

# RANSOM EVERGLADES SWIM TEAM

LECTURE # 1

NUTRITION BASICS

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# INTRODUCTION

- NUTRITION AND ATHLETIC PERFORMANCE ARE CLOSELY LINKED
- MACRONUTRIENTS & FOODS THAT SUSTAIN ENERGY – WEEK 1
- BALANCING ENERGY INTAKE WITH ENERGY EXPENDITURE – WEEK 2
- WHAT TO EAT AND WHEN – WEEK 3

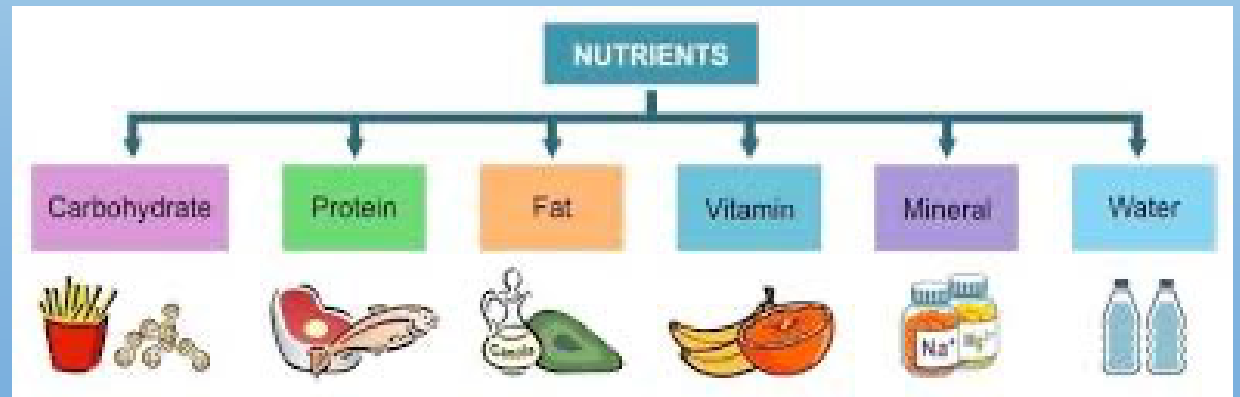
# NUTRITIONAL CONCEPTS

- NUTRIENTS:
  - GIVE MUSCLES ENERGY
  - BUILD MUSCLES, ORGANS, AND BONES
- WELL-NOURISHED ATHLETES:
  - ARE MORE LIKELY TO STAY HEALTHY
  - HAVE BETTER CARDIOVASCULAR FUNCTION
  - ARE MORE LIKELY TO GROW NORMALLY AND BUILD MUSCLE
  - WILL HEAL WELL

# NUTRIENTS

## SIX CLASSES OF NUTRIENTS:

1. CARBOHYDRATES
2. PROTEINS
3. FATS
4. VITAMINS
5. MINERALS
6. WATER



# NUTRIENTS

- NUTRIENT BALANCE IS CRITICAL:
  - AVOID MONOTONY
  - ENSURE OPTIMAL NUTRIENT EXPOSURE
  - AVOID NUTRIENT TOXICITY

# NUTRIENTS THAT PROVIDE ENERGY

- ENERGY NUTRIENTS - MACRONUTRIENTS:
  - CARBOHYDRATES
  - PROTEINS
  - FATS
- ENERGY IS MEASURED IN KILOCALORIES (KCAL)
- NEED MORE ENERGY WHEN TRAINING HARDER

# CARBOHYDRATE BASICS

- DIGESTIBLE VERSUS INDIGESTIBLE
- COMPLEX VERSUS SIMPLE
- SOLUBLE VERSUS INSOLUBLE FIBER

# FUNCTIONS OF CARBOHYDRATE

- PROVIDES ENERGY
- PROTEIN SPARING
- PART OF OTHER COMPOUNDS
- STORED ENERGY



# TYPES OF CARBOHYDRATES

- SIMPLE CARBOHYDRATES (SUGARS)
  - SUGARY CEREAL, WHITE BREAD/PASTA, CANDY, SPORTS DRINKS
- COMPLEX CARBOHYDRATES (WHOLE FOODS)
  - VEGETABLES, FRUITS, WHOLE-GRAINS, BEANS

