

Fueling Performance



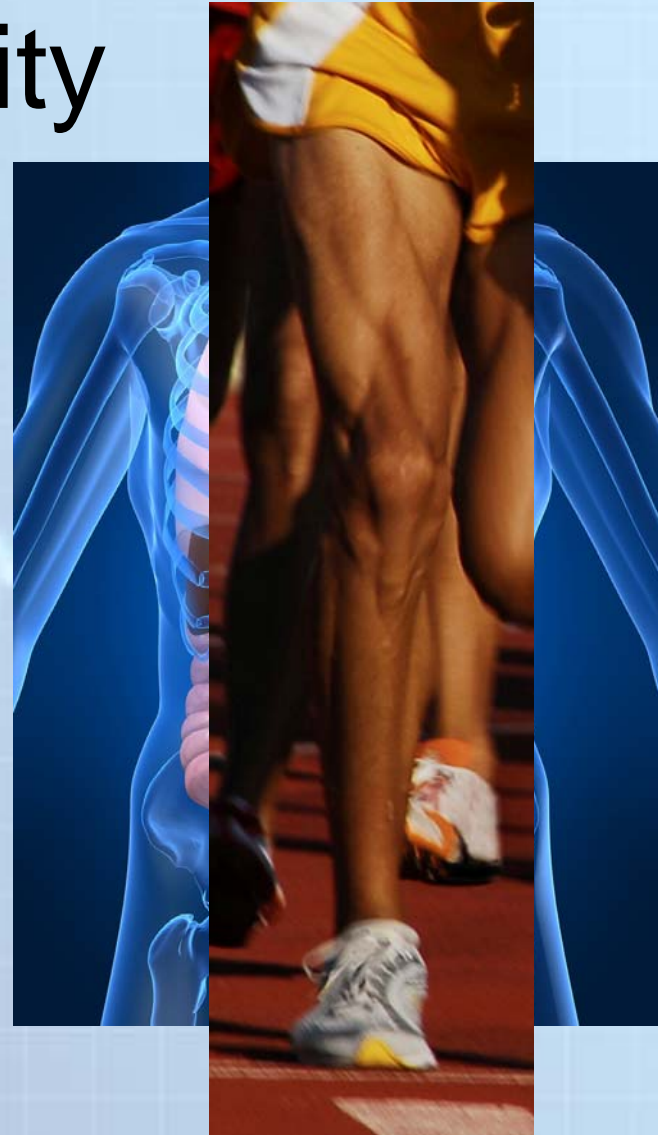
June 25, 2010
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R.D. Candidate

Outline

- Background Information
 - Fuel Type
 - Energy Systems
 - Digestion
- Pre Competition/Pre Training Meals and Snacks
- Hydration and Energy During Competition and Training
- Post Competition/Post Training Meals and Snacks

Energy Use During Physical Activity

- Carbohydrates
 - Consumed
 - Stored
- Fat
- Protein
 - Used in negligible amounts during exercise



Energy Use During Physical Activity

- Determinants of Fuel Source
 - Exercise
 - Frequency
 - Intensity
 - Time
 - Type
 - Sex
 - Fitness Level
 - Intake Prior to Exercise



