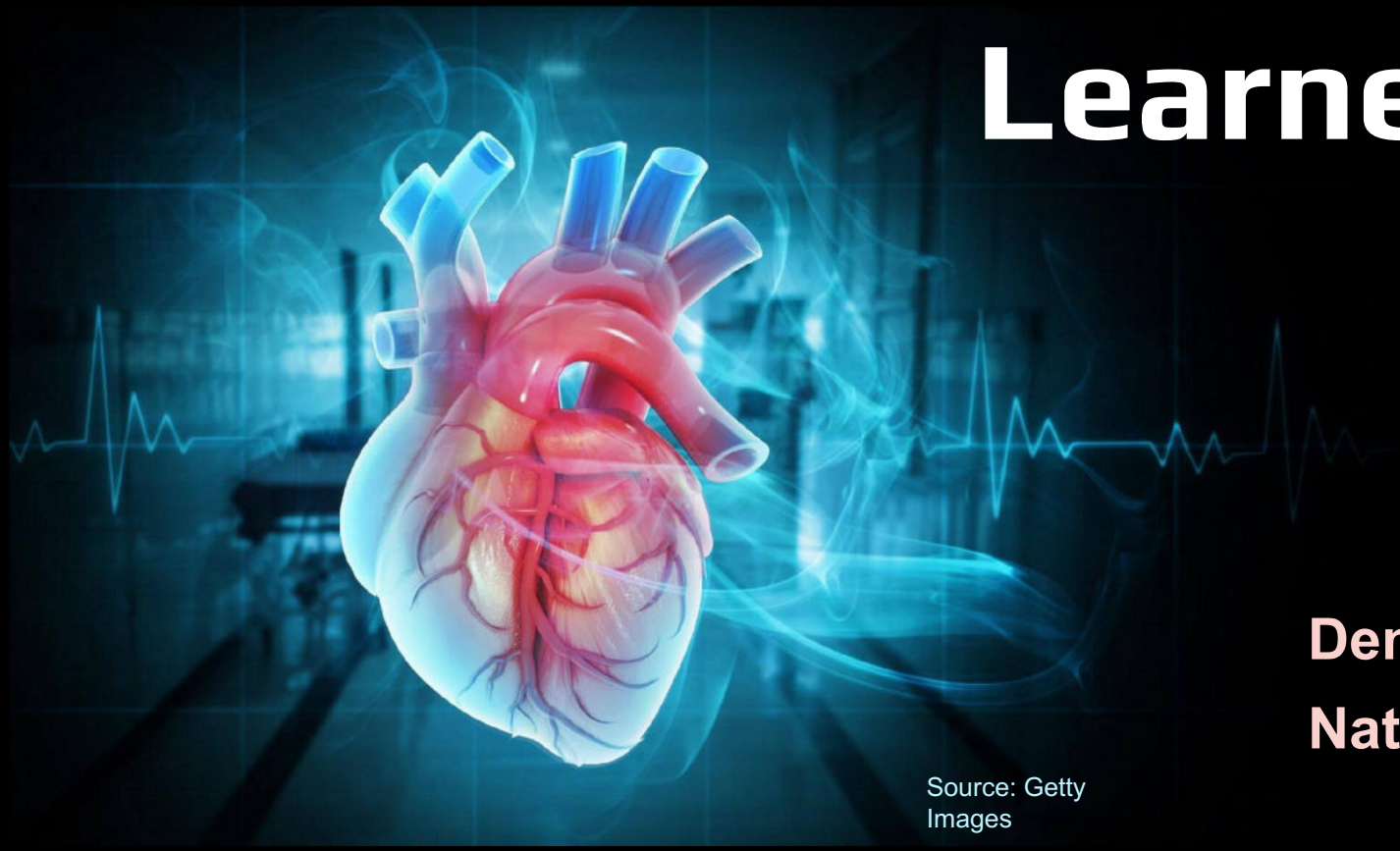
# Visual and Multimodal Strategies for Teaching Cardiac Anatomy to Deaf and Hard-of-Hearing (DHH) Learners



Source: Getty Images

**Denise Lengyel, Senior Lecturer**

**National Technical Institute for the Deaf**

# Overview

- Research-based Techniques
- Lesson of Cardiac Anatomy
- Q & A

# Summary of Research-Based Techniques

- Morphological Segmentation
- Active Learning
- Visual Aids
- Mnemonic device

# Morphological Segmentation

**Example:** Myocardium → myo = muscle, cardio = heart, -ium = layer

**Benefits:**

- Vocabulary expansion
- Enables students to dissect unfamiliar terms
- Improves reading comprehension

- Ruan et al., 2018 – Morpheme awareness predicts reading comprehension ability

# Active Learning

**Examples:** Discussion, Open Recall, Application, Analysis, Reasoning, Note-taking, and Problem-solving.

**Benefits:**

- Deeper understanding
- Critical thinking
- Memory integration, retention and recall

- Prince (2013) – Active learning leads to knowledge retention

# Visual Aids

**Examples:** Diagram, Models, videos, Images, Dissection, Handshapes

**Benefits:**

- Decreases language demands
- Comprehension & Retention
- Clarification

- Alabi (2024) - A wide variety of visual aids enhances comprehension & a more cohesive learning experience

# Mnemonic devices

**Examples:** ABCs, “Try Pulling Blood Along”, LAB RAT, “Away” &“Visit”

**Benefits:**

- Links content to something personal, visual-spatial, humorous, etc.
- Content becomes more meaningful
- Fact memorization

- Akpan (2021) - Caution; they are not comprehension strategies
  - Instructor provided devices may not be meaningful

# Heart Anatomy – Overview

- Medical Terminology
- Chambers
- Major vessels
- Valves
- Blood flow

# Medical Terminology

- Pulmonary =
- Atri/o =
- Ventricular =
- Inter =
- Semi =
- Lunar =
- Bi =
- Tri =
- Chamber =
- Descending =
- Arch =
- Aortic =
- Cuspid =
- Septum =
- Superior =
- Inferior =

# Medical Terminology

- **Pulmonary** = Lung
- **Atri/o** = Atrium (singular), Atria (pleural)
- **Ventricular** = ventricle
- **Inter** = between
- **Semi** = half, part
- **Lunar** = moon
- **Bi** = two
- **Tri** = three
- **Chamber** = room
- **Descending** = going down
- **Arch** = curve
- **Aortic** = aorta
- **Cuspid** = pointed extension / flap
- **Septum** = wall
- **Superior** = above
- **Inferior** = below

