



# Hepatic System



## Characteristics

- ◆ The largest gland of the body.
- ◆ Located in the right upper abdomen.
- ◆ Very vascular.
- ◆ Receives blood from the GI tract via the portal vein and the hepatic artery.

## Structure

### Lobes

- ◆ **Glisson's capsule:** A layer of connective tissue surrounding the liver and ensheathing the hepatic artery, portal vein, and bile ducts within the liver.
- ◆ **Caudate lobe:** A lobe of the liver bounded on the right by the inferior vena cava, on the left by the fissure of the ductus venosus, and connected with the right lobe by a narrow prolongation.
- ◆ **Quadratic lobe:** Is an area of the liver situated on the under surface of the medial segment left lobe (Continued segment IVb), bounded in front by the anterior margin of the liver; behind by the porta hepatis; on the right, by the fossa for the gallbladder; and on the left, by the fossa for the umbilical vein.

## Functions

- ◆ Glucose metabolism
- ◆ Anemia conversion
- ◆ Protein metabolism
- ◆ Fat metabolism
- ◆ Vitamin and iron storage
- ◆ Drug metabolism
- ◆ Bile formation
- ◆ Bilirubin excretion
- ◆ Clotting factors
- ◆ Blood filtering
- ◆ Metabolism of glucose.
- ◆ Regulation of clotting factors.
- ◆ Let a food become energy by breaking down fats and proteins.
- ◆ Iron storage.
- ◆ Vitamin storage.
- ◆ Excretion of bilirubin.
- ◆ Removes toxins and filters bacteria.

## Changes with older Age

- ◆ Liver decreases in size and weight.
- ◆ Decreased hepatic flow.
- ◆ Decreased ability to metabolize drugs.
- ◆ Increased risk of gallstones.
- ◆ More frequent and severe complications of biliary tract disease.



## Hepatic circulation

One hepatic artery carries nutrient poor, oxygen rich blood through the hepatic circulatory system. One portal vein flows through the hepatic circulatory system carrying nutrient rich, oxygen poor blood. Blood flows from the abdominal organs to the liver through the portal vein. Then into the sinusoids of the liver, and into the hepatic vein before returning to the heart from the inferior vena cava. The hepatic artery provides 30 to 40% of the oxygen to the liver, while only accounting for 25% of the total liver blood flow. The rest comes from the partially deoxygenated blood from the portal vein which makes up about 75% of liver blood flow. The liver consumes about 20% of the total body oxygen when at rest. That is why the total liver blood flow is quite high, at about one liter a minute and up to two liters a minute. This pathway permits the liver to process and to detoxify substances entering the body from the gastrointestinal tract.

## Hepatic dysfunctions & manifestations

### Dysfunctions:

- ◆ Acute or chronic cirrhosis of the liver
- ◆ Malnutrition from alcoholism
- ◆ Infection
- ◆ Anemia
- ◆ Metabolic disorders
- ◆ Nutritional deficits
- ◆ Hypersensitivity states

### Manifestations:

- ◆ Jaundice
- ◆ Portal hypertension
- ◆ Ascites
- ◆ Varices
- ◆ Hepatic Encephalopathy
- ◆ Coma
- ◆ Nutritional deficits



Nurse Angie 2018

# Cardiovascular system

## Function of circulation

Delivers O<sub>2</sub>, nutrients, hormones and antibodies to organs, tissues and cells. Removes the end product of cellular metabolism.

## Function of the heart

Pumps oxygenated blood into the arterial system to supply capillaries and tissues.

Pumps oxygen poor blood from the venous system through the lungs to be reoxygenated.



## Blood Flow Through the Heart

1. From the superior and inferior vena cava, oxygen poor blood goes to the right atria through the tricuspid valve.
2. Right ventricle to the pulmonary valve.
3. To the pulmonary trunk and arteries into the lungs. CO<sub>2</sub> is lost and O<sub>2</sub> is gained in the pulmonary capillaries.



# Study Guide For Anatomy And Physiology Marieb

**RC Schank**



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## **Table of Contents Study Guide For Anatomy And Physiology Marieb**

1. Understanding the eBook Study Guide For Anatomy And Physiology Marieb
  - The Rise of Digital Reading Study Guide For Anatomy And Physiology Marieb
  - Advantages of eBooks Over Traditional Books
2. Identifying Study Guide For Anatomy And Physiology Marieb
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Study Guide For Anatomy And Physiology Marieb
  - User-Friendly Interface
4. Exploring eBook Recommendations from Study Guide For Anatomy And Physiology Marieb
  - Personalized Recommendations
  - Study Guide For Anatomy And Physiology Marieb User Reviews and Ratings
  - Study Guide For Anatomy And Physiology Marieb and Bestseller Lists
5. Accessing Study Guide For Anatomy And Physiology Marieb Free and Paid eBooks
  - Study Guide For Anatomy And Physiology Marieb Public Domain eBooks

- Study Guide For Anatomy And Physiology Marieb eBook Subscription Services
- Study Guide For Anatomy And Physiology Marieb Budget-Friendly Options
- 6. Navigating Study Guide For Anatomy And Physiology Marieb eBook Formats
  - ePub, PDF, MOBI, and More
  - Study Guide For Anatomy And Physiology Marieb Compatibility with Devices
  - Study Guide For Anatomy And Physiology Marieb Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Study Guide For Anatomy And Physiology Marieb
  - Highlighting and Note-Taking Study Guide For Anatomy And Physiology Marieb
  - Interactive Elements Study Guide For Anatomy And Physiology Marieb
- 8. Staying Engaged with Study Guide For Anatomy And Physiology Marieb
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Study Guide For Anatomy And Physiology Marieb
- 9. Balancing eBooks and Physical Books Study Guide For Anatomy And Physiology Marieb
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Study Guide For Anatomy And Physiology Marieb
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Study Guide For Anatomy And Physiology Marieb
  - Setting Reading Goals Study Guide For Anatomy And Physiology Marieb
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Study Guide For Anatomy And Physiology Marieb
  - Fact-Checking eBook Content of Study Guide For Anatomy And Physiology Marieb
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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