Energy Use During Physical Activity

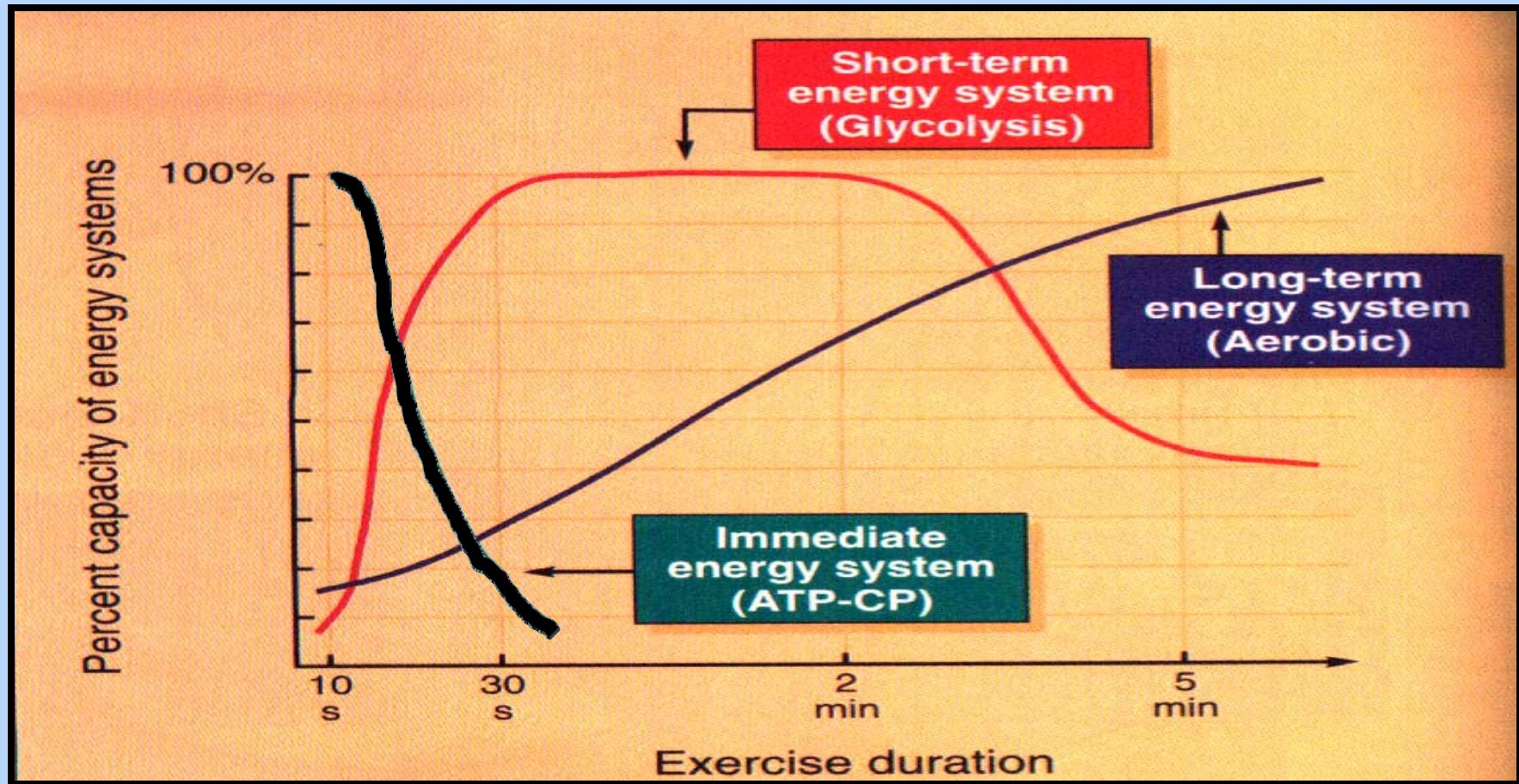
Muscle Glycogen per 100 g of Muscle	
Untrained Muscle	13 g
Trained Muscle	32 g
Carbohydrate Loaded Muscle	35-40 g

Energy Use During Physical Activity



- Immediate Energy System (ATP-CP)
 - Pre-Formed Energy
- Short Term Energy System (Glycolysis)
 - Carbohydrates
- Long Term Energy System (Aerobic)
 - Fat and Breakdown Products of Carbohydrate Metabolism

