
The Fuels of Engagement: Applying Science to Performance:

Leslie Bonci, M.P.H., R.D., CSSD, LDN
Owner- Active Eating Advice



MY CLIENTS

- 2020 SuperBowl champions- Kansas City Chiefs
- Worked with the Pittsburgh Steelers
- Worked with the Pittsburgh Penguins
- Worked with 5 Major League Baseball teams
- Worked with Olympic rowers, swimmers, track and field
- Work with the Pittsburgh Ballet Theatre



THE 5 P's of SPORTS NUTRITION

- Physiology
- Performance
- Physique
- Protein
- Practicality





PHYSIOLOGY OF SPORTS

- Bowling, shooting- skill sports
- Table tennis, fencing, dance- agility
- Short track speed skating, squash- strength and speed
- Underwater hockey, sailing, swimming- strength, speed, stamina



WHAT'S ENTICING: MACROS & FLUID

NUTRIENT	QUANTITY	SOURCES	BENEFITS	STRENGTH OF EVIDENCE
Protein	0.3 g/kg post training 0.3 g/kg across meals	High leucine sources: whey/milk High quality animal and plant protein sources	Muscle protein synthesis Muscle repair and remodeling	Good
Carbohydrate	1-2 g/kg within 1 hr post training 3-12 g/kg/d over the day	Fruit, cereal, sports drinks, bread Produce, grains, dairy foods	Replenish liver and muscle glycogen Support immune function	Good
~3 PUFA	~3 g/d EPA/DHA	Fatty fish, krill, supplement	↓inflammation Support immune function Support muscle repair/remodeling if protein intake is inadequate	Fair
Fluid	1-1.5 L/kg body mass lost	Water, sports drink, milk, juice	Fluid balance and plasma volume restoration	Good

COMMON PROBLEMS

Performance detractors	Possible nutrition causes	Suggested nutrition solutions
Fatigue	No food/fluid before or during activity	Food/fluid pre, during and post sport
	Low iron levels	Supplementation
	Insufficient calories	Adequate calories for growth and sport

COMMON PROBLEMS

Performance detractors	Possible nutrition causes	Suggested nutrition solutions
Muscle cramps	Inadequate or excess fluid/sodium intake	Adequate fluid/sodium for salty sweaters
Inability to gain mass	Inadequate calories	More food, more often
	No protein pre strength training	Protein + carbohydrate pre and post lift
Inability to lose fat	Meal skipping	Eat at regular intervals
	Restricting fat/carbohydrate	Carbohydrate, protein, and fat at every meal
	Too many calories in fluids	Calories from food rather than beverages
	Consuming too many calories post exercise	Less is more for post exercise repletion

WHAT HAPPENS IF YOUR ATHLETES DON'T EAT WELL?

- ↓ strength
 - ↓ endurance
 - ↓ speed
 - ↓ coordination
 - ↑ risk of injury
 - ↑ Risk of Upper Respiratory Infections
 - ↑ preoccupation with food & body
 - ↑ anxiety
 - ↑ agitation/irritability
 - ↑ fear
 - ↓ motivation
 - ↓ confidence and self-esteem
- 

OBSTACLES

- Athletes don't know:
 - What to eat
 - When to eat
 - How much to eat
 - How to prepare foods
 - What to choose when eating out
 - How to achieve weight goals the RIGHT way!
 - Facts about supplements