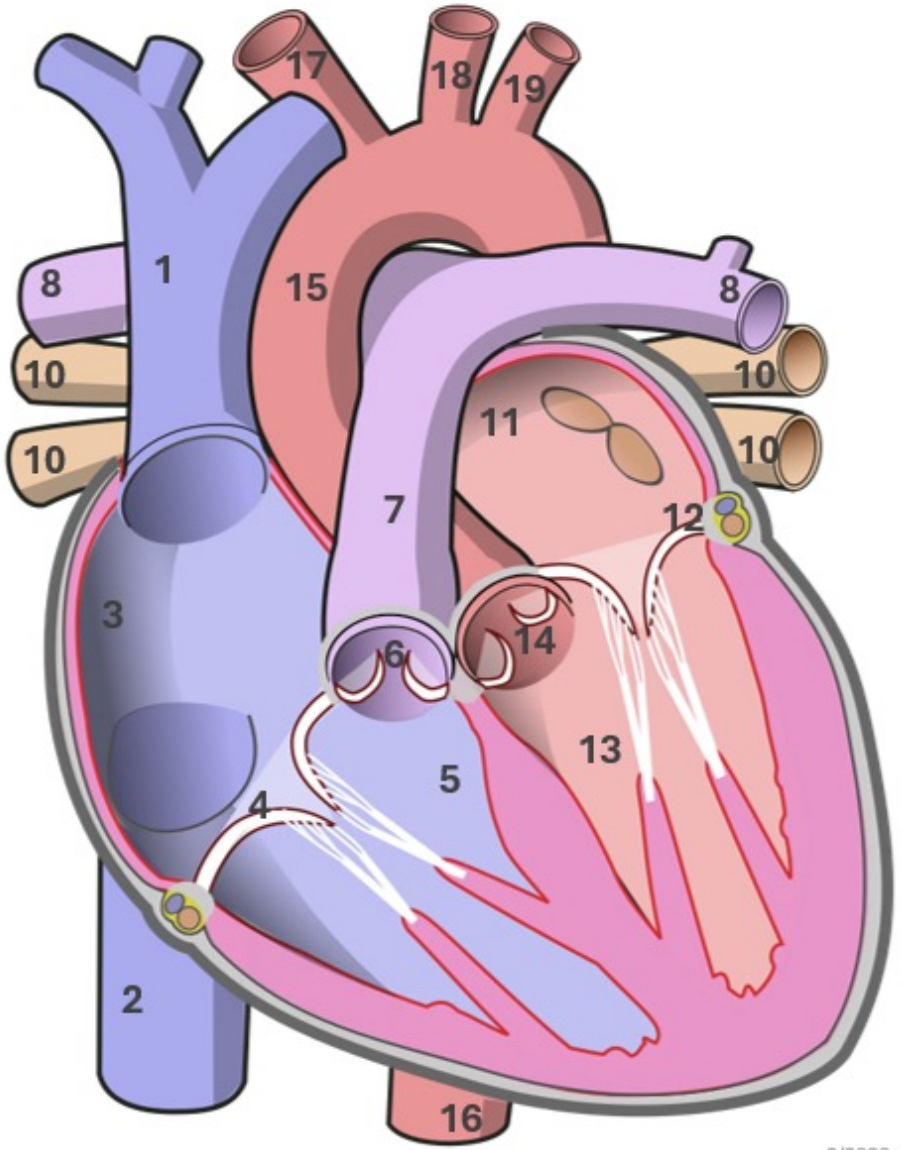
RIT

**Write the name of the structure that corresponds to the numbers below:**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

