

**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**
    - o 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
    - o Glycogenolysis provides 65-75% of the glucose released
    - o Gluconeogenesis provides the remaining 25-35% of the glucose released by the liver.
    - o Muscle glycogen cannot be converted to blood glucose
  - **Postprandial state = Fed state**
    - o Absorbed glucose is being stored as glycogen (glycogenesis) in skeletal muscles and liver
    - o Most cells of the body are removing glucose for energy (glycolysis), especially neurons and red blood cells
    - o Adipose cells remove glucose to form glycerol needed for triglycerides formation and fatty acids
  - **Absorption of Carbohydrates:**
    - o Monosaccharides are absorbed through the wall of the small intestine into capillaries leading to the portal vein
    - o Glucose and Galactose are absorbed by secondary active transport coupled to Na<sup>+</sup> transport into the epithelial cells and then move into the blood by facilitated diffusion

- o 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
  - o A higher carbohydrate intake causes higher levels of glycogen stores during exercise.
  - o Higher levels will last longer, will not be depleted as quickly as if the initial glycogen levels were low
- Training Status
  - o 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
  - o 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
  - o 3 or more hours before exercise
    - This has been found to improve performance