PERFORMANCE



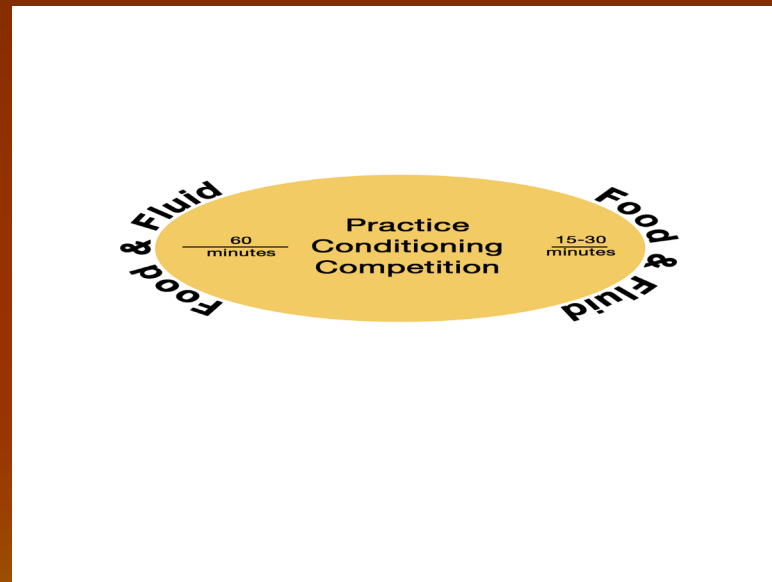
PRIORITIES

- When to eat (Timing)
- What to eat/drink (Quality)
- How much to eat/drink (Quantity)
- How often one eats this way
(Consistency)



TIMING

- Need to think about pre and post fueling and hydration





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Pre-exercise strategies

- The goal is to provide quality carbohydrate with some protein and nothing greasy
- Carbohydrate is the primary fuel of exercising muscle. Quality carbohydrate include whole grains such as oatmeal and whole grain breads, potatoes, fruits and vegetable.
- Lean protein choices include eggs, chicken, fish and plant based options such a tofu, veggie burgers and quinoa
- Top off your fluids with water, sports drinks or 100% juice

POST-EXERCISE

- Within 15 minutes:
 - Fluid to replace what the body has lost
 - 50-100 grams of carbohydrate depending upon the duration/intensity of exercise)
 - 15-20 grams of protein to expedite recovery
 - Whey protein based smoothie
 - Chicken and rice
 - Kaya toast with egg
 - Protein bar



HYDRATION

- Dehydration can occur at any time
- Strength, speed and stamina will be reduced if one is not optimally hydrated
- It is important to drink enough, but not too much
- Weighing before and after practice can help an athlete monitor hydration status
- It is important to check the color of urine before exercise



Measuring Hydration Status

- USE URINE COLOR AS A GUIDE

1		<i>If your urine matches the colors 1, 2, or 3, you are properly hydrated. Continue to consume fluids at the recommended amounts.</i>
2		
3		
4		<i>If your urine color is below the BLUE line, you are DEHYDRATED and at risk for cramping / a heat illness!</i> <i>YOU NEED TO DRINK MORE WATER / SPORTS DRINK!</i>
5		
6		
7		
8		

ALCOHOL- EFFECTS ON PERFORMANCE

- Can be a diuretic, especially if you have not had enough to drink
- Slows reaction time
- Delays recovery- up to 72 hours through slowing muscle glycogen resynthesis
- Exacerbates soft tissue injuries and delays the healing process



SODIUM NEEDS OF ATHLETES

- Sweat loss: 1-4 liters
- Sodium loss: 1150-3220 milligrams or more
- For salty sweaters; recommend adding salt, salty sauces, or salty foods to the diet or adding salt or electrolytes to beverages



Consequences of Inadequate Recovery

- Delay in glycogen repletion
- Cumulative ↑ in fatigue
- Potential for calorie overload later
- Potential for inadequate rehydration
- Catabolism vs. anabolism
- Insufficient opportunity to ↓ inflammatory response



What is recovery?- it is a process and not just a smoothie

Do this



- Eat a carbohydrate and protein snack soon after training
- Have another snack or a meal within ~ 2-3 hours
- Make sure to rehydrate
- Choose a protein snack before bedtime- a protein+ fruit smoothie can work!
- Strive to get 8 hours of sleep

Not that!