**SIMPLE  
CARBS**

**VS.**

**COMPLEX  
CARBS**

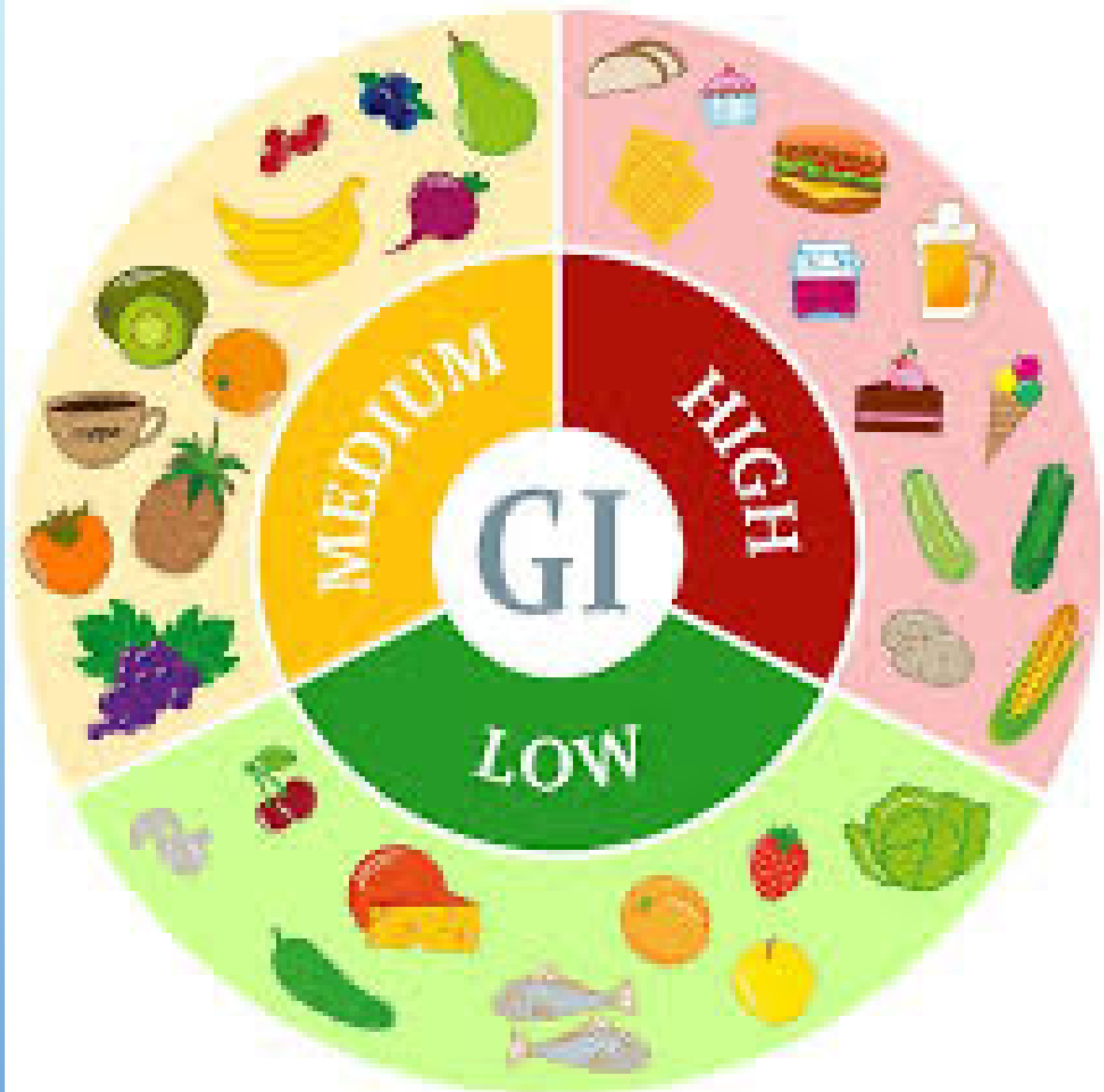


# THE GLYCEMIC INDEX

- THE GLYCEMIC INDEX MEASURES HOW DIFFERENT CONSUMED CARBOHYDRATE FOODS AFFECT BLOOD SUGAR LEVEL – AVAILABLE ENERGY
- LOWER GLYCEMIC INDEX FOODS HELP:
  - MAINTAIN BLOOD SUGAR
  - AVOID EXCESSIVE INSULIN RESPONSE THAT CAN ENCOURAGE MANUFACTURE OF FAT
  - KEEP PEOPLE FEELING BETTER
  - BEST FOR STEADY ENERGY THROUGHOUT DAY

