FIT FOR LIFE
PHYSICAL THERAPY

ATP- Fleet Feet
Nutrition Basics for the Endurance Athlete

Rebecca Youngs, MS, RD, LD

Who am I?

- Registered and Licensed Dietitian
- Bachelor's and Master's degree from The Ohio State University (Human Nutrition and Dietetics; Human Nutrition)
- Sports Dietitian- Fit for Life Physical Therapy; OP Soccer, Team USA
- Clinical/Metabolic Dietitian- Nationwide Children's Hospital

What do I do?

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DIETITIAN vs NUTRITIONIST

DIETITIAN	NUTRITIONIST
Qualification -Bachelor's degree -Completion of a Dietetic Internship -Passed a national exam -Maintains on-going education credits	**Qualification** -None required -Self-proclaimed title
Definition -A qualified health professional who helps promote good health through proper nutritional habits	**Definition** -Someone who works with food and nutritional science, aiming to prevent diseases related to nutrient deficiencies.
Legal Status -An expert on nutrition -Registered with the Commission of Dietetics Registration (CDR) -Licensed to practice diet and nutritional consultation	**Legal Status** -Not legally accepted as an expert

***Master's degree required after 2024

Overview: Macronutrients

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Carbohydrates: energy

- Fiber: regularity in digestive system, satisfaction
- Simple: "quick" energy, leave stomach quickly (juice, candy, Gatorade, bread, dried fruit, fruit)
- Complex: "slow releasing" energy, slowly leaves the stomach (whole grain bread, pasta, beans, nuts, oats)
- Focus on ⇧ intake around activity
- WFPB → where would be get the simple carbs?

Protein: building blocks, satisfaction

- Animal protein (chicken, fish, beef, shellfish, dairy, eggs)
- Non-animal protein (soy, beans, nuts, tofu, tempeh, quinoa)
- Spread throughout the day; protein rich snack after a workout

Fat: satisfaction, hormone function, cell functioning

- Saturated: usually solid (butter, coconut oil, whole milk)
- Unsaturated: liquid (plant oil, avocados, seeds/nuts) → focus on unsaturated fat intake > saturated
  - Omega-3: inflammation, heart health

Athlete's Plate

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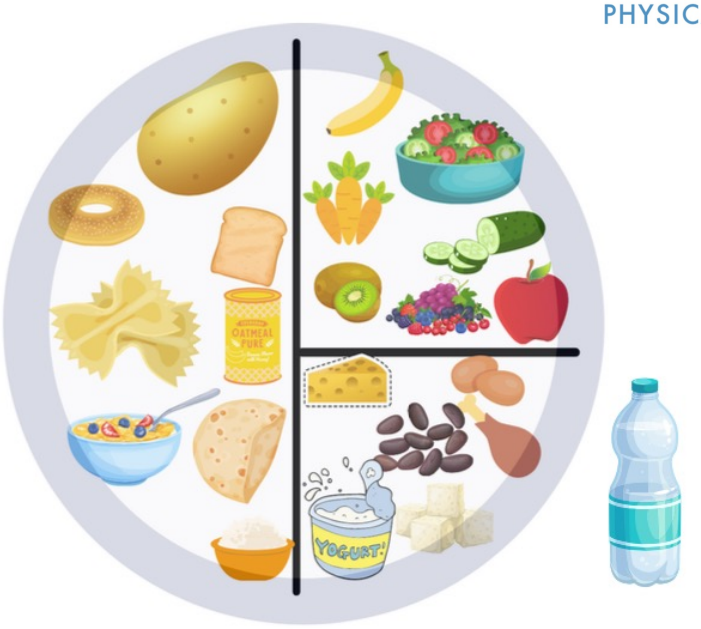

Athlete's Plate: Carbs by the Numbers

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Daily Habitual Intake

Table II: Carbohydrate requirements for physical activity[2,3,5,12]

Physical activity level	g/kg BW/day	Comments
Daily or habitual carbohydrate requirements		
ACSM		
Athletes	6-10 g/kg BW/day	Depends on the athlete's total daily energy expenditure, type of sport, gender and environmental conditions.
ISSN		
General physical activity, 30-60 minutes/day, 3-4 times a week	3-5 g/kg BW/day	Complex carbohydrates. Low to moderate GI. Concentrated carbohydrates.
Moderate- to high-intensity volume, 2-3 hours/day, 5-6 times a week	5-8 g/kg BW/day	
High-volume, intense exercise, 3-6 hours/day, 1-2 sessions, 5-6 time a week	8-10 g/kg BW/day	
IOC		
Low-intensity or skill-based activities	3-5 g/kg BW/day	Include pre-, during and post-training intake. Individual tolerance and preference. Nutrient-dense choices.
Moderate exercise programme, ~ 1 hour/day	5-7 g/kg BW/day	
Endurance programme, moderate to high intensity, 1-3 hours/day	6-10 g/kg BW/day	
Strength-trained athletes	4-7 g/kg BW/day	
Extreme commitment, moderate to high intensity, > 4-5 hours/day	8-12 g/kg BW/day	