Postpone a snack till you get hungry

Choose just a carbohydrate snack or a sports drink

Just choose protein

Drink alcohol

Avoid a snack before bed

PROTEIN REQUIREMENTS

- 1.3- 1.8 grams pro/kilogram BW/day:
 - Muscle protein repair and resynthesis
 - Increases in LBM
 - “Remodeling” protein in muscle, bone, tendons, ligaments
 - Support a health immune system



Recommendations for protein intake— sports nutrition

International Olympic Committee

- “Foods or snacks that contain **high-quality proteins** should be **consumed regularly throughout the day** as part of the day’s total protein intake, and in particular **soon after exercise**, in quantities sufficient to maximize the synthesis of proteins, to aid in long-term maintenance or gain of muscle and bone and in the repair of damaged tissues. Ingestion of foods or drinks providing **15-25 g** of such protein **after each training session will maximize the synthesis of proteins** that underpins these goals.”

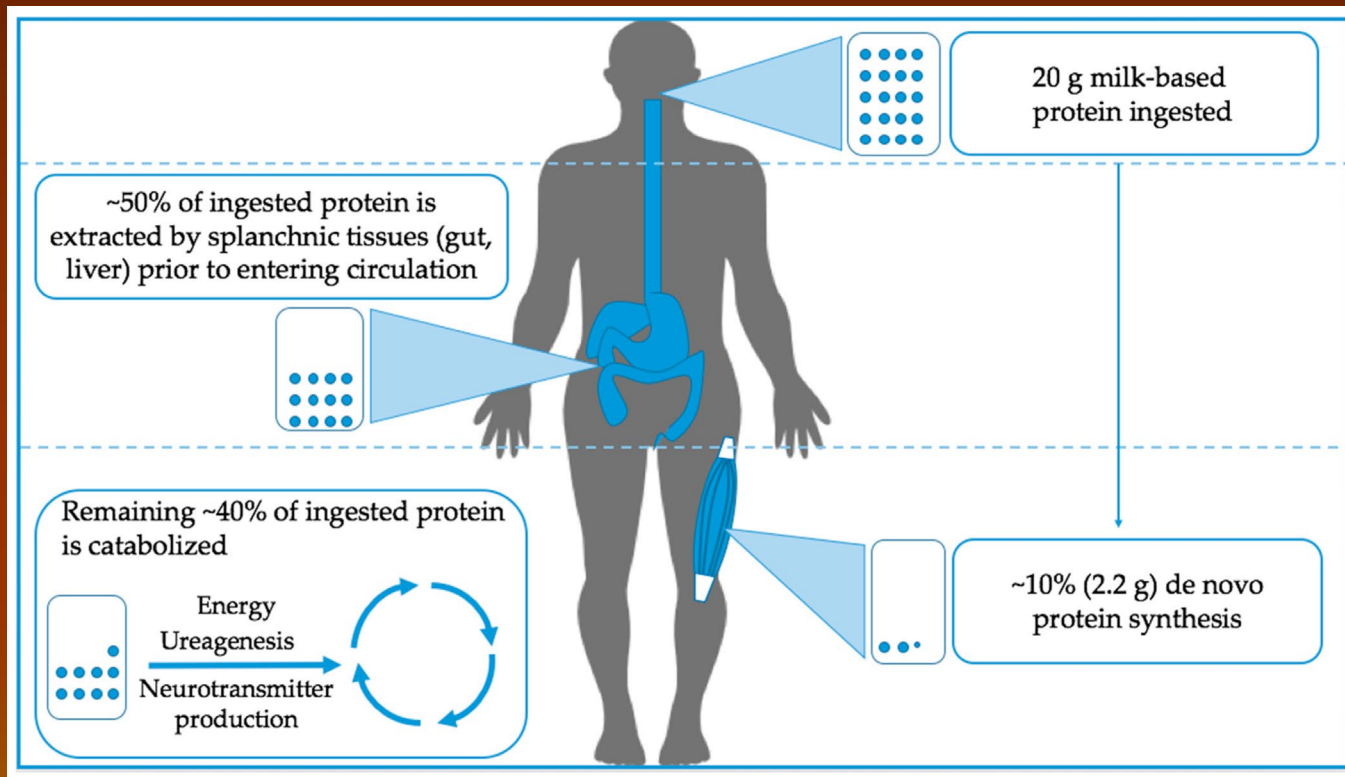
PROTEIN



Protein requirements for active adults by age, sport, body goals

Type of athlete	Protein- gms//kg/day	68 kg athlete
Recreational	1.1-1.5	75-105
Endurance	1.1-1.76	75-120
Strength training	1.1-1.76	75-120
Teenage athlete	1.5-1.98	105-135
Athlete building mass	1.1-1.98	90-135
Athlete restricting calories	1.98-2.2	135-150
Maximum usable amount	1.98-2.2	135-150

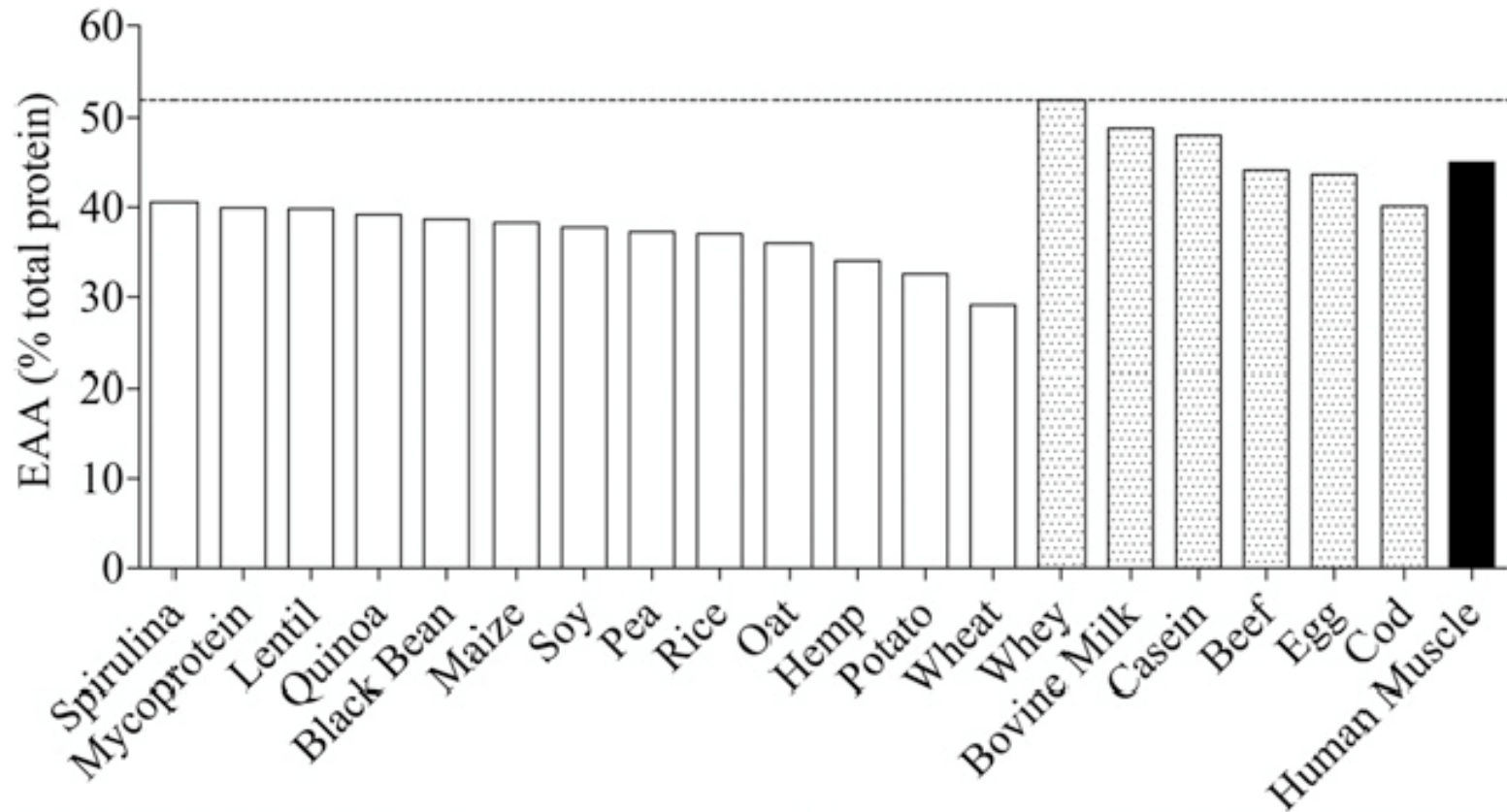
PROTEIN- USE OR LOSE?