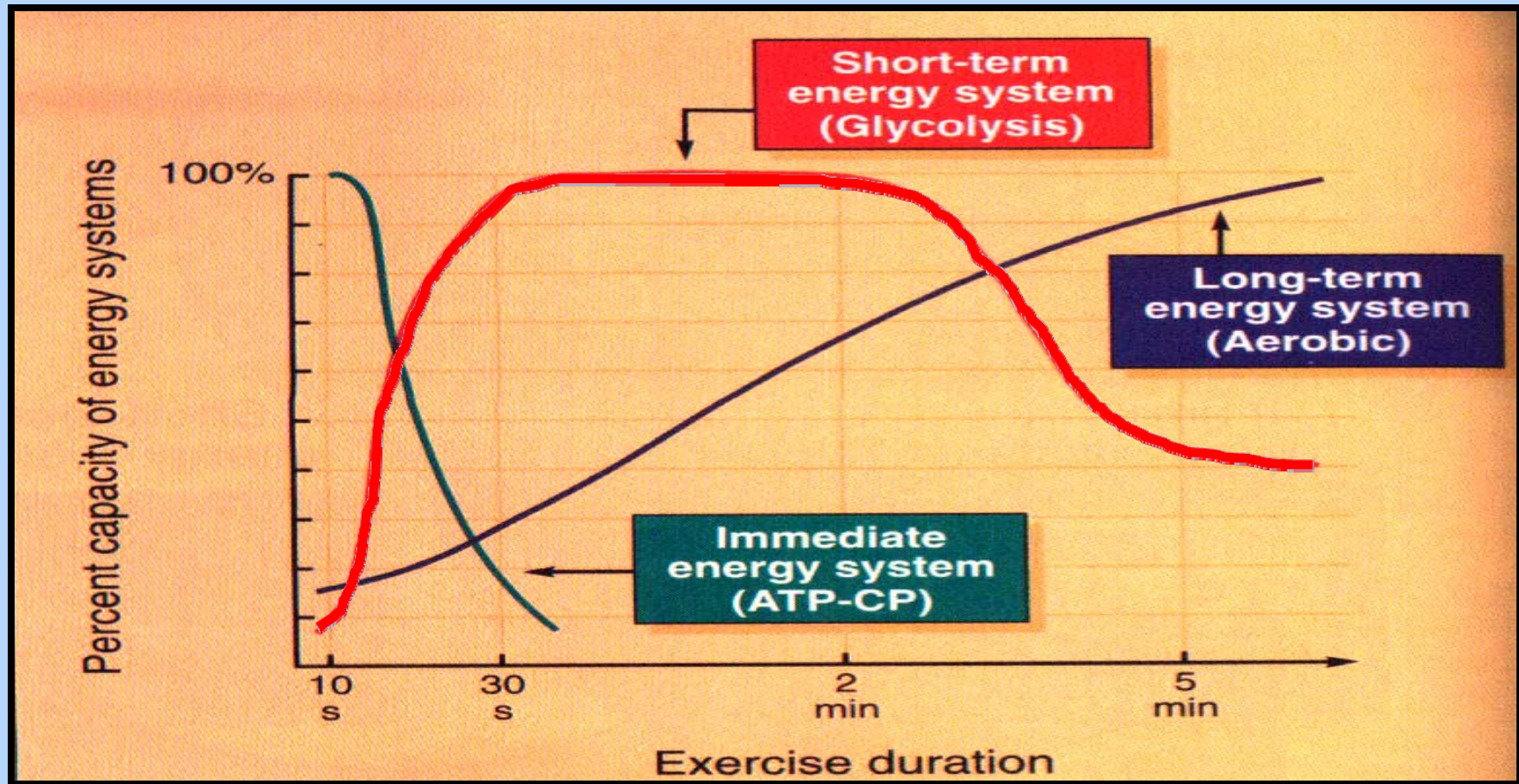
Energy Use During Physical Activity



Immediate Energy System



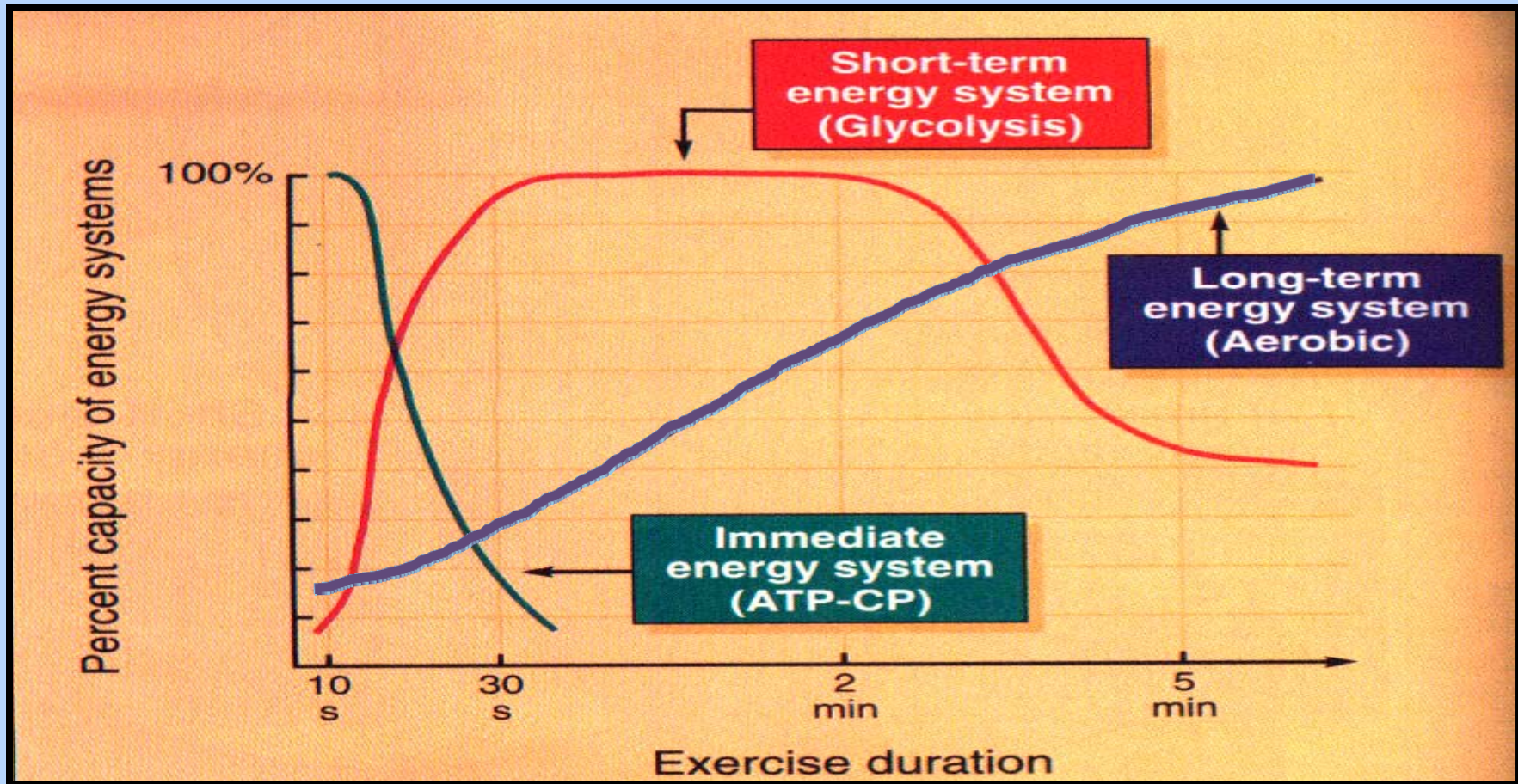