Potgieter S. Sport nutrition: A review of the latest guidelines for exercise and sport nutrition from the American College of Sport Nutrition, the International Olympic Committee and the International Society for Sports Nutrition. S Afr J Clin Nutr 2013;26(1):6-16

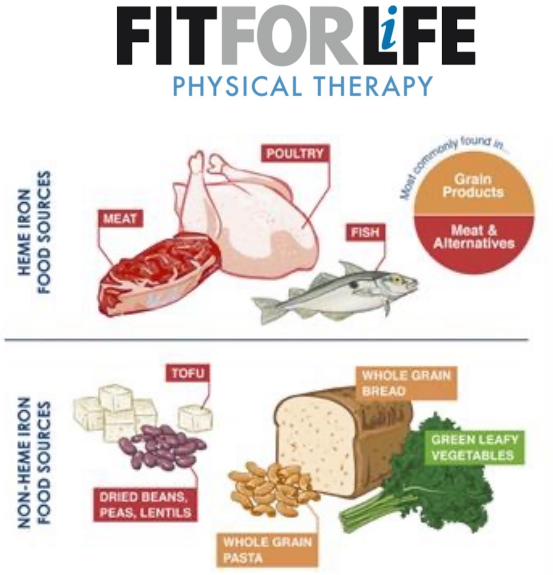
Breakfast

Breakfast Protein	Breakfast Carb/Color
Eggs	Fruit (berries, apples, banana, clementine, pear, melon, orange)
Greek yogurt, cottage cheese	Granola
Nut butter	Whole grain cereal
Turkey sausage	Granola bar/fig bar/Energy bites
Low-fat milk	Oatmeal (cup, pouch, container)
Protein oatmeal	Roasted breakfast potatoes
High protein frozen waffles	Bagel
High protein granola bar	English Muffin
Ham	Toast
Frozen breakfast burrito	Fruit smoothie
Nuts	Apple sauce + pouch
Whey/plant-based protein powder	Tortilla

Examples
½ cup cottage cheese/Greek yogurt + strawberries + ¼ cup granola
Fruit and protein smoothie (Greek yogurt + frozen mixed fruit + peanut butter + honey)
Protein waffle + almond butter + sliced banana coins
Ham + low fat cream cheese + whole wheat bagel sandwich
Granola bar + milk
Egg bites + apple
Oatmeal + sliced almonds + blueberries
Homemade chocolate zucchini muffin + Greek yogurt cup
Jimmy Dean Breakfast sandwich + clementine

Important Nutrients for Athletes

- **Iron**
  - Transports oxygen in the blood → need to give us energy
  - Higher amounts needed in endurance athletes, women
  - Low iron → pale, fatigued, "foggy" head
  - Food first!
    - Iron rich sources: animal products (chicken, beef, salmon), eggs, fortified cereals/grains, beans
    - Vitamin C
    - Consult with RD for iron supplementation



Important Nutrients for Athletes

- **Calcium:** bone health, muscle contractions
  - Highest needs until 25 years old
  - Diet low in calcium → pull from the bones → fractures
  - Food sources: Dairy, fortified grains, dark leafy vegetables
- **Vitamin D:** bone health, immune system, protein synthesis
  - Deficiency: darker skin, cloudy environment, indoor sport
  - Food sources: fatty fish, fortified milk/dairy, cereals

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Special Diets

Vegan → B12 supplement (speak with an RD), higher protein needs → soy- based protein, calcium/vitamin D

Vegetarians → protein intake (dairy, fish, egg)

Celiac Disease → adequate carbohydrate intake, nutrient deficiencies, cross contamination with gluten