IS MORE BETTER?

- Recent study on young resistance trained men demonstrated that 40 grams of whey protein POST **whole-body** resistance training stimulated a greater muscle protein synthesis response than 20 grams

ESSENTIAL AMINO ACID CONCENTRATION OF VARIOUS PROTEIN SOURCES



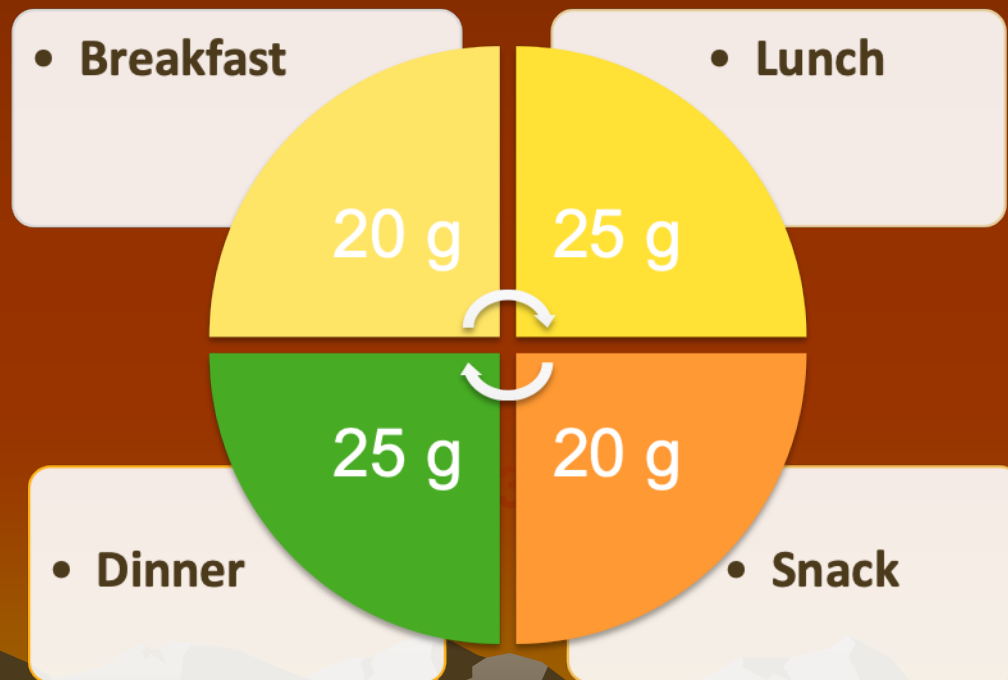
PROTEIN QUALITY IS CRITICAL

- Protein quality is determined by its specific amino acid composition and digestibility
- Animal sources of protein are considered the highest sources of quality protein
- Plant sources of protein are limited in their amount of protein content and many are incomplete sources



PROTEIN DISTRIBUTION IS KEY

- Even out the intake throughout the day
- Example: 90 grams of protein per day =



HOW TO CONSUME PROTEIN

- Acute and chronic studies have shown that **consuming protein every 4 hours** in an appropriate amount is best for those looking to augment and/or maintain skeletal muscle mass and function
- (Areta et al, 2013;Murphy et al, 2015; Mamerow et al, 2014, Loenneke et al, 2016)
- Skeletal muscle can respond to amino acids **up to 48 hours post-exercise** (Burd et al, 2011).