# THE GLYCEMIC INDEX

- THE GLYCEMIC INDEX MEASURES HOW DIFFERENT CONSUMED CARBOHYDRATE FOODS AFFECT BLOOD SUGAR LEVEL – AVAILABLE ENERGY
- HIGHER GLYCEMIC INDEX FOODS HELP:
  - QUICKLY INCREASE BLOOD SUGAR
  - PROVIDED QUICK BURST OF AVAILABLE ENERGY
  - BEST FOR BEFORE PRACTICE/MEETS



**TABLE 6.4 HIGH, MEDIUM, AND LOW GLYCEMIC INDEX FOODS (24)**

High Glycemic Index (>85)	Medium Glycemic Index (60–85)	Low Glycemic Index (<60)
Glucose	All-bran cereal	Fructose
Sucrose	Banana	Apple
Maple syrup	Grapes	Applesauce
Corn syrup	Oatmeal	Cherries
Honey	Orange juice	Kidney beans
Bagel	Pasta	Navy beans
Candy	Rice	Chick-peas
Corn flakes	Whole grain rye bread	Lentils
Carrots	Yams	Dates
Crackers	Corn	Figs
Molasses	Baked beans	Peaches
Potatoes	Potato chips	Plums
Raisins		Ice cream
White bread		Milk
Whole wheat bread		Yogurt
Sodas (nondiet)		Tomato soup
Sports drinks		

Adapted from Rankin JW. *Glycemic Index and Exercise Metabolism*. Barrington (IL): Gatorade Sports Science Institute, Sports Science Exchange, Publication no. 64; 1997:10(1).

# PROTEIN BASICS

- PROTEINS ARE COMPLEX COMPOUNDS MADE OF AMINO ACIDS THAT BUILD LOTS OF THE BODY'S STRUCTURES

**TABLE 6.5** QUICK FACTS FOR PROTEIN

Recommended intakes	Infants: 2.2 g/kg of body weight Children: 1.0–1.6 g/kg of body weight Adults: 0.8 g/kg of body weight Adult athletes: 1.2–1.7 g/kg of body weight (16)
Recommended intake of protein	10%–35% of total calories
Good sources of protein	Meat, poultry, fish, yogurt, eggs, milk; combinations of legumes (beans and dried peas) with cereal grains

# FUNCTIONS OF PROTEIN

- ENZYME AND PROTEIN SYNTHESIS
- NUTRIENT TRANSPORT
- ENERGY SOURCE
- HORMONE PRODUCTION
- GROWTH AND TISSUE MAINTENANCE





# PROTEIN QUALITY

- **ESSENTIAL AMINO ACIDS:**
  - CANNOT BE MANUFACTURED BY THE BODY – MUST BE EATEN
  - DETERMINE PROTEIN QUALITY
  - BEST SOURCE IS FOODS OF ANIMAL ORIGIN
- **NONESSENTIAL AMINO ACIDS:**
  - CAN BE MANUFACTURED BY THE BODY
  - COMBINING GRAINS AND LEGUMES
  - SOME VEGGIES TOO

**TABLE 6.7** **FOODS HIGH IN PROTEIN**

<b>Food</b>	<b>Calories from Protein (%)</b>	<b>Total Calories</b>
Tuna, canned in water (3 oz)	93	129
Shrimp, canned (3 oz)	87	97
Chicken, roasted, breast (3 oz)	80	185
Turkey, roasted light meat (3 oz)	79	127
Crab meat, canned (1 cup)	75	123
Chicken, roasted, drumstick (1.6 oz)	73	66
Clams, raw (3 oz)	72	61
Salmon, baked (3 oz)	65	129
Turkey, roasted dark meat (3 oz)	64	150
Beef steak, broiled (5 oz)	62	284
Halibut, broiled, with butter (3 oz)	60	134
Lamb, leg, roasted, lean (2.6 oz)	60	134
Salmon, canned (3 oz)	60	113
Pork, roasted (5 oz)	53	304
Cheese, cheddar (1 oz)	26	109
Peanut butter (1 tbsp)	19	104

