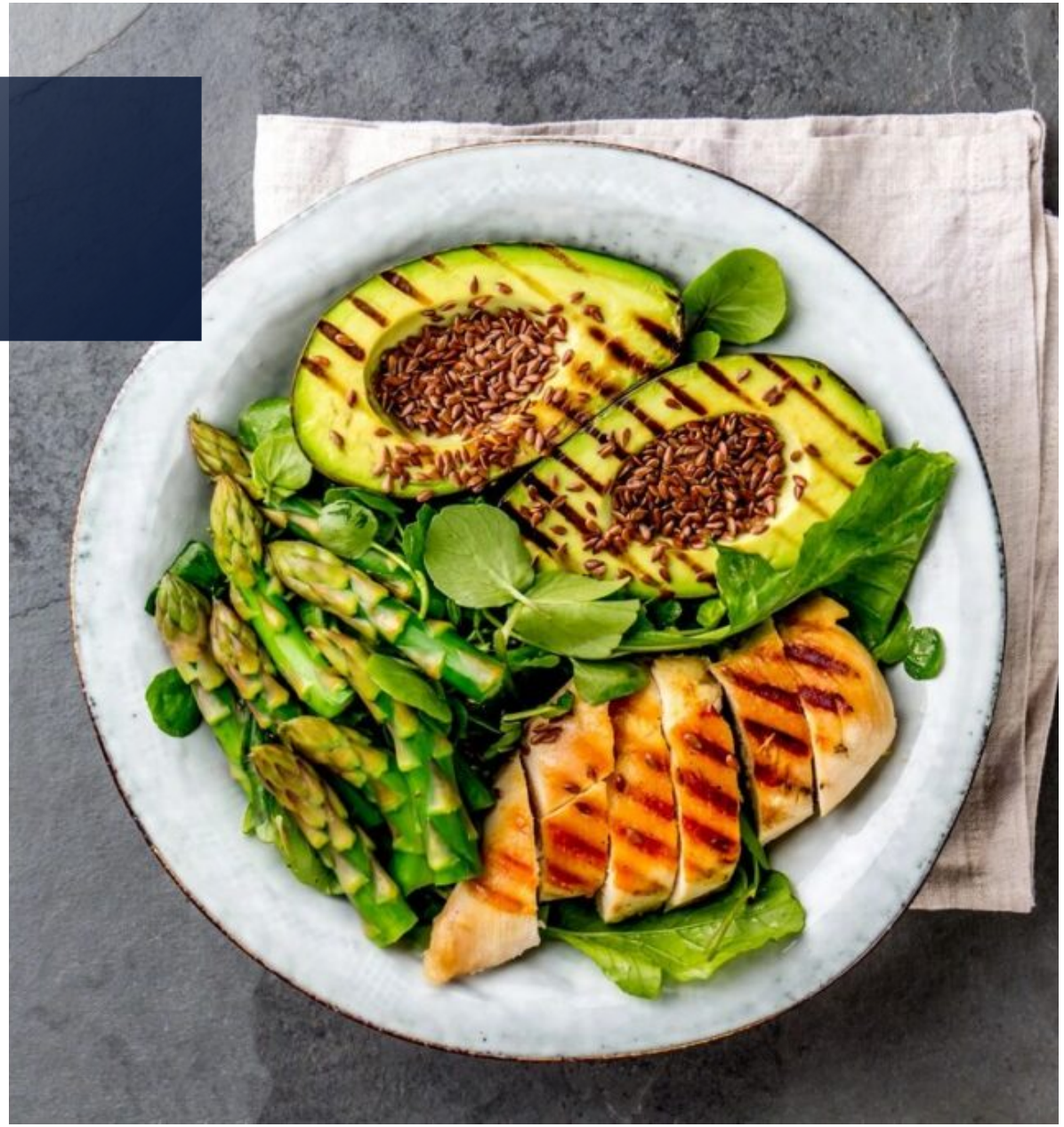
25% Vegetables and Fruits

50% Whole Grains (20% for weight management)