Energy Use During Physical Activity



Short Term Energy System

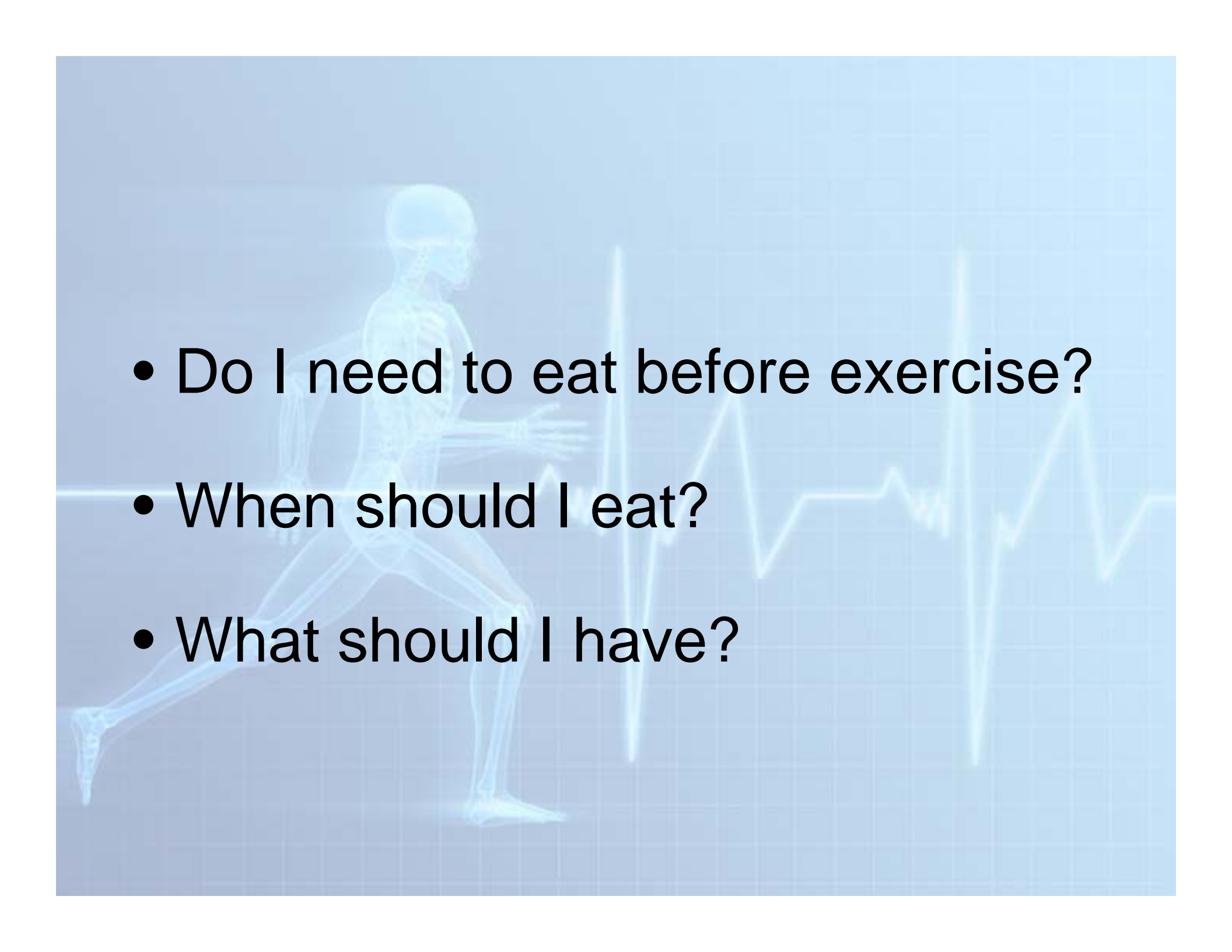


Energy Use During Physical Activity



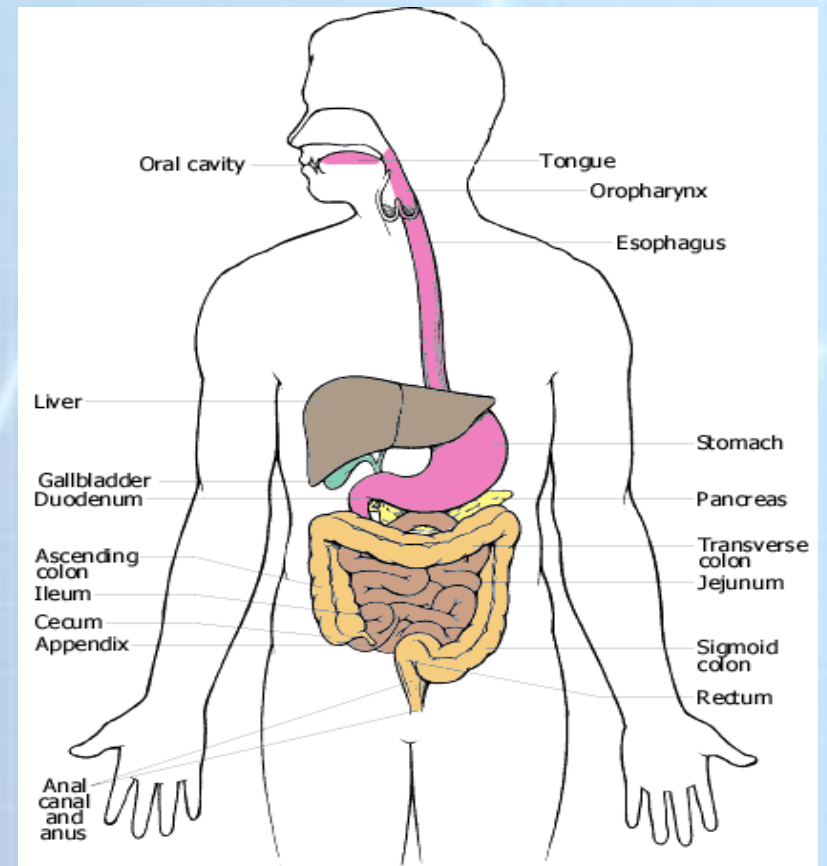
Long Term Energy System



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- Do I need to eat before exercise?
 - When should I eat?
 - What should I have?