Pre-run

- Hydrate
- Familiar foods!
- Lower in fat/fiber to avoid upset stomach
- **Pre-event meal (3-4 hours before) (1-3 gm/kg BW)**
  - Oatmeal with banana + honey
  - Cereal with fruit/yogurt, honey
  - White pasta with chicken
  - Turkey sandwich on white bread
  - White rice stir-fry
  - Breakfast for dinner (eggs, toast, fruit)
- **Pre-event snack*: Simple carbs* (30 min- 1 hour before) ~ 35-45 gm carbs**
  - Toast with PB and jelly
  - Granola bar
  - Dry cereal
  - Poptart
  - Dried fruit
  - Gel, waffle, sports drink
  - Candy

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Volleyball Afternoon Match	
7:00 am Awake	
7:30 am Breakfast	3 scrambled eggs 2 pieces whole wheat toast 2 Tbsp peanut butter, honey 1 cup strawberries 8-16 oz water
11:00 am Lunch	turkey sandwich 12 baby carrots, hummus 1 cup pretzels 6 oz greek yogurt 8 oz milk, 8-16 oz water
1:30 pm Snack	1 banana or granola bar 8-16 oz water
2:00 pm Match Start	
2:00 – 4:00 pm Fueling	16-32 oz sports drink, water OR 16-32 oz water, gel/chews
4:00 pm Finished!	water & recovery

Fueling mid run

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- Replenish glycogen stores
- Prevent "hitting the wall"
- Sustain cognitive function
- Prolong the time it takes to feel fatigued
- Things to consider: GI sensitivity, weather, distance, sweat rate, MTC, accessiblity to gels, chews, fluids
- Carbohydrate loading
  - 8-12 gm/kg for 2-3 days

Fueling mid run

- Fuel
  - 30-60g of carbohydrate/hr during exercise >1 hour.
  - 60-90g of carbohydrate/hr during exercise lasting longer than 2-2.5 hours should be considered
    - Energy gels
    - Apple sauce/pureed fruit pouches
    - Gummy bears
    - Fruit snacks
    - 4-8% carbohydrate drink
- Can train the gut the more we practice!
- Hydration
  - 4-8 oz of fluids every 15-20 minutes
  - Electrolytes
  - Increased salt needs? Sweat that stings the eye, white streaks on arms or legs, "gritty" feeling on skin

Source: USADA

Fueling mid run: Multiple Transportable Carbohydrates (MTC)

- Using a combination of carbohydrates that use two **DIFFERENT** transporters → maximize absorption
  - Glucose → SGLT1
  - Fructose → GLUT5
- Can get in more than 60 gm carbs (recommended up to ~90 gm/hr for exercise > 2.5 hr) using multiple types (don't oversaturate the transporters)
- Fluids delivery improved with MTC
- Greater oxidation with MTC → more carbs burned, less sitting in the gut = faster gastric emptying and decrease GI distress

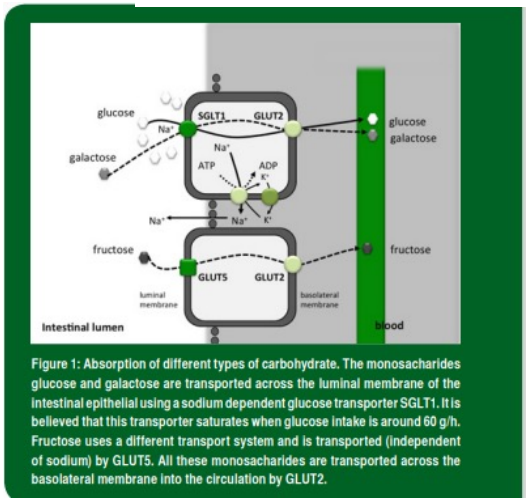

Figure 1: Absorption of different types of carbohydrate. The monosaccharides glucose and galactose are transported across the luminal membrane of the intestinal epithelial using a sodium dependent glucose transporter SGLT1. It is believed that this transporter saturates when glucose intake is around 60 g/h. Fructose uses a different transport system and is transported (independent of sodium) by GLUT5. All these monosaccharides are transported across the basolateral membrane into the circulation by GLUT2.

GSSI: Jeukendrup, 2013

Examples of MTC

- Maurten
- Skratch chews/drink mix
- Tailwind
- Never Second C30
- Honey Stinger Performance

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Caffeine in gels/chews

- Caffeine: ergogenic aid: prolongs the time it takes to feel fatigue
- High doses: increate heart rate, increased anxiety, GI distress
- Low doses: 100-200 mg can be beneficial
- Very individualized
- Trial in training multiple times

Recovery

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- Recovery meal within 2-3 hours of a run
- Small snack of carb + protein if not eating a meal within 1.5 hours
- Carb (25-60 gm) + protein (15-30gm)
  - Need the carbs to stimualte muscle protein synthesis
  - Help replenish glycogen stores
- Sweaty? Salty snacks, salt on foods, electrolyte powder
- Hydration!