# FAT BASICS





- HEALTHY LIMIT FOR FAT INTAKE IS 30% OF TOTAL DAILY CALORIES
- HIGHER FAT INTAKE DOES NOT ENHANCE ATHLETIC PERFORMANCE

# FUNCTIONS OF FAT

- ENERGY SOURCE
- INSULATION FROM EXTREME TEMPERATURES
- CUSHION AGAINST CONCUSSIVE FORCES
- SATIETY CONTROL
- FOOD FLAVOR
- CARRIER OF ESSENTIAL NUTRIENTS

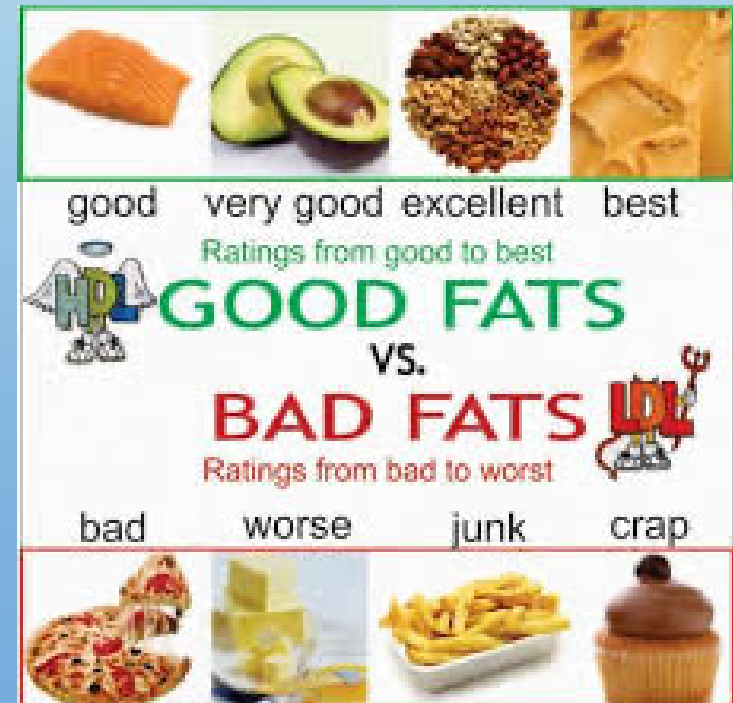
# FAT CLASSIFICATIONS AND DEFINITIONS

- FATS AND OILS
- TRIGLYCERIDES, DIGLYCERIDES, AND MONOGLYCERIDES
- FATTY ACIDS:
  - SHORT-CHAIN, MEDIUM-CHAIN, AND LONG-CHAIN
  - POLYUNSATURATED
  - MONOUNSATURATED
  - SATURATED

Type of Fatty Acid	Found in	Characteristics
<b>Saturated</b> 	<i>Animal fats</i> (fatty meats, poultry fats and skins)  <i>Dairy products</i> (butter, cheeses, milk, ice cream)	Tend to remain <b>solid</b> at room temperature
<b>Trans</b> 	<i>Fast foods</i> (deep-fried foods, margarine)  <i>Processed snacks</i> (packaged cookies, sweets)	
<b>Monounsaturated</b> 	<i>Plant-based foods</i> (avocado, olives, various nuts)  <i>Oils</i> (olive oil, canola oil, safflower oils)	Tend to remain <b>liquid</b> at room temperature
<b>Polyunsaturated</b> 	<i>Fish</i> (salmon, tuna, sardines)  <i>Certain vegetables</i> (dark green, leafy vegetables)	

# HEALTHY VS UNHEALTHY FAT

- HEALTHY FATS
  - NUTS, AVOCADO, OLIVE & COCONUT OILS
- UNHEALTHY FATS
  - FRIED FOODS, TRANS FATS,



# FLUID AND HYDRATION

- WATER:
  - CARRIES NUTRIENTS TO CELLS
  - CARRIES WASTE PRODUCTS AWAY FROM CELLS
  - LUBRICATES THE BODY
  - HELPS MAINTAIN BODY TEMPERATURE
- OPTIMAL HYDRATION IS IMPORTANT
- A 2% BODY WEIGHT LOSS DURING EXERCISE IS ASSOCIATED WITH REDUCED PERFORMANCE