Digestion

- Your body takes time to digest
 - Food can remain in the stomach for hours
 - Protein, Fat, and Fibre affect the rate of digestion
- There is a maximal rate at which your body can oxidize energy



Pre Competition/Pre Training Meals and Snacks

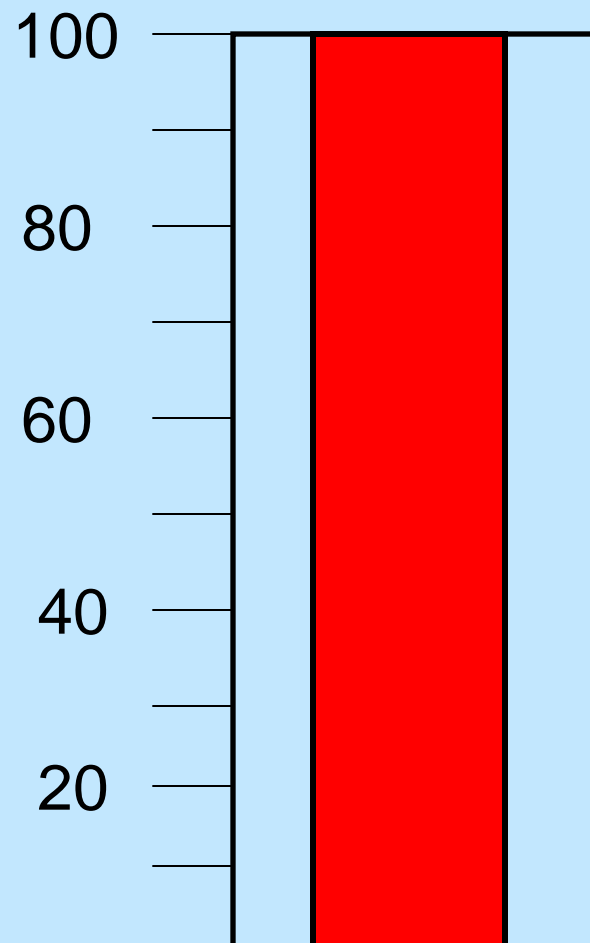
- Purposes:
 - Maximize readily available energy
 - Improve recovery and training adaptations
 - Maintain hydration and electrolyte status
- Goals:
 - High in carbohydrates to maximize glycogen stores
 - Low in fat and fibre to avoid cramping and bloating
 - Moderate protein
 - Composed of familiar foods

Pre Competition/Pre Training Meals and Snacks

- 3 to 4 Hours Before Exercise
 - 1 - 2 servings from each CFG group
 - 4-8 servings total
 - 500-800 kcal
 - Carbs should make up 65% of meal
 - Approx. 7 g/kg/day for maximal glycogen repletion
 - Meal should contain carbs, pro, and fat
 - 1-2 cups of fluid

Energy Use During Physical Activity

- Important to load daily during training and rest
- Take rest days!
- Do not fat load



Choices!

Tim Hortons

Turkey Bacon Club

Calories	440 kcal
Carbohydrates	63 g
Protein	30 g
Fat	8 g

Pizza

2 Pepperoni Slices

Calories	480 kcal
Carbohydrates	64 g
Protein	22 g
Fat	16 g

Meal

Turkey Bacon Club	440 kcal
Split Pea with Ham Soup	150 kcal
Chocolate Milk (250 ml)	166 kcal
Orange	60 kcal
Total	<u>816 kcal</u>
	CHO: 65%
	PRO: 23%
	FAT: 12%

Pre Competition/Pre Training Meals and Snacks

- 3 to 4 Hours Before Exercise
 - Grilled chicken and vegetables with milk
 - Pasta with lean meat balls, low fat parmesan, and side salad
 - Low fiber cereal with milk, orange juice, and a fresh fruit
 - High energy sports bar and fruit smoothie
 - Bread with cheese and meat, soup or salad, along with juice

