

# CARDIOVASCULAR SYSTEM : ANATOMY & PHYSIOLOGY

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

## ANATOMY OF THE HEART

Cone shaped organ located in the mediastinal space.  
The pericardial sac encases the heart and protects it, lubricates and holds 5-20 ml of pericardial fluid.  
This has two layers.

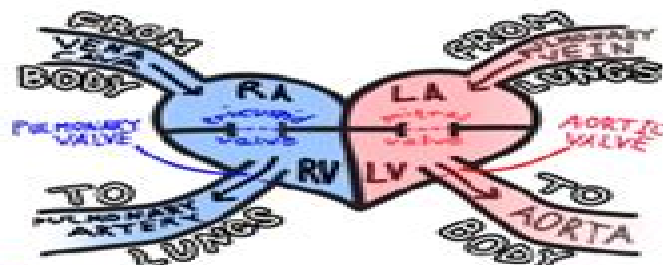
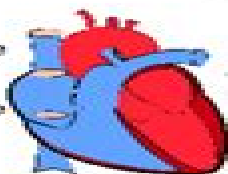
- ✦ the parietal pericardium which is the outer membrane.
- ✦ the visceral pericardium is the inner membrane attached to the heart.

## CONSISTS OF 3 LAYERS

- ✦ **Epicardium** : outermost layer of the heart.
- ✦ **Myocardium**: middle layer of the heart, the contracting muscle.
- ✦ **Endocardium**: innermost layer of the heart, lines the inner chambers and the valves.

## 4 CHAMBERS

- ✦ **Right atrium**: carries deoxygenated blood from the body via superior and inferior vena cava.
- ✦ **Right ventricle**: carries blood from the right atrium and pumps it into the lungs through the pulmonary artery.
- ✦ **Left atrium**: carries oxygenated blood from the pulmonary veins.
- ✦ **Left ventricle**: carries oxygenated blood from the left atrium and pumps it into the systemic circuit through the aorta.



## 4 VALVES

*Two atrioventricular valves that close at the beginning of ventricular contraction. They prevent blood from flowing back into the atria.*

- ✦ **Tricuspid valve** : on the right side of the heart.
- ✦ **Bicuspid valve**: on the left side of the heart.

*Two semilunar valves that prevent blood from flowing back into the ventricles during relaxation.*

- ✦ **Pulmonic semilunar valve**: between the right ventricle and pulmonary artery.
- ✦ **Aortic semilunar valve**: between the ventricle and the aorta.

## CORONARY ARTERIES

- ✦ **Right main coronary artery**: supplies the right atrium and ventricle, the inferior left ventricle, posterior septal wall, SA and AV nodes.
- ✦ **Left main coronary artery**: consists of two main branches left anterior descending which supplies blood to the left ventricle and the ventricular septum and circumflex arteries which supply blood to the left atrium and the lateral/posterior aspects of the left ventricle.

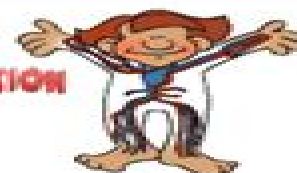
## BLOOD FLOW OF THE HEART

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.
4. O<sub>2</sub> rich blood enters the pulmonary veins to the left atrium.
5. Blood travels through the bicuspid valve and enters the left ventricle.
6. Blood moves through the aortic valve and travels through the aorta to the systemic circuit.

## ELECTRICAL CONDUCTION:

- ✦ **SA node**: pacemaker of the heart and initiates contraction at 60- 100 BPM.
- ✦ **AV** : receives impulses from the SA node initiates and sustains impulses at 40-60 BPM.
- ✦ **Bundle of His**: continuation of the AV node and branches into the the bundle branches which terminate in the purkinje fibers.
- ✦ **Purkinje fibers**: network of conducting strands beneath the ventricular endocardium. They can act as a pacemaker when the SA and AV fail as pace makers. They can sustain at 20-40 BPM.

**CIRCULATION**



# Cardiac Surgery Study Guide

**Steven E. Lucking, Frank A.  
Maffei, Robert F. Tamburro, Neal J.  
Thomas**

## **Cardiac Surgery Study Guide:**

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practitioners The major textbooks are excellent references but do not allow concise reading on specific topics and are not intended to act as both text and study guide There are also several handbooks available but these are usually written for general pediatric residents and lack the advanced physiology and pathophysiology required for the higher level pediatric critical care practitioner

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*Cardiac Surgery* Shahzad G. Raja, 2020-02-11 This textbook provides a succinct overview of cardiac surgery with key concepts being emphasized throughout An abundance of illustrations intra operative photographs tables as well as information boxes aids the reader to visualise grasp and retain difficult concepts The inclusion of evidence based approaches to the management of a range of cardiac surgical conditions equips the reader with an understanding of how to overcome a variety of potentially tough clinical challenges Concise Cardiac Surgery A Complete Guide comprehensively covers a range of techniques used in cardiac surgery It is therefore an ideal resource for the trainee and practising cardiac surgeon seeking a practically focused text detailing how to apply the latest techniques and evidence based approaches in their day to day practice

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## **Table of Contents Cardiac Surgery Study Guide**

1. Understanding the eBook Cardiac Surgery Study Guide
  - The Rise of Digital Reading Cardiac Surgery Study Guide
  - Advantages of eBooks Over Traditional Books
2. Identifying Cardiac Surgery Study Guide
  - 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 Cardiac Surgery Study Guide
  - User-Friendly Interface
4. Exploring eBook Recommendations from Cardiac Surgery Study Guide
  - Personalized Recommendations
  - Cardiac Surgery Study Guide User Reviews and Ratings
  - Cardiac Surgery Study Guide and Bestseller Lists
5. Accessing Cardiac Surgery Study Guide Free and Paid eBooks
  - Cardiac Surgery Study Guide Public Domain eBooks
  - Cardiac Surgery Study Guide eBook Subscription Services

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