**Use arrows to illustrate the path of one red blood cell through the heart.**

20 _____

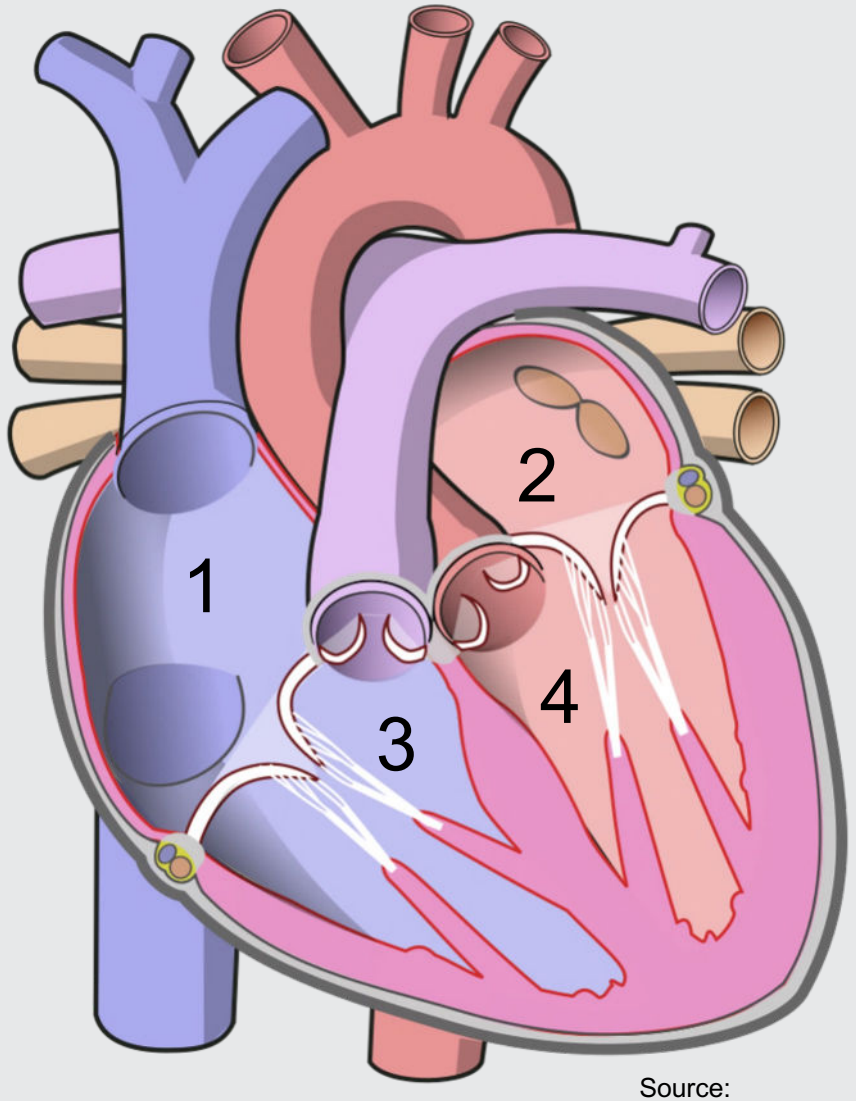



6/2026

20 _____

# The Human Heart

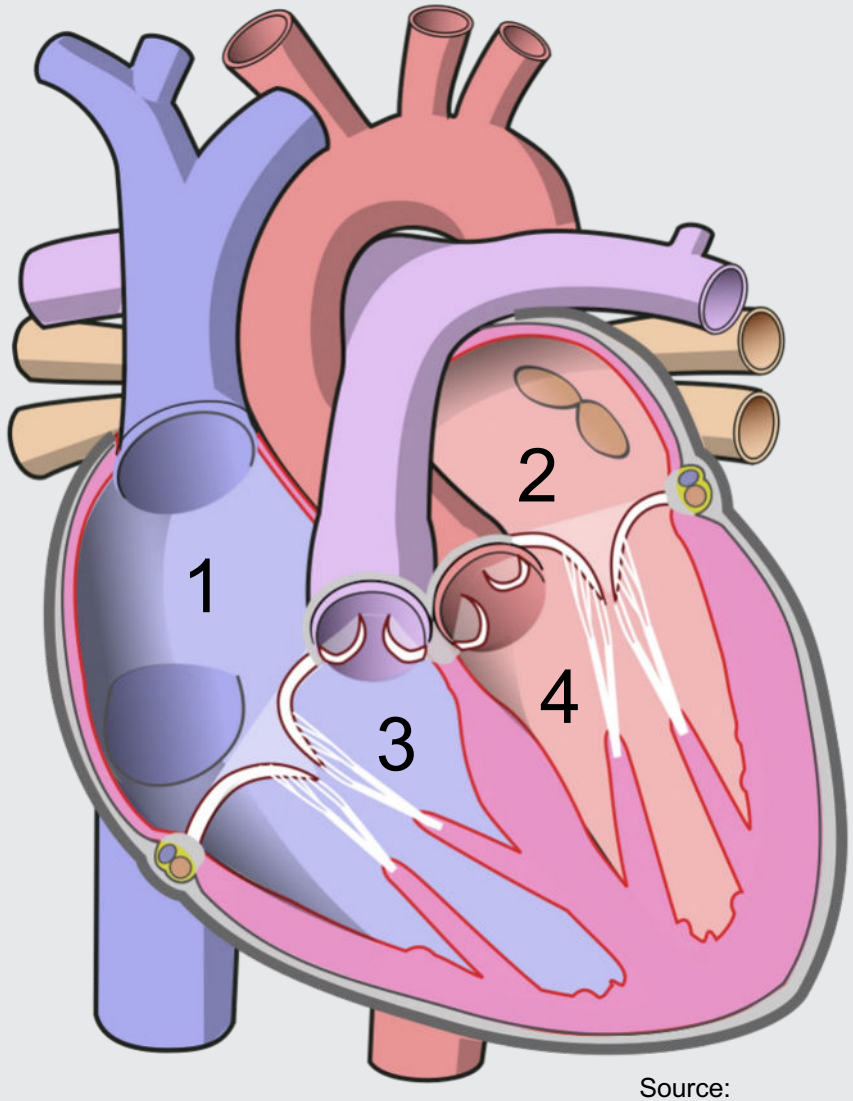
- Orientation – Left vs Right
- Orientation in relation to lungs and rest of body
- Apex
- 4 chambers
  - 1.
  - 2.
  - 3.
  - 4.
- Septum




Source: Wikimedia

# The Human Heart

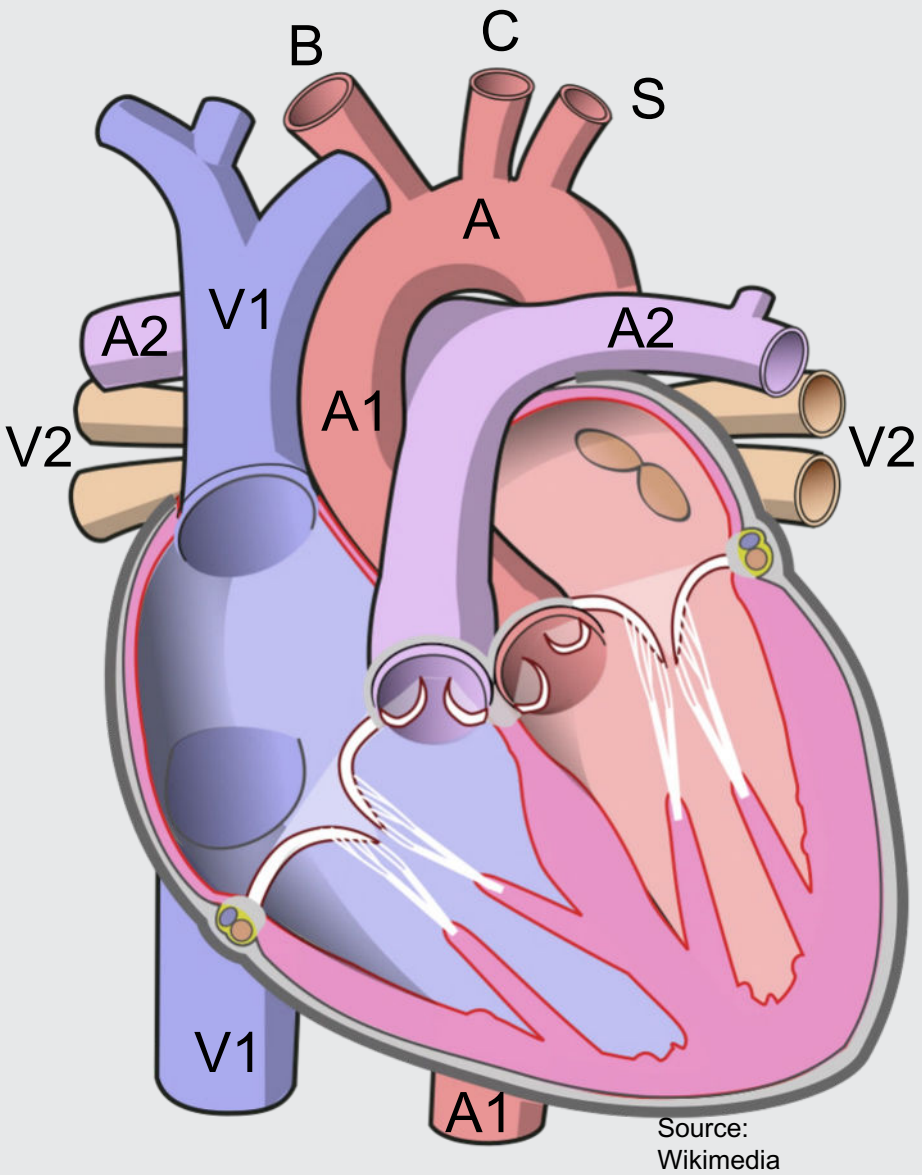
- Orientation – Left vs Right
- Orientation in relation to lungs and rest of body
- Apex
- 4 chambers
  - 1. **Right Atrium**
  - 2. **Left Atrium**
  - 3. **Right Ventricle**
  - 4. **Left Ventricle**
- Septum




Source: Wikimedia

# The Human Heart

- 4 major vessels & sections
- **Arteries** **Blood moves Away from the heart**
  - 1.
  - 2.
- **Veins** = **Blood Visits the heart**
  - 1.
  - 2.
- **ABCs**
  - A =
  - B =
  - C =
  - S =
  - “Common” =