Pre Competition/Pre Training Meals and Snacks

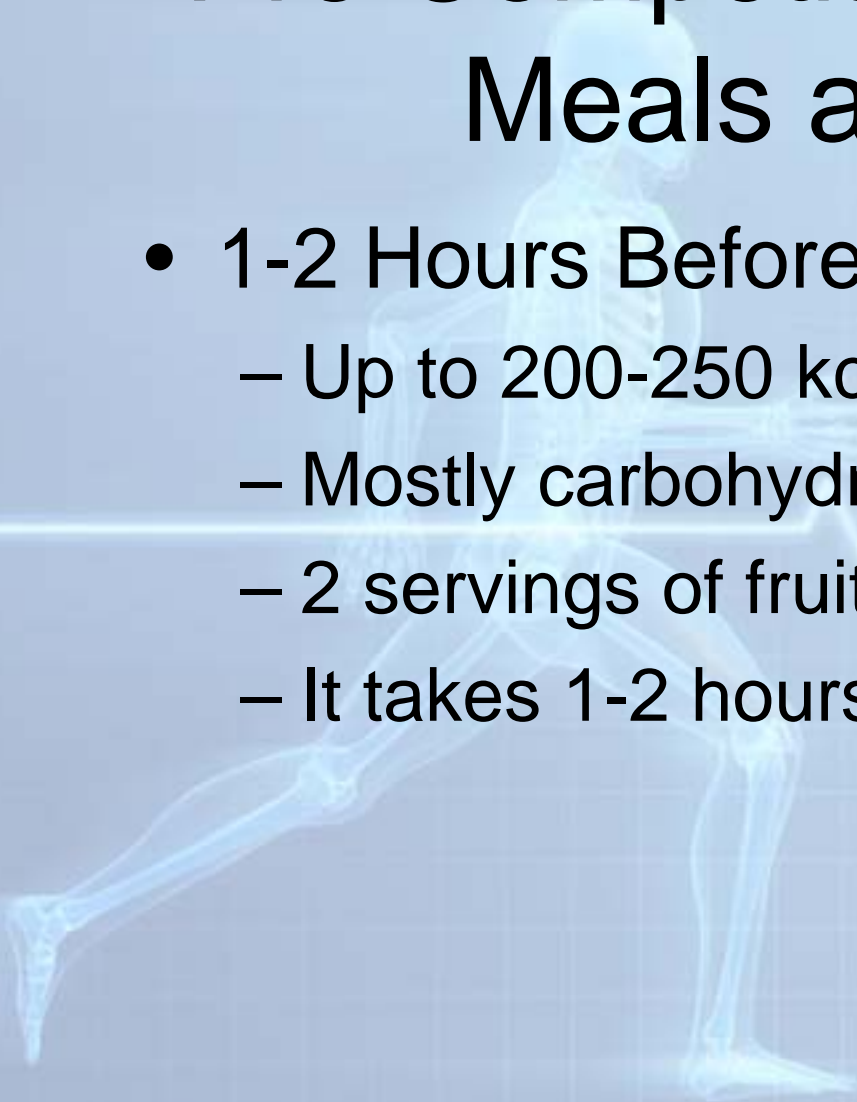
- 2 to 3 Hours Before Exercise
 - 3-4 servings from CFG
 - Up to 250 to 500 kcal
 - Meal should contain only carbohydrates and protein; limited fat, low fibre
 - Takes 2-3 hours to digest a small meal

Pre Competition/Pre Training Meals and Snacks

- 2-3 Hours Before Exercise
 - Fresh fruit; fruit/vegetable juices
 - Low fat yogurt parfait
 - Cereal Bar containing less than 4 g of each fat, fiber, and protein
 - Bread or bagel with low fat cream cheese and jelly
 - Raw veggies and crackers

Pre Competition/Pre Training Meals and Snacks

- 1-2 Hours Before Exercise
 - Up to 200-250 kcal
 - Mostly carbohydrate, little protein
 - 2 servings of fruits, vegetables, &/or grains
 - It takes 1-2 hours to digest a snack



Pre Competition/Pre Training Meals and Snacks

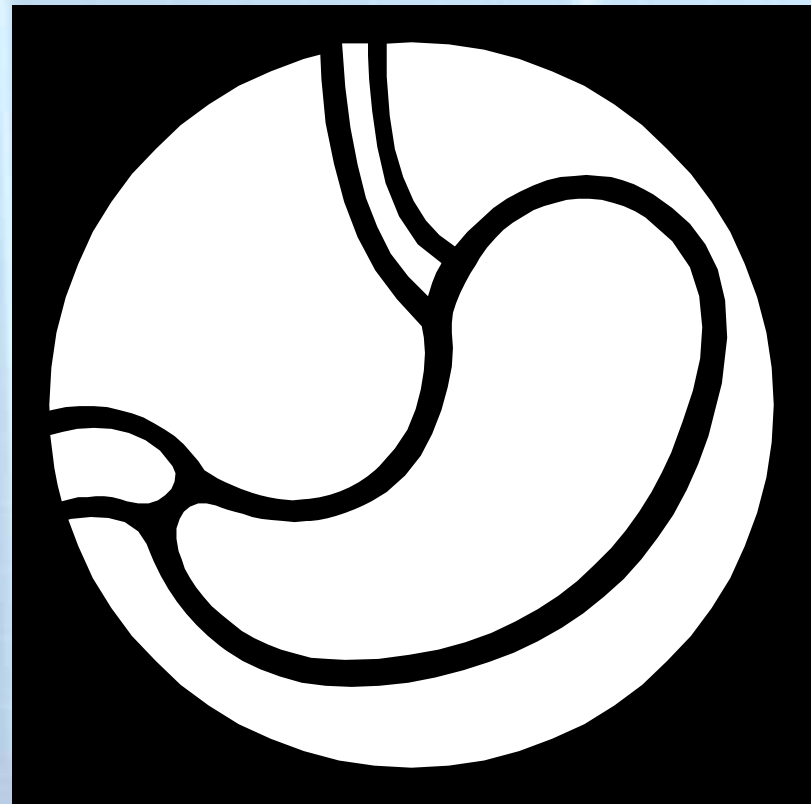
- 1-2 Hours Before Exercise
 - Small fruit or vegetable juice
 - Fresh fruit or vegetable
 - Low fat milk or soy beverage
 - Sports drink
 - 100 kcal pre-packaged snacks

