



PHARMACOLEARN

It's Important to Know!

BP201T — Human Anatomy and Physiology II

B.Pharm Semester 2 · Unit 2 — Digestive System and Energetics

Unit II: Digestive System and Energetics

This unit follows food from the gastrointestinal tract to absorption and explains how cells use ATP, phosphocreatine and basal metabolic rate.

Gastrointestinal tract

The gastrointestinal tract includes the mouth, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and anal canal. Accessory organs include the salivary glands, liver, gallbladder and pancreas.

The stomach stores food, mixes it and begins protein digestion. Parietal cells secrete hydrochloric acid and intrinsic factor. Chief cells secrete pepsinogen, which becomes pepsin in an acidic environment. Gastrin and vagal activity participate in gastric regulation.

The small intestine is the main site of digestion and absorption. Its folds, villi and microvilli increase surface area. The large intestine absorbs water and electrolytes and forms faeces. Peristalsis moves contents forward, while segmentation mixes contents.

Salivary glands, pancreas and liver

Saliva moistens food and begins starch digestion. Pancreatic juice contains digestive enzymes and bicarbonate. Bicarbonate helps neutralise acidic chyme entering the small intestine. The liver produces bile, processes absorbed nutrients and performs metabolic and detoxification functions. Bile salts help emulsify lipids.

Digestion and absorption

Carbohydrates are reduced to monosaccharides, proteins to amino acids and small peptides, and lipids to fatty acids and monoacylglycerols. Monosaccharides and amino acids enter blood capillaries in intestinal villi. Many lipid products enter enterocytes, are reassembled and leave in lipoprotein particles through lymphatic vessels.

Energetics

ATP is the main immediately available energy currency of the cell. Phosphocreatine stores a rapidly transferable phosphate group in muscle and can help regenerate ATP during sudden

activity. Basal metabolic rate is the energy expenditure needed to maintain essential functions under defined resting conditions. It is influenced by body size, age, sex, body composition, hormones, temperature and health status.

Unit II: Frequently asked questions

Q: What is the role of hydrochloric acid in the stomach?

A: It creates an acidic environment that supports conversion of pepsinogen to pepsin, helps protein digestion and contributes to defence against swallowed microorganisms.

Q: What is the main site of nutrient absorption?

A: The small intestine is the main site because its folds, villi and microvilli provide a large absorptive surface.

Q: What is basal metabolic rate?

A: Basal metabolic rate is the energy expenditure needed to maintain essential body functions under defined resting conditions.

Unit II: Key takeaways

- The stomach stores, mixes and begins digestion of proteins.
- The small intestine performs most digestion and nutrient absorption.
- The liver produces bile and processes absorbed nutrients.
- ATP supports immediate cellular work, while phosphocreatine helps rapid ATP regeneration.
- Basal metabolic rate changes with biological and environmental factors.

Unit II: Clinical correlation

Clinical correlation: malabsorption. Damage to intestinal mucosa can reduce nutrient absorption and lead to weight loss or deficiency states.