Snack Ideas

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Recovery Snack Ideas

Choose a food from protein column + food from carb column based on training session!

Protein: 15-20 g	Protein: 20-25 g	Carbohydrates: 15-30 g	Carbohydrates: 45-60 g
• 2 c milk (cow's, soy)*	• 3 c milk (cow's, soy)*	• 1 piece or cup fresh fruit	• 2-3 piece or cups fresh fruit
• ¾ -1 c Greek yogurt*	• 1 ½ c Greek yogurt*	• ¼ - ½ c dried fruit	• ¾ - 1 c dried fruit
• ¾ c cottage cheese	• 1½ c cottage cheese	• 1 c fruit juice	• 2 c fruit juice
• 2 string cheeses	• 3 string cheeses	• 1 c chocolate milk	• 2 c chocolate milk*
• 1 c firm tofu	• 1 ¼ c firm tofu	• ½ c oatmeal	• 1-1 ½ c oatmeal
• 2-3 cooked eggs	• 3-4 cooked eggs	• 1-2 slices sandwich bread	• 3-4 slices sandwich bread
• 2-3 oz deli meat	• 3-4 oz deli meat	• ½ bagel	• 1 bagel
• 1 ½ c Kefir*	• 2-2 ¼ c Kefir*	• 1 english muffin	• 2 english muffins
• 1 ½ oz jerky	• 2-2 ½ oz jerky	• 1 granola or cereal bar	• 4 fig bar cookies
• 2-3 oz fish	• ¾ -1 c nuts or seeds *	• 2 x 6" tortillas or wraps	• 2 x 8" tortilla or wrap
• ½ c nuts or seeds*	• 1 c edamame	• ½ - ¾ c rice or farro	• 1-1½ c rice or farro
• ½ - ¾ c edamame	• 1-1½ c beans or lentils*	• ½ -1 c quinoa, beans, lentils*	• 1½ -2 c quinoa, beans, lentils*
• 4 Tbsp nut butter*	• 1 scoop whey protein	• ¾ c cooked pasta	• 1 ½ c pasta
• 1 c beans*		• 4 Tbsp nut butter*	

Carbohydrate Loading

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- Increase glycogen stores
- Increase total body water
- Carbohydrate loading
  - 8-12 gm/kg for 2-3 days
  - Week of a marathon:
    - Nothing new!
    - Limit high fiber foods/raw vegetables 3-4 days out
    - Emphasize hydration AND electrolytes

Bars

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Pre-workout bar guidelines

- Low in fat
- Low in fiber
- Low to moderate in protein
- Free of any stomach irritants (inulin, chicory root fiber, xylitol, sorbitol)

Examples of bars before activity:

- Quaker Chewy Granola bar (S'mores, chocolate chip, peanut butter, oatmeal raisin)
- Nature's Valley Oats n' Honey Granola bar
- Nutri-grain Harvest baked granola bar
- Sunbelt Bakery Granola bar (various flavors)
- Made Good Granola Bars
- Bobo's Bake granola bars
- Nature's Bakery Fig bar
- Annie's Organic Chewy granola bar
- Lara Bar
- KIND Breakfast Oat bars

Bars

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Post-workout bar guidelines

- Balance of protein and carbohydrates
- Low-moderate in fiber

Examples of bars after activity or day-to-day:

- Cliff Bar
- KIND bar
- Special K Protein Granola bar
- RX Bar
- Nature's Valley Protein Bars
- Go Macro Bars
- Perfect Bar (refrigerated)
- Kashi Granola Bars (various flavors)

Weight changes with training

- You should not be trying to lose weight and train at a high level!
- Increased carbohydrates + increase water retention → normal!
- Make the choice: time/performance goal OR weight/physique goal

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RED-S: What is it?

