

PET3361
EXAM II STUDY GUIDE

1. Define postabsorptive and postprandial states and explain how each of the macronutrients is absorbed into the system.
 - **Postabsorptive state = Fasting state**
 - After an overnight fast, blood glucose is maintained by glycogenolysis (break down of glycogen) and gluconeogenesis (formation of glucose from non-carbohydrate source) in the liver
 - Glycogenolysis provides 65-75% of the glucose released
 - Gluconeogenesis provides the remaining 25-35% of the glucose released by the liver.
 - Muscle glycogen cannot be converted to blood glucose
 - **Postprandial state = Fed state**
 - Absorbed glucose is being stored as glycogen (glycogenesis) in skeletal muscles and liver
 - Most cells of the body are removing glucose for energy (glycolysis), especially neurons and red blood cells
 - Adipose cells remove glucose to form glycerol needed for triglycerides formation and fatty acids
 - **Absorption of Carbohydrates:**
 - Monosaccharides are absorbed through the wall of the small intestine into capillaries leading to the portal vein
 - Glucose and Galactose are absorbed by secondary active transport coupled to Na⁺ transport into the epithelial cells and then move into the blood by facilitated diffusion
 - Fructose is absorbed through epithelial cells and into the blood by facilitated diffusion
 - **Fats and water are absorbed through – Passive absorption**
 - **Fructose is absorbed through – Facilitated absorption**
 - **Amino Acids and Glucose are absorbed through – Active absorption**

2. Which hormones control blood glucose and how? How does exercise influence these responses?

- o Insulin
 - o Secreted from Beta cells in the Pancreas
 - o Released when blood glucose high
 - o Causes active transport of amino acids into tissue cells
 - o Causes facilitated diffusion of glucose into tissue cells
 - o Leads to a decrease in Blood glucose and increase in stored glycogen
 - o Gradually decreases as exercise intensity increases (blunted response)

 - o Glucagon
 - o Secreted from Alpha cells in the Pancreas
 - o Released when blood glucose is low
 - o Stimulates glycogenolysis and gluconeogenesis
 - o Stimulates fat breakdown
 - o Causes increased Blood glucose level

 - o Epinephrine & Norepinephrine
 - o Work in conjunction with Glucagon to raise blood glucose levels
 - o Stimulate fat breakdown
 - o Stimulate glycogenolysis and gluconeogenesis
 - o Exercise causes increase in Epinephrine and Norepinephrine levels
3. What factors influence CHO use during exercise and how?
- Exercise Intensity
 - o The greater the intensity of exercise = the quicker the depletion of stored glycogen
 - o As you increase exercise intensity you increase reliance on CHO and decrease your reliance on fat

 - Exercise Duration
 - o The longer the exercise goes, the more depleted glycogen stores get

- Initial Glycogen Levels
 - A higher carbohydrate intake causes higher levels of glycogen stores during exercise.
 - Higher levels will last longer, will not be depleted as quickly as if the initial glycogen levels were low
- Training Status
 - The more trained you are, the more efficiently you can use fuels

4. What is the recommended timing for the feeding of CHO before exercise?

- Timing
 - 30-60 minutes before exercise
 - Some studies with heavy exercise reported reductions in endurance
 - Studies using moderate intensity reported no significant difference
 - Probably better for moderate intensity activity
 - 3 or more hours before exercise
 - This has been found to improve performance

5. What are the general guidelines for a pre-competition meal?

- Pre-competition meal general guidelines:
 - Carbohydrate feeding 3-4 hours before exercise
 - 150-300 grams of carbohydrates (3-5 grams/kilogram body weight)
 - Solid or liquid
 - Relatively little fat or fiber (avoid fried foods)
 - These cause discomfort, digestive rate slows, potentially doesn't allow access to other fuels
 - Limit protein (controversy)

6. When is it most beneficial to feed CHO during exercise? What are the guidelines?