Source: Wikimedia

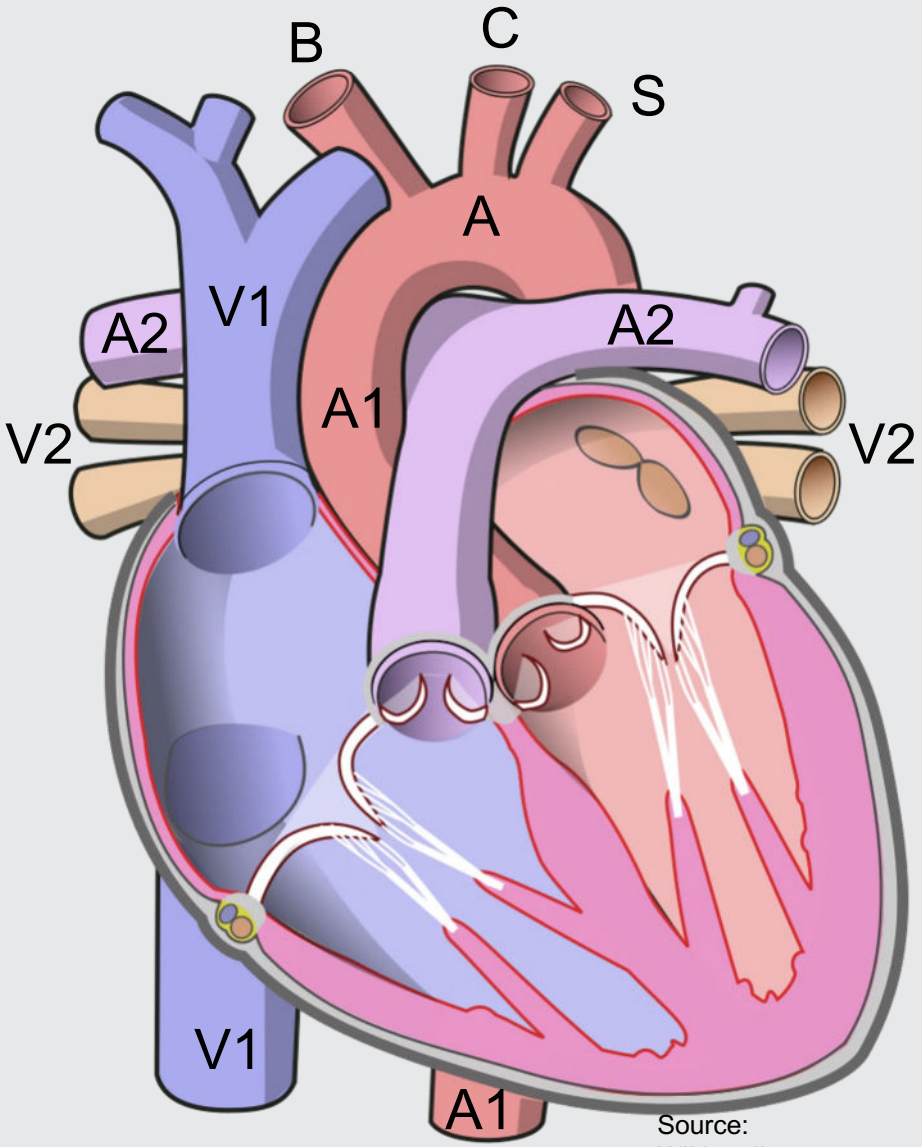
# The Human Heart

- 4 major vessels & sections
- **Arteries** **Blood moves Away from the heart**
  - 1. **Aorta**
  - 2. **Pulmonary Arteries**

- **Veins =** **Blood Visits the heart**
  - 1. **Superior & Inferior Vena Cava**
  - 2. **Pulmonary Veins**

- **ABCs**
  - A = **Aortic arch**
  - B = **Brachiocephalic Trunk**
  - C = **Common Carotid Artery**
  - S = **Subclavian Artery**

  “Common” means this vessel will branch into internal and external vessels

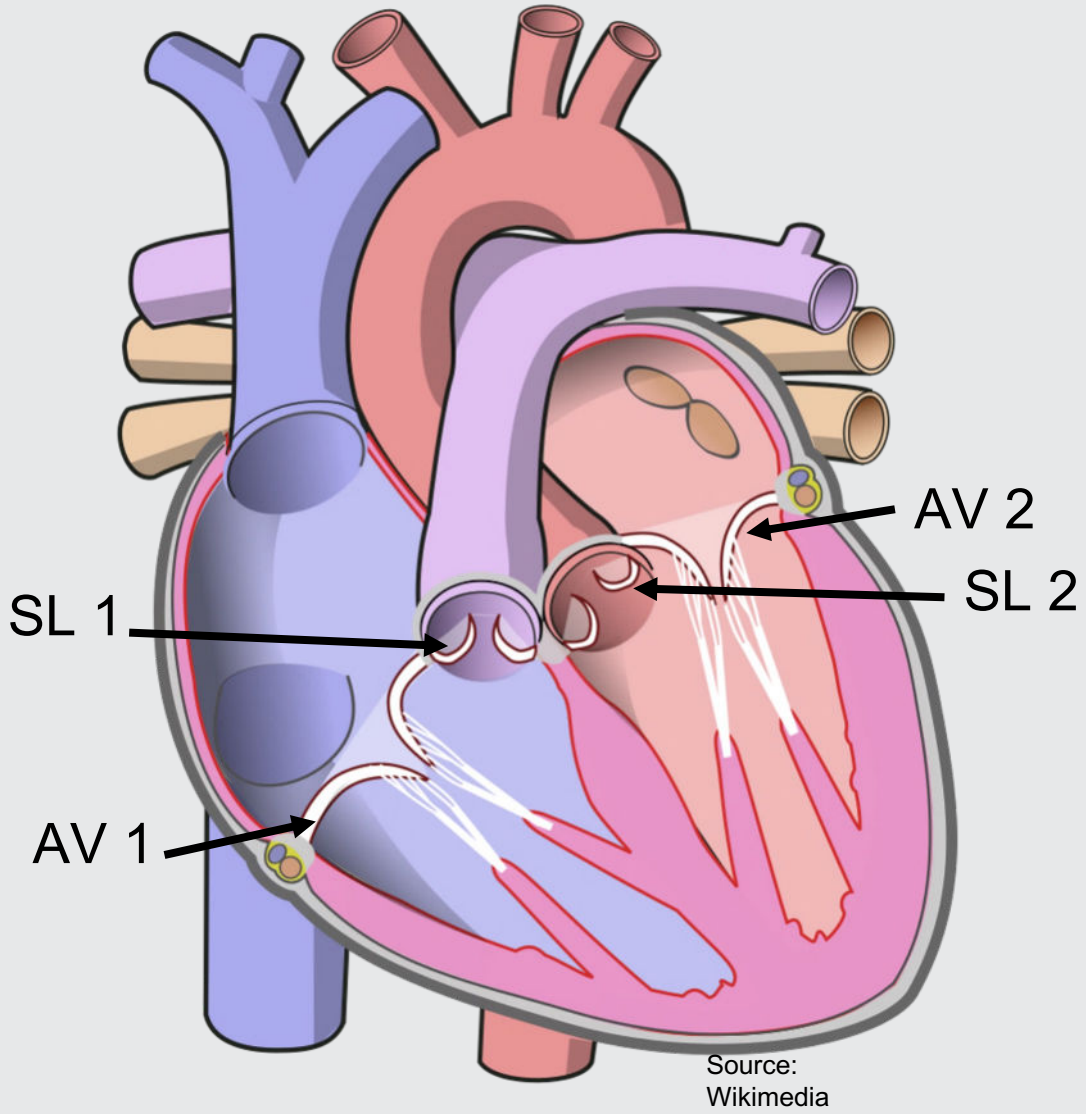



Source: Wikimedia

# The Human Heart

- 4 Valves
  - 2 **atrioventricular (AV)** valves
    - 1.
    - 2.
  - 2 **semilunar (SL)** valves
    - 1.
    - 2.