- International Olympic Committee (IOC)
- 1990s- 2000s: Female Athlete Triad
  - *"the combination of **disordered eating (DE) and irregular menstrual cycles** eventually leading to a decrease in endogenous estrogen and other hormones, resulting in **low bone mineral density'(BMD)** based on the original scientific evidence of Drinkwater et al."*
- 2014: Relative Energy Deficiency in Sport (RED-S)
  - *"The impaired physiological functioning caused by **relative energy deficiency** and **includes, but is not limited to,** impairments of*
    - *Metabolic rate*
    - *Menstrual function*
    - *Bone health*
    - *Immunity*
    - *Protein synthesis*
    - *Cardiovascular health"*
- Updated consensus in 2018
- More common in appearance based sports (endurance running, swimming, dance, gymnastics, volleyball), and in women

RED-S

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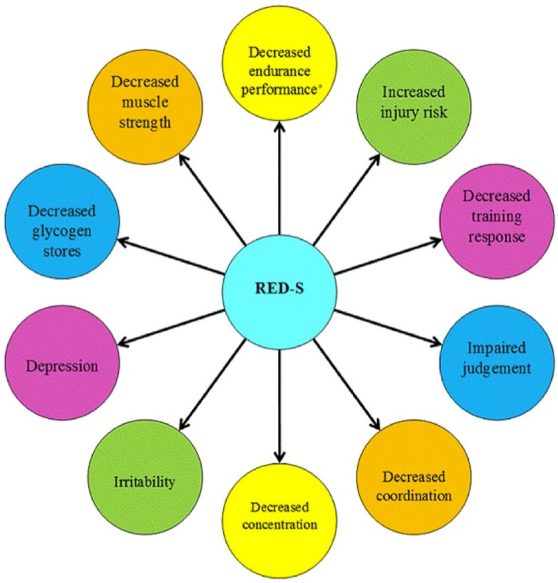

Figure 2 Potential Performance Effects of Relative Energy Deficiency in Sport (*Aerobic and anaerobic performance). Adapted from Constantini.[54]

Energy Availability (calories)