NEEDS BASED PROTEIN GUIDELINES

- **For those in energy balance:**
 - 0.4 g/kg BM to stimulate MPS after rest or exhaustive exercise
 - Space protein throughout the day ~ 3-5 hrs
 - Consider pre-sleep protein ingestion to minimize MPS decline during overnight fasting
 - To maximize MPS with resistance training- protein recommendations are 1.6-2.2 g/kg/d in 3-4 meals/day
 - 3 meals with 0.53 g protein/kg or 4 meals with 0.4 g protein/kg
- **For those restricting calories**
 - For those in make weight sports- high quality proteins can help with satiety
 - Protein intakes of 2.3-3.1 g/kg/d may prevent loss of LBM

TIMING AND DISTRIBUTION OF PROTEIN INTAKE MATTER

- Protein post resistance exercise → anabolic stimulus in the few hours post
- Repeated ingestion of protein confers better MPS response in the hours post resistance training
- **PRACTICAL:** no need for huge amounts of protein post lift at the expense of no appetite later!
- Protein before bed may help augment MPS overnight **BUT** not necessarily more protein, **instead better spacing of the protein throughout the day**

PROTEIN CONTENT OF ANIMAL FOODS

FOOD	PROTEIN (grams)
i phone size meat, poultry, fish	21
85 grams of tuna	21
85 gram hamburger (mayo jar lid size)	21
Greek yogurt, 150-227 grams	9-23
Regular yogurt 150-227 grams	5-9
Eggs, 3 whole or 6 whites	21
Whey protein isolate, 29 grams	20
Cheese, 3 slices or 90 grams	21
Ham, 3 thin slices, 90 grams	21
Bacon, 7 slices	21

PROTEIN CONTENT OF PLANT FOODS

FOOD	PROTEIN (grams)
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Ramen, 1 serving	4.5
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Whole wheat toast, 2 slices	4
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Broccoli, 91 grams	3
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Brown rice, 200 grams	5
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Beans, 90 grams	20
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Lentils, 75 grams	20
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Tofu, 170 grams	20
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Hummus, 75 grams	20
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Edamame, 60 grams	17
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Cashews, 60 grams	21
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Almonds, 120 grams	18
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Peanuts, 40 grams	22
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Sunflower seeds, 40 grams	22
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PROTEIN DOSE FOR MUSCLE SYNTHESIS



- 8 grams EAA maximally stimulates MPS
- 20 grams of high-quality protein- will provide 8 grams of Branched chain amino acids
 - .75 l milk
 - 3 large eggs
 - 85 grams lean meat/fish
 - 225 grams yogurt

Adding Protein to Meals

Whey protein add to kaya toast

Whey protein added to nasi lemak

Whey protein added to Lor mee

Whey protein added to Chwee kueh

Whey protein added to soups

Whey protein added to noodle dishes

Whey protein added to rice dishes

Whey protein added to sambal



LEUCINE

- Amino acid that assists in protein synthesis acting as a dietary trigger to support an anabolic response in muscle tissue
- Ideally meals should contain 2-3 grams of leucine
- Vegetarians will need to eat more total protein to get adequate leucine



Leucine in Food

FOOD	LEUCINE (grams)
Whey protein isolate, 25gram serving	2.15
Beef, 85 grams	2.15
Chicken, 85 grams	2.00
Fish, 85 grams	1.75
Pork 85 grams	1.45
Milk, .25 L	0.85
Peanuts, 28 grams	0.75
Lentils, 64 grams	0.65
Egg, 1 large	0.60
Almonds, 28 grams	0.40
Soybeans, 64 grams	0.40
Asparagus, 64 grams	0.10

Benefits Of Whey Protein

- Significant source of leucine- for muscle protein synthesis
- Excellent source of essential amino acids with few calories
- 1 Tablespoon of whey protein provides about 4 grams protein and about 20-25 calories and is 99.9% lactose free
- Versatility-Can be an appetizer, main course, dessert or snack
- No food waste