“**T**ry **P**ulling **M**y **A**orta”
“**T**ry **P**ulling **B**lood **A**long”
“**LAB RAT**”

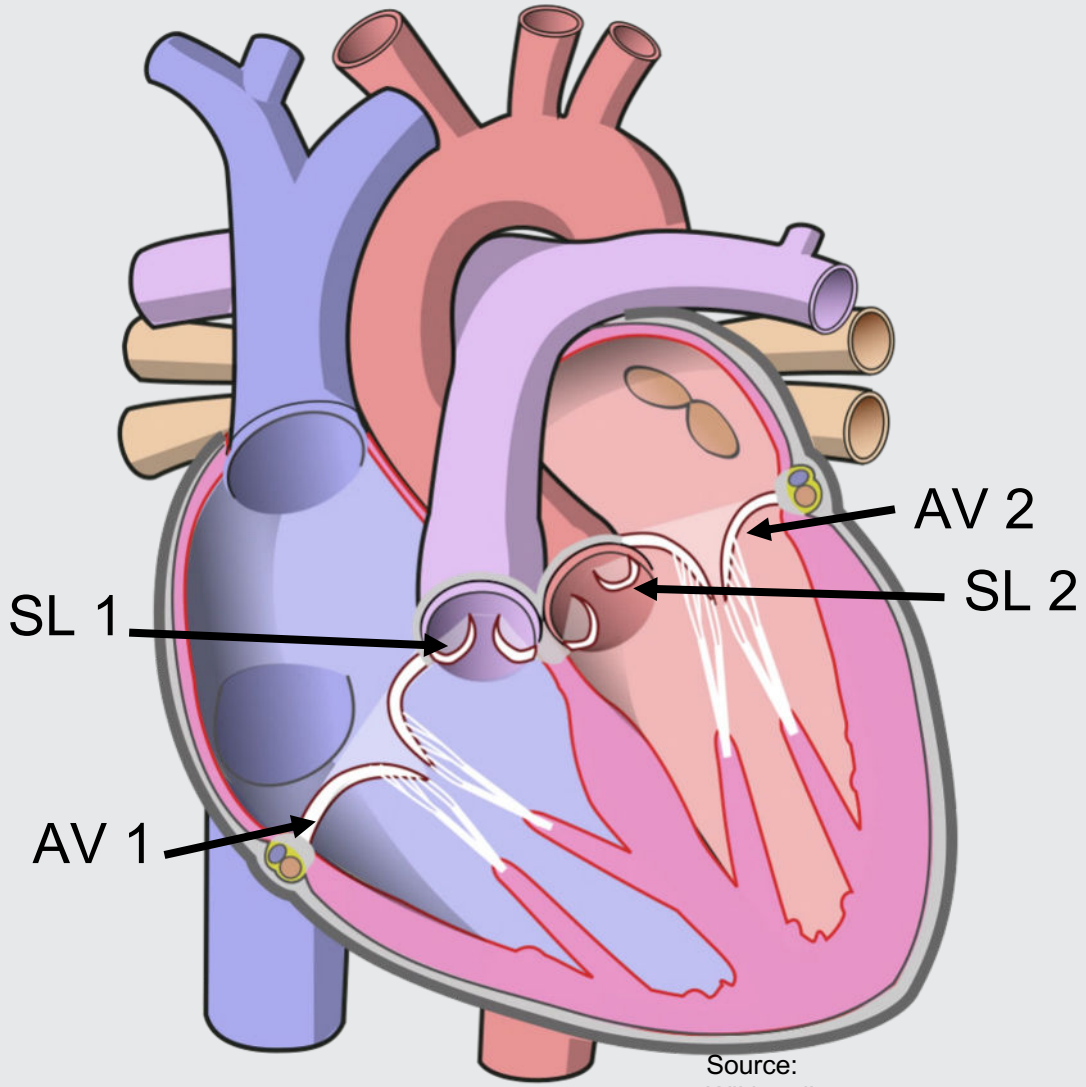


Source: Wikimedia

# The Human Heart

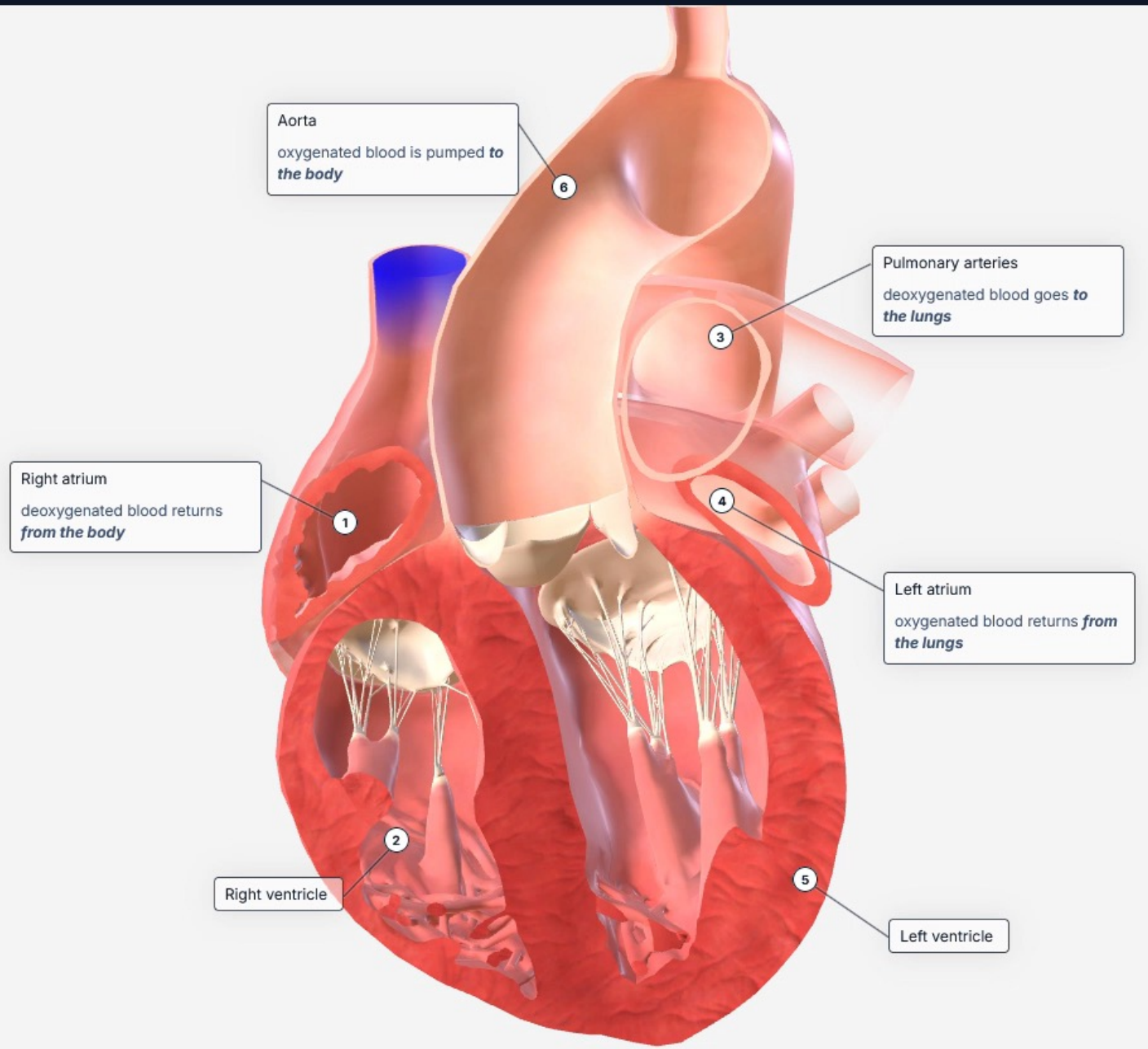
- 4 Valves
  - 2 **atrioventricular (AV)** valves
    - 1. **Tricuspid Valve**
    - 2. **Bicuspid Valve (Mitral Valve)**
  - 2 **semilunar (SL)** valves
    - 1. **Pulmonary Semilunar Valve**
    - 2. **Aortic Semilunar Valve**