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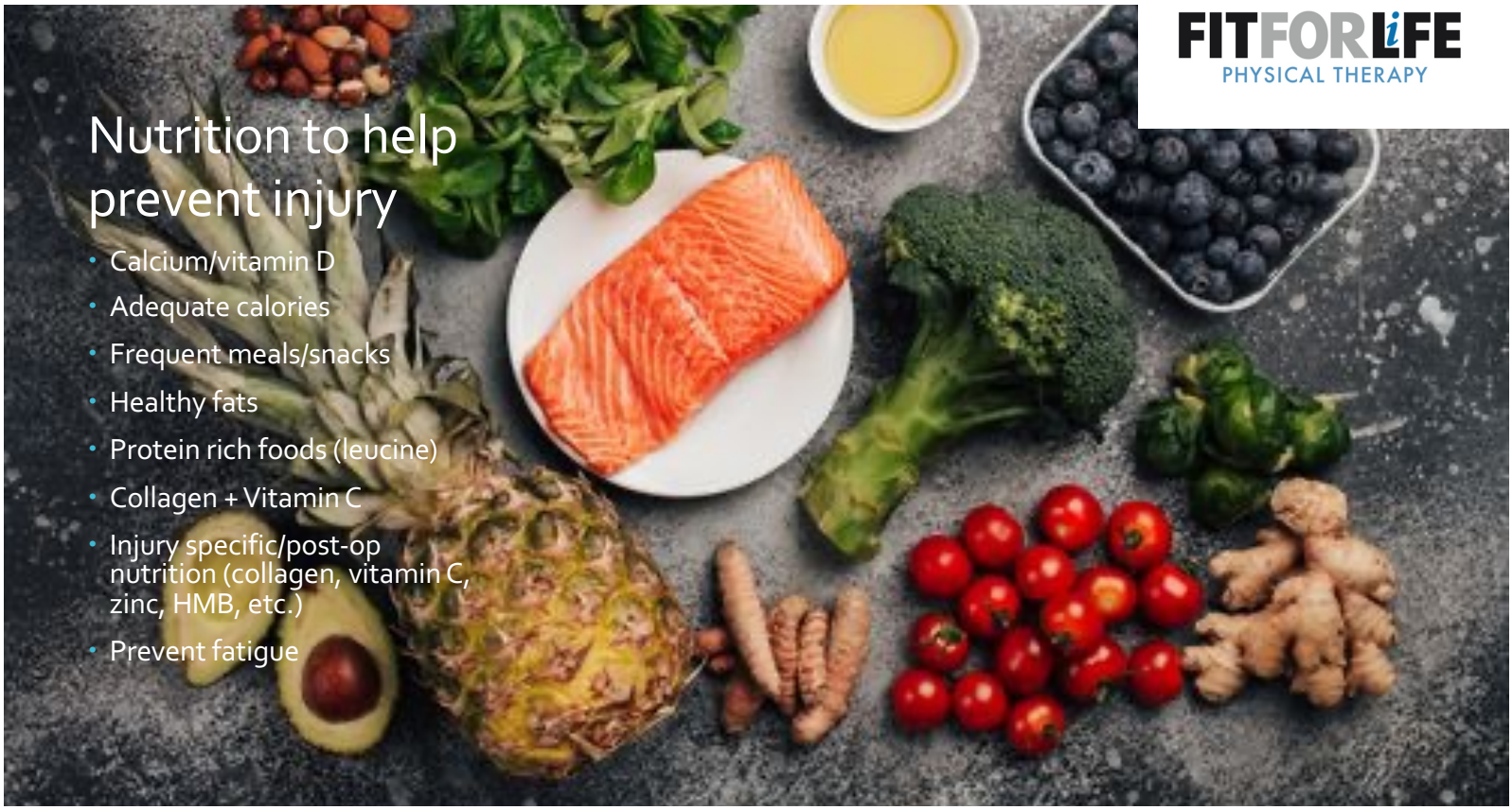
- Low energy intake (LEA) is not the same as a diagnosed eating disorder
- LEA = under fueling
- Energy intake (calories in) is not equal to calories expended (calories out from exercise, daily metabolic rate, other stressors, etc.)
- How can it happen?
  - Intentional calorie restriction (disordered eating)
  - Unintentional calorie restriction
  - Increased exercise
  - Eating Disorder
- First thing to address to prevent RED-S!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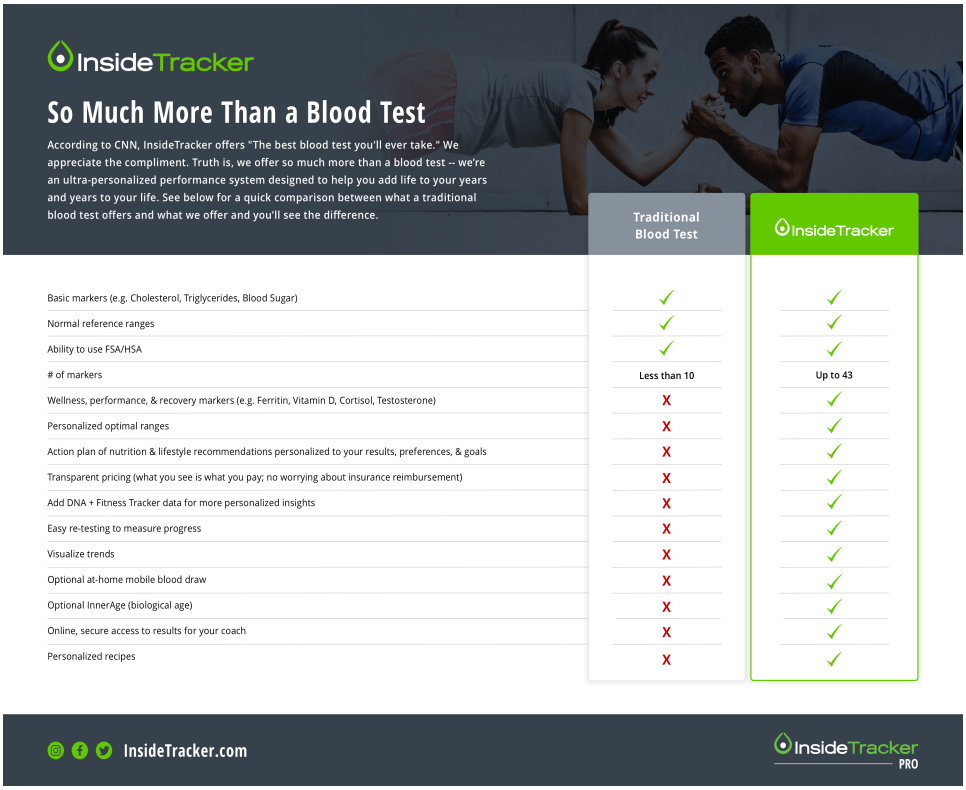
Nutrition to help prevent injury
• Calcium/vitamin D
• Adequate calories
• Frequent meals/snacks
• Healthy fats
• Protein rich foods (leucine)
• Collagen + Vitamin C
• Injury specific/post-op nutrition (collagen, vitamin C, zinc, HMB, etc.)
• Prevent fatigue

Optimize Performance

Code: REBECCAPRO25



Questions?

Thank you!

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