# MEETING FLUID NEEDS

- CONSUME FLUIDS ON A FIXED TIME INTERVAL.
- BENEFITS OF OPTIMAL HYDRATION:
  - LESS HEART RATE INCREASE
  - LESS CORE BODY TEMPERATURE INCREASE
  - IMPROVED CARDIAC STROKE VOLUME AND CARDIAC OUTPUT
  - IMPROVED SKIN BLOOD FLOW
  - MAINTAINED BLOOD VOLUME
  - IMPROVED ENDURANCE

**TABLE 6.13 WARNING SIGNS OF DEHYDRATION, HEAT EXHAUSTION, AND HEAT STROKE: WHAT TO DO?**

Dehydration with loss of energy and performance	Drink carbohydrate- and electrolyte-containing sports drinks; avoid beverages with carbonation, which can cause gastrointestinal distress
Dehydration with muscle cramps	Immediately stop exercising and massage the cramping muscle(s); consuming a sports beverage that contains sodium may help relieve the cramp
Heat exhaustion with dizziness, light-headedness, and cold, clammy skin	Immediately replace fluids while in a cool, shaded area until the dizziness passes; stretching may improve circulation and prevent fainting; lying with the legs elevated will improve blood circulation to the head, thereby alleviating the dizziness
Heat exhaustion with nausea/headaches	Rest in a cool place until the nausea passes; drinking fluids to rehydrate is critical; lying down may help relieve headaches
Heat stroke with high body temperature and dry skin	Immediately get out of the heat and seek immediate medical treatment; feeling chilly with arms tingling and with goose bumps means skin circulation has shut down and heat stroke is imminent; this is an extremely serious condition that must be immediately treated
Heat stroke with confusion or unconsciousness	Confusion strongly suggests, and unconsciousness confirms, heat stroke. This is a medical emergency that calls for fast cooling with ice baths or any other available means to lower body temperature

Adapted from Casa DJ, Armstrong LE, Hillman SK, et al. National Athletic Trainers' Association position statement: fluid replacement for athletes. *J Athl Train.* 2000;35(2):212-24.

# FLUID CONSUMPTION GUIDELINES

- BEFORE TRAINING – 12-18 OUNCES
- DURING TRAINING AND COMPETITION – 3-4 OUNCES AT A TIME
- AFTER TRAINING AND COMPETITION – 12-18 OUNCES

# WATER VERSUS SPORTS DRINKS

- SPORTS DRINKS PROVIDE:
  - FLAVOR SO PEOPLE WANT TO DRINK
  - ENERGY (SUGAR)
  - SODIUM THAT HELPS MAINTAIN BLOOD VOLUME

## Estimated Calorie Needs per Day by Age & Gender

Estimated amounts of calories<sup>1</sup> needed to maintain calorie balance for various gender and age. The estimates are rounded to the nearest 200 calories for assignment to a USDA Food Pattern. An individual's calorie needs may be higher or lower than these average estimates based on activity level.

	Female	Male
Age (years)	Calories (per day)	
2-3	1,000	1,000
4-8	1,200 - 1,400	1,200 - 1,400
9-13	1,400 - 1,600	1,600 - 2,000
14-18	1,800	2,000 - 2,400

<sup>1</sup> Based on Estimated Energy Requirements (EER) equations, using reference heights (average) and reference weights (healthy) for each age-gender group. For children and adolescents, reference height and weight vary.

## Your Go-To Macro Breakdown



# WEB LINKS

- [HTTPS://CHOOSEMYPLATE-  
PROD.AZUREEDGE.NET/SITES/DEFAULT/FILES/TENTIPS/2013-  
WHATSMYPLATEALLABOUTINFOGRAPHIC.PDF](https://choosemyplate-prod.azureedge.net/sites/default/files/tentips/2013-whatismyplateallaboutinfographic.pdf)
- [HTTPS://WWW.EATRIGHT.ORG/-  
/MEDIA/FILES/EATRIGHTDOCUMENTS/SPORTFUELLINGFORKIDSINFO  
GRAPHIC.PDF?LA=EN&HASH=06B0E8D5326E2FA9FA884EEC44D6F0A  
4E6BF3B14](https://www.eatright.org/-/media/files/eatrightdocuments/sportfuellingforkidsinfo-graphic.pdf?la=en&hash=06b0e8d5326e2fa9fa884eec44d6f0a4e6bf3b14)