SOURCE OF PROTEIN

- Whey & soy-fast proteins(quick digest)
 - Rapidly increase blood AA levels
- Casein- Slow protein- slow digest
Moderate ↑ in blood AA levels
- Whey post resistance training > ↑ Muscle Protein Synthesis than soy or casein

CARBOHYDRATES

- Essential for fluid balance
- Primary fuel substrate for exercise
- Important for muscle glycogen resynthesis and muscle growth
- Amount required:
 - Minimum of 6 grams/kg body weight
 - 2/3 of the plate at each meal/snack
- Type of carbohydrate: Fruits, vegetables, grains, sweets



TIMING OF CARBOHYDRATES

- Before exercise

1-2 hours before exercise: cereal, bread, pasta, rice, granola or cereal bar

< 1 hour before exercise (sports drink, honey, fruit

- During

- During exercise: sports drink, honey, gels, dried fruit, fresh fruit, crackers



FOR RECOVERY

- Carbohydrate within 15 minutes after exercise to accelerate muscle glycogen resynthesis, as well as muscle protein synthesis and repair
- After exercise: a shake made with whey protein isolate, a sandwich, rice with tofu, yogurt with cereal



PHYSIQUE



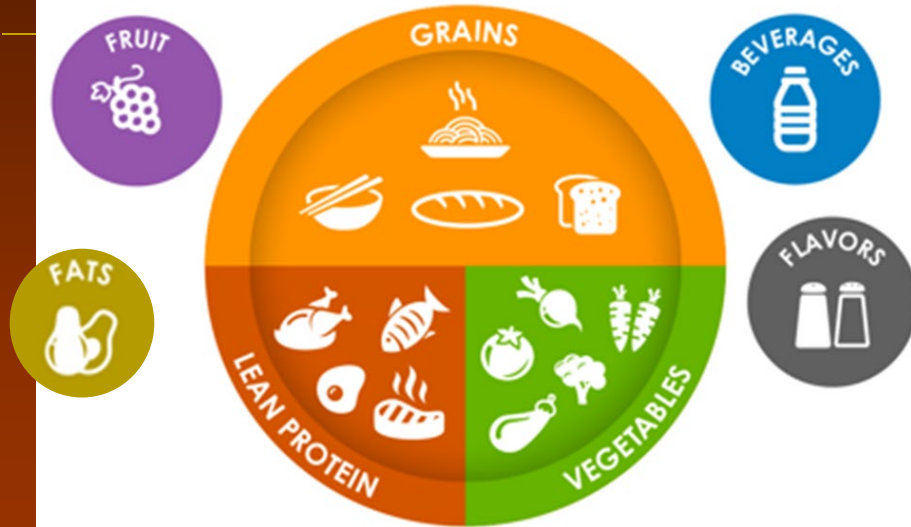
Athlete's Plate



Easy Training & Maintenance

- What's your goal?
- You can be Plant-based
Half of the plate fruits and vegetables
- Grains, nuts , seeds,avocado are plants
- Protein sources can be plant-based
- Use sports drinks only during practice
- Limit high fat foods and meats

Athlete's Plate



- For those who are trying to gain mass as well as game days
- Extra carbs help you to prepare with fuel to spare and provide the additional calories to help your goals to gain

Hard Training & Training
Camp

Athlete's Plate



- If goal is **to lose Body Fat** add more produce & protein, cut back on carbs
- If goal is to **increase Muscle Mass** cut back on produce & add kcal from protein, carbs, fats & beverages

Body Composition
Strategies

PRACTICALITY



FOR ATHLETES WITH DIGESTIVE ISSUES



The excitement of competition can change the way the stomach works



Some athletes may not have much of an appetite or even feel a bit nauseated



The two most important nutrition strategies on event days are to focus on carbohydrate and fluid. Protein takes a back seat if you feel queasy



It is never good nutrition if it ends up on your shoes or the field!