Hydration and Exercise

- To prevent dehydration you must replace the water you lose in sweat
- Rate of sweat loss
 - Individual biology/Fitness level
 - Temperature, humidity
 - Clothing/Equipment
- Hydrate before exercising
 - Consume extra fluids that night before
 - 2 - 3 cups up to 2 hours before exercise
 - 1 - 2 cups 5 - 10 min before exercise

Hydration and Exercise

- Typically sweat 0.5 - 2.0 L/hour
- Gastric Emptying
 - 10-20 ml/min
- Maximum fluid intake
 - 150 - 300 ml/15 min



When are sports drinks needed?



- Prolonged or intense exercise
 - Bodies glycogen stores have enough energy for exercise < 60 min
- When sweat losses are high
 - Replacement of electrolytes in extreme heat or with large sweat rates
- During competitions
 - Assist in glycogen repletion during when limited time for meals between events/games

Post Competition/ Post Training Meals and Snacks

- Purposes:
 - Replace fluids lost from sweat
 - 450 - 675 ml fluid for every pound lost
 - Replenish glycogen stores
 - Assist in recovery
- Goals:
 - Eat immediately following exercise
 - 1-1.5g carbohydrate per kg of body weight every 2 hours for 4 - 6 hours

Post Competition/Post Training Meals and Snacks

- Target:
 - 1 - 1.5 g of Carbs per kg of body weight
- Example:
 - 70 kg person: 70 - 105 g carbs
 - Snack:
 - 1 small apple: 15 g Carbs
 - 250 ml chocolate milk: 30 g Carbs/8 g Protein
 - 1/2 bagel with 1 tbsp jam: 30 g Carbs
 - Total = 75 g Carbohydrates & 8 g Protein

Post Competition/Post Training Meals and Snacks

- Eat a balanced meal within 2 hours after exercise
 - 500 - 800 kcal
 - 1-2 servings from each CFG group
 - 4-8 servings total
 - Carbs should make up 65% of the meal
 - Meals should contain Carbs, Pro, Fat
 - Fluids

Role of Protein

- Muscle fibres are composed of protein
- Assists in repair of tissues damaged during exercise
- Role in exercise adaptation vs performance?
 - Resistance athletes
 - Endurance athletes



Role of Protein

- Do athletes need more protein?
 - High habitual intakes in the general population:
 - >100 g/day
 - Protein preserving affect of exercise
- Daily requirements:
 - Normal person: 0.8 g/kg/day
 - Endurance athletes: 1.2 -1.7 g/kg/day

Energy Drinks/Caffeine



- Caffeine has proven performance benefits
 - Improves mental alertness
 - Decrease perception of fatigue
- Dosage
 - Performance benefits occur at low dosages
 - No increased benefit with high doses
 - 1 - 2 cups of coffee sufficient to see effects

Energy Drinks/Caffeine

- Safety of energy drinks is in question:
 - Taurine and glucoronolactone
- Not formulated for rapid rehydration or glycogen replenishment
 - High sugar content
 - Carbonated



A blue-tinted illustration of a human skeleton in a running pose, overlaid with a white ECG line on a grid background. The skeleton is shown in profile, running towards the right. The ECG line is a white, jagged line that follows the general shape of the skeleton's movement. The background is a light blue grid.

QUESTIONS?