"**T**ry **P**ulling **M**y **A**orta"
"**T**ry **P**ulling **B**lood **A**long"
"**LAB RAT**"



Source: Wikimedia

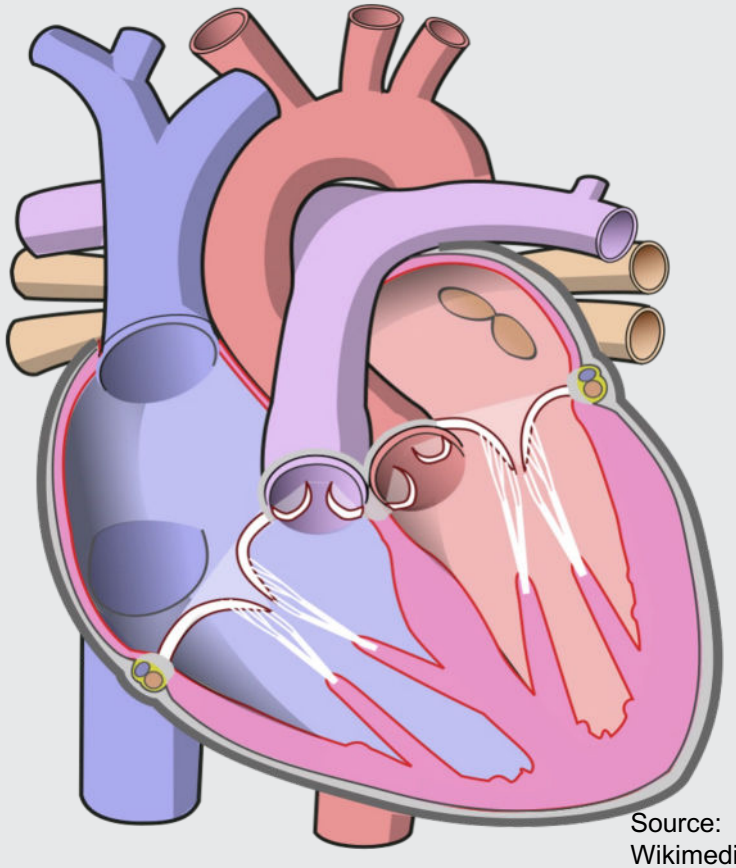
# Blood Flow Through the Heart




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a division of Anatomage

# Blood Flow Through the Heart – Pulmonary Circuit

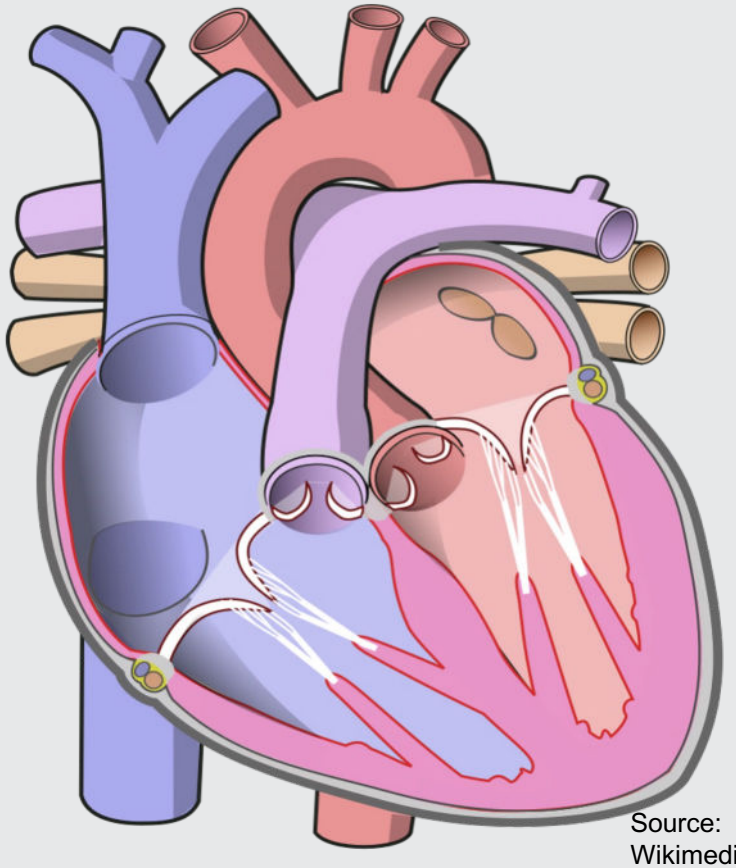
1. From the **upper body**, blood enters the _____ & from the **lower body**, blood enters the _____.
2. Blood enters the _____ & travels through the _____ valve.
3. Blood enters the _____ & travels through the _____ valve.
4. Blood enters the _____ to the **Lungs.**



Source: Wikimedia

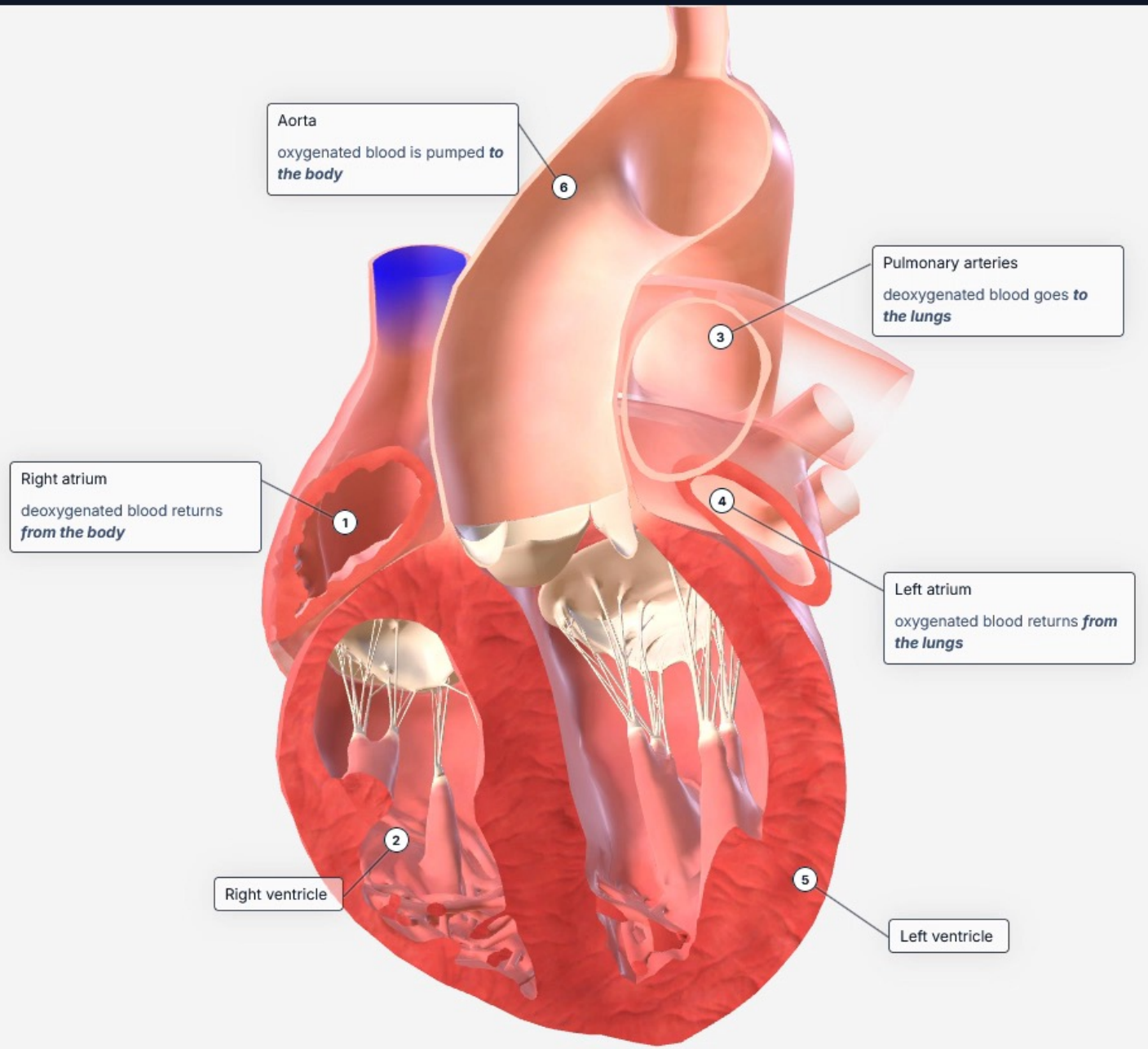
# Blood Flow Through the Heart – Pulmonary Circuit