Good options if you can't eat a full meal would include a sports drink, a low fat bar, dry cereal, toast with jelly, a baked potato

Fight the flame of chronic inflammation

- Eat cold water fish such as salmon, cod or albacore tuna
- More plants on the plate
- It is the colors in fruits and vegetables that fight inflammation
- Make at least half the plate plants
- Not a fruit or vegetable fan? Try drinking real fruit and vegetable smoothies
- Vitamin D can also cool down inflammation- 2000 IU is a safe dose

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WHAT'S ENTICING: Supplements

- IOC consensus statement definition of a supplement
 - A food, food component or nutrient, or non-food compound that is purposefully ingested in addition to the habitually consumed diet with the aim of achieving a specific health and/or performance benefit
- Dietary supplements include
 - Functional foods
 - Formulated foods
 - Single nutrients
 - Multi-ingredient products



WHERE SUPPLEMENTATION MIGHT BE WARRANTED

- Specific nutrient deficiencies
- Complications of underfueling- low BMD
- When calories are low or diet is exclusionary
- Food allergies/intolerances
- Prior to interventions to optimize adaptation: altitude/iron status
- Food hygiene/food safety/availability concerns

ERGOGENIC SUPPLEMENTS

- Whey Protein isolate
- Multivitamin/mineral supplements
- Fish oil supplements
- Iron, calcium, D- if indicated

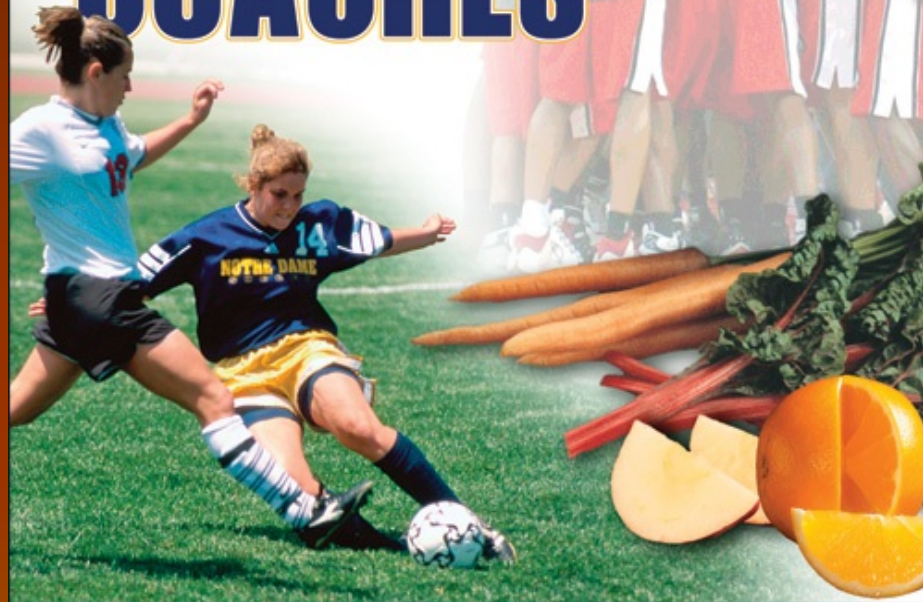


ATHLETE'S TO DO LIST

- **PRIORITIZE** Fueling/hydration, and especially protein quality not just quantity
- **PARENTHE SIZE** Training with food/fluid
- **OPTIMIZE**- protein intake throughout the day
- **STRATEGIZE** during training to determine:
 - Gut comfort with food/fluids
 - Palatability
 - What seems to work the best



SPORT NUTRITION FOR COACHES



LESLIE BONCI, MPH, RD, CSSD

Contact information

- Leslie Bonci, MPH, RDN, CSSD
 - Email: boncilj1@gmail.com
 - Facebook: Leslie Bonci
 - Twitter: @lesliebonci #ActiveAdvice
 - Instagram: boncilj
 - Website: www.activeeatingadvice.com
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