More fats

Hard/Race

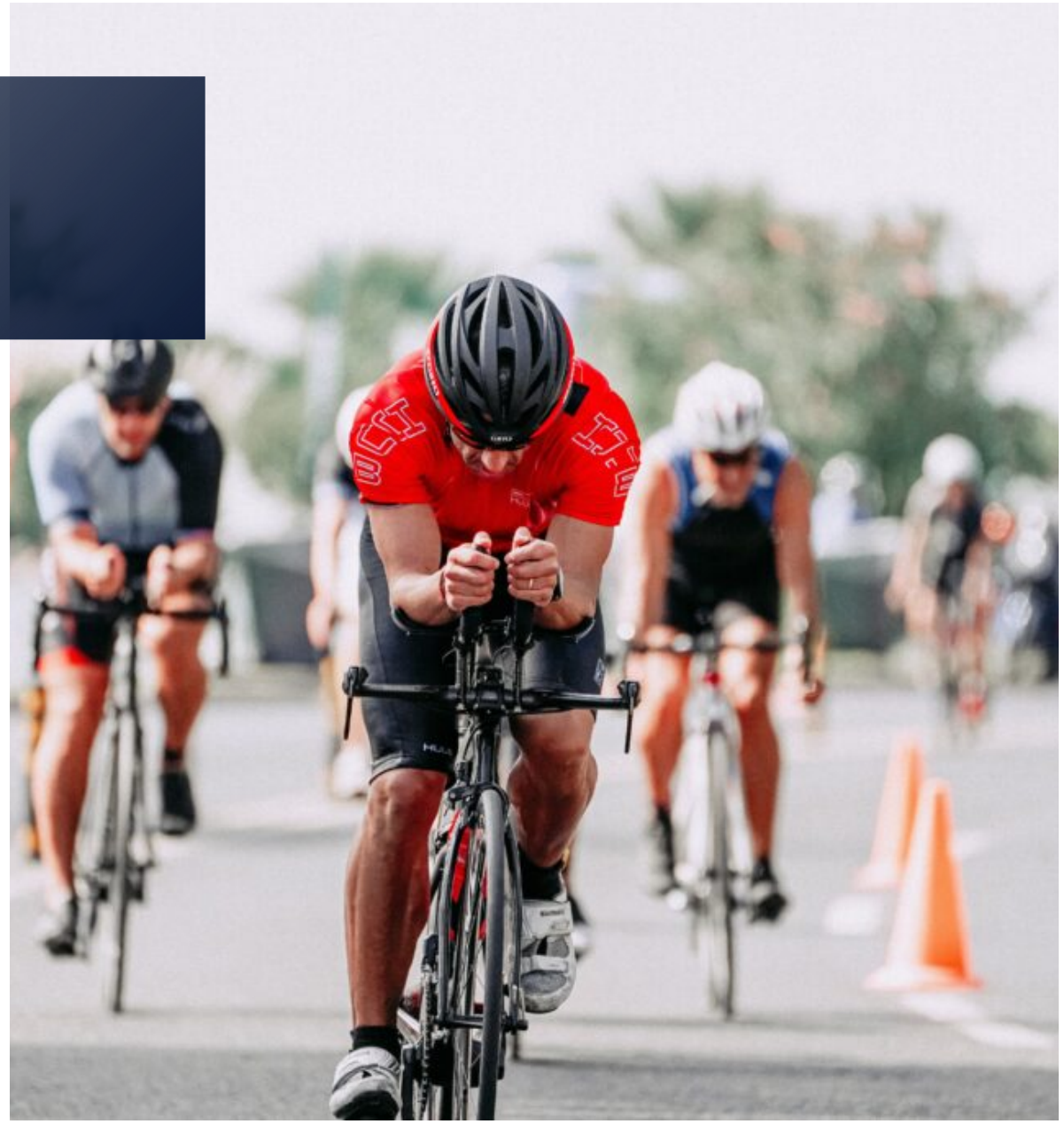
- A hard day contains at least 2 workouts that are relatively hard or competition.
- If your competition requires extra fuel from carbohydrates, use this plate to load up in the days before, throughout, and after the event.



Nutrition at Home

General

- The body requires over 40 different essential nutrients every day to maintain general health and support the demands of training. Therefore, eat a variety of foods from all food groups. Choose “colorful” fruits and vegetables.
- Decrease the amount of processed foods you eat. Choose whole foods as often as you can.
- Read labels. Look for whole ingredients and fewer ingredients.
- Consider how you prepare your food. For example, steaming is preferred to boiling and grilling is preferred to frying.
- Timing is important. Your last big meal should be at least 3-5 hours before training or racing. Eating late in the evening also keeps the body “awake” at night digesting food, repairing muscles less.



Race Day Considerations

Sprint/Olympic Distance (1-3 hrs.)

- Focus on hydration. Minimal caloric needs for Sprint.
- Calculate caloric needs for Olympic.

Middle/Long Distance (4 hrs. +)

- High carbohydrate lunch day before.
- Low fiber dinner night before.
- Last meal (Breakfast) should be 3-5 hours before race start.
- Hydrate fully 24 hours before race start. Drink at least 12 oz. of water upon waking the morning of race.
- Calculate caloric needs and consume at rate your gut can withstand.
- Calculate sweat rate and replace what your gut can withstand. Consider weather conditions.

THANKS

Does anyone have any questions?

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