1. From the **upper body**, blood enters the **Superior Vena Cava** & from the **lower body**, blood enters the **Inferior Vena Cava.**
2. Blood enters the **Right Atrium** & travels through the **Tricuspid** valve.
3. Blood enters the **Right Ventricle** & travels through the **Pulmonary Semilunar** valve.
4. Blood enters the **Pulmonary Artery** to the **Lungs.**



Source: Wikimedia

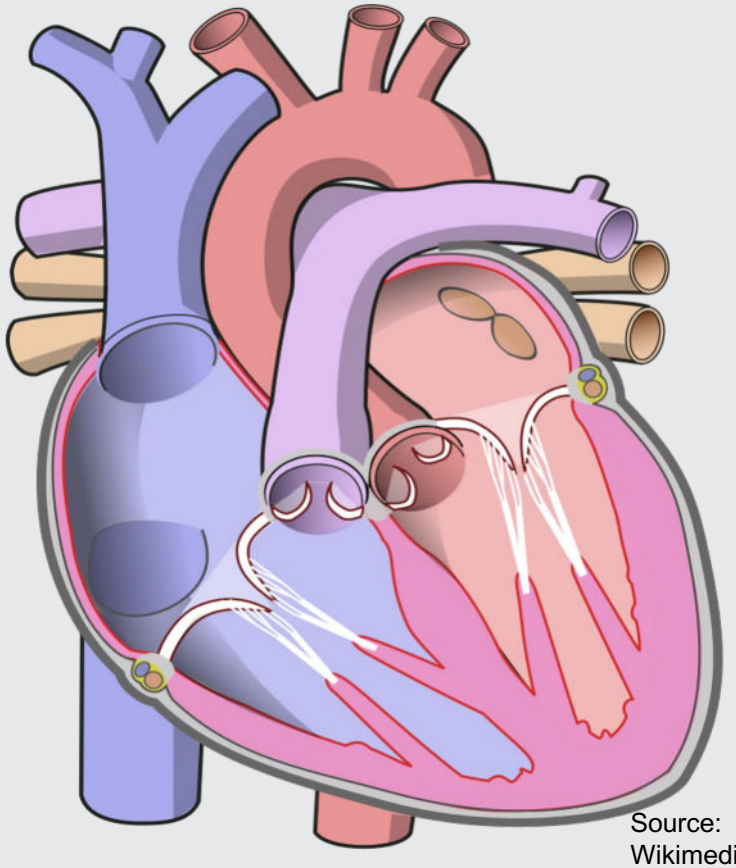
# Blood Flow Through the Heart




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# Blood Flow Through the Heart – Systemic Circuit

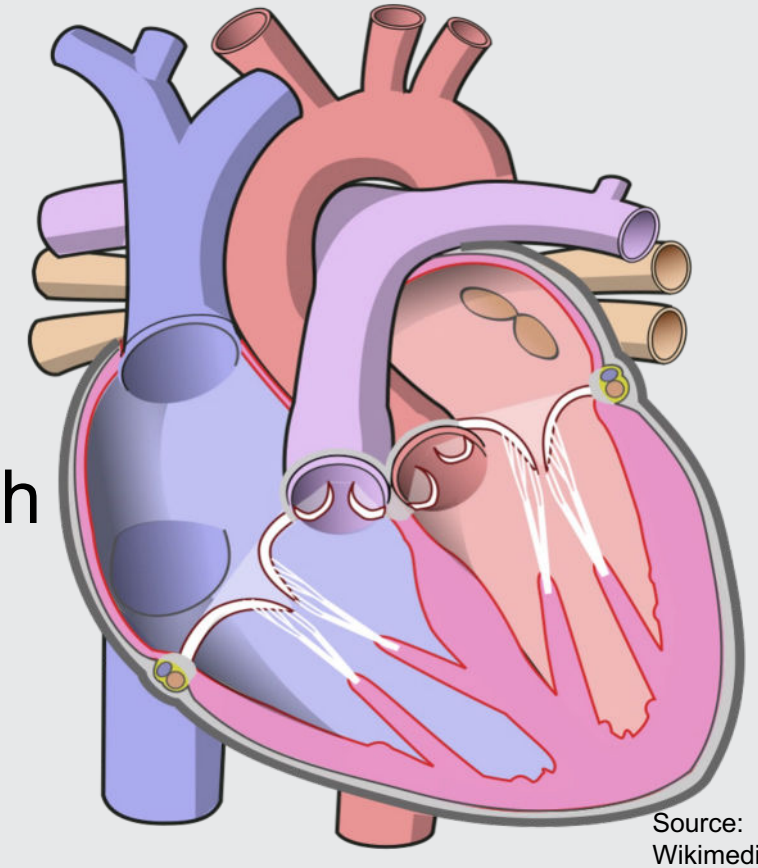
1. From the **Lungs**, blood enters the heart via the _____.
2. Blood enters the _____ & travels through the _____ valve.
3. Blood enters the _____ & travels through the _____ valve.
4. Blood enters the _____ & is sent to the **upper** and **lower body**



Source: Wikimedia

# Blood Flow Through the Heart – Systemic Circuit

1. From the **Lungs**, blood enters the heart via the **Pulmonary Vein.**
2. Blood enters the **Left Atrium** & travels through the **Bicuspid (Mitral)** valve.
3. Blood enters the **Left Ventricle** & travels through the **Aortic Semilunar** valve.
4. Blood enters the **Aorta** & is sent to the **upper** and **lower body**

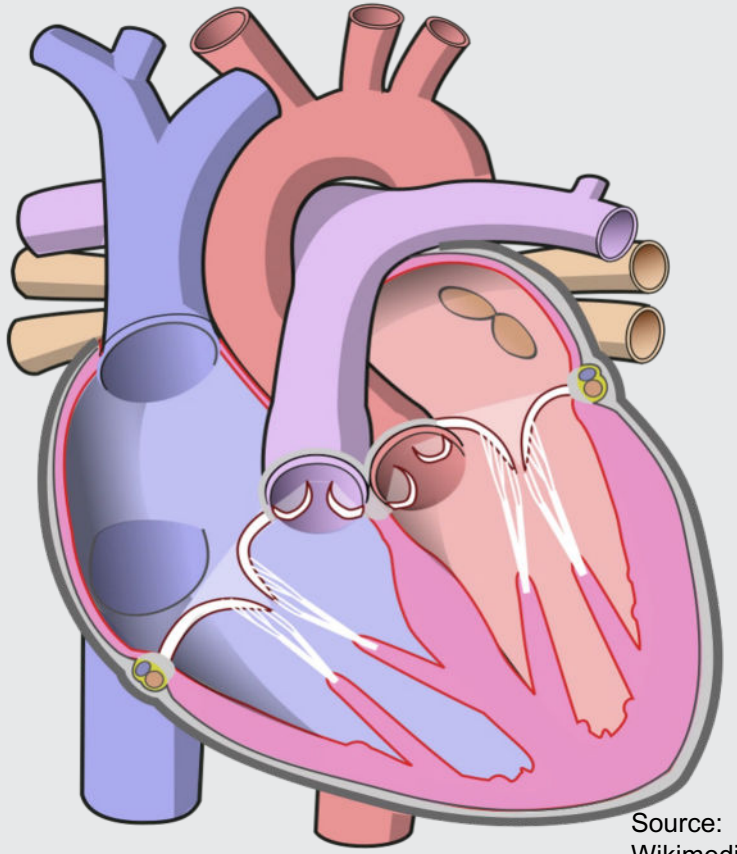


Source: Wikimedia

# Blood Flow Through the Heart

**Vena Cava** → **Right Atrium** → **Tricuspid** Valve → **Right Ventricle** → **Pulmonary Semilunar** Valve → **Pulmonary Arteries** → **Lungs.**

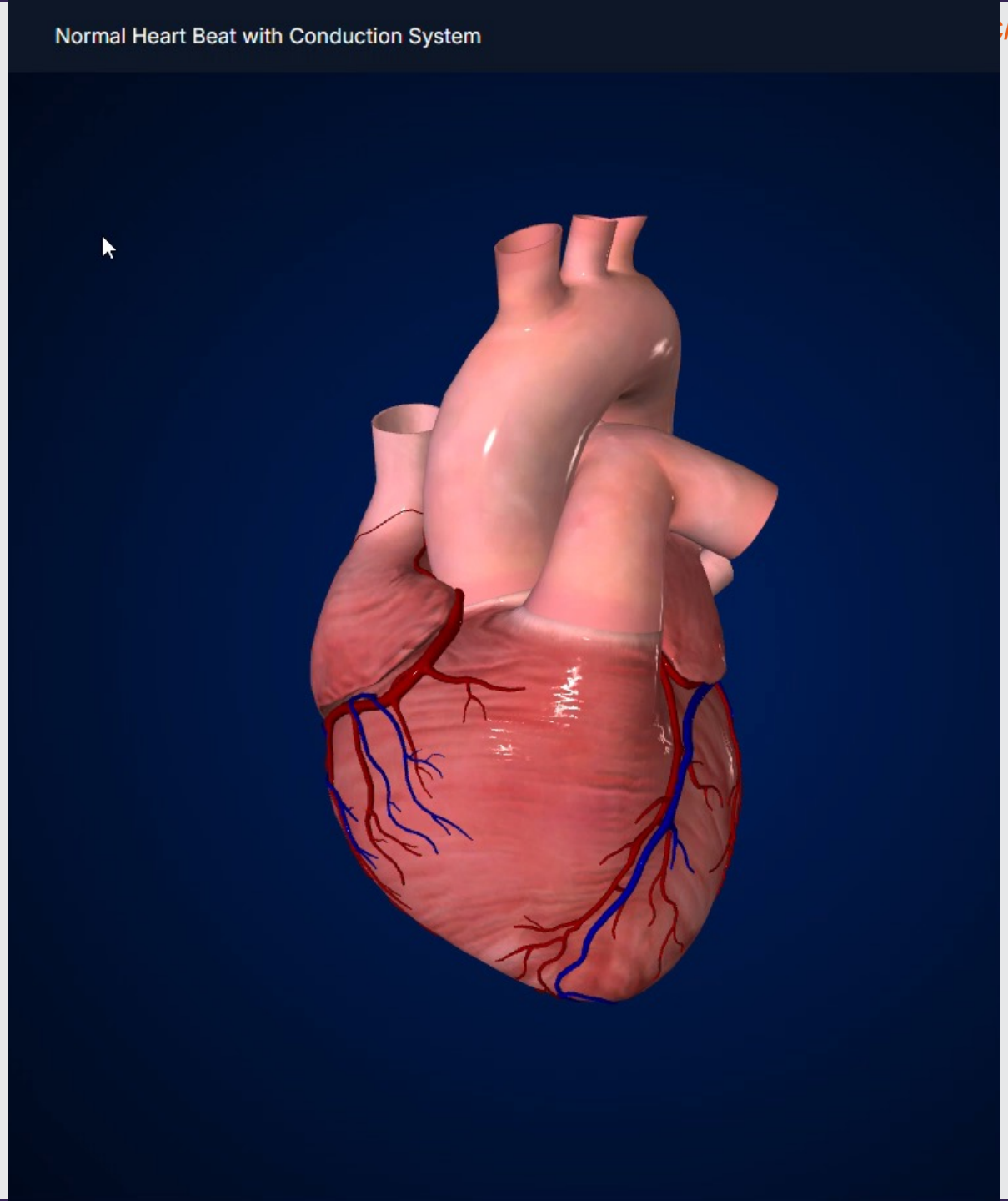
**Lungs** → **Pulmonary Veins** → **Left Atrium** → **Bicuspid** Valve → **Left Ventricle** → **Aortic Semilunar** Valve → **Aorta** → **upper** and **lower body**



Source: Wikimedia

## Both Circuits Run Simultaneously!

Normal Heart Beat with Conduction System

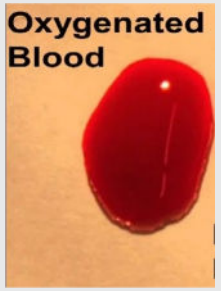


# Oxygenated vs Deoxygenated

- Remember, red blood cells are red because hemoglobin contain iron ($Fe^{2+}$).

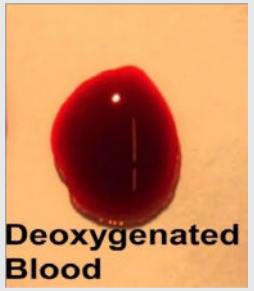
- **Oxygenated blood** = **$[O_2] > [CO_2]$**

  **Blood is bright red**




- **Deoxygenated blood** = **$[CO_2] > [O_2]$**

  **Blood is darker red**



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# Questions?

**If you're interested in a copy of the slides, handout, or have questions, I can be reached at:**

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**(585) 475-2945**