
# Effect of Temperature on Peripheral Circulation

Human Biology (ANE106)

**Anesthesia Department**

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Lab 3

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# Circulatory System

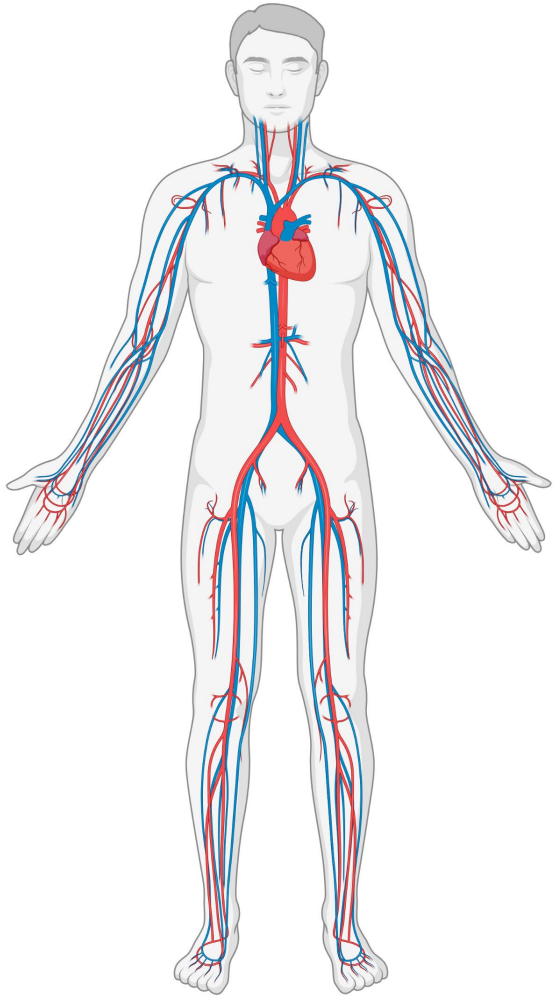
The is the body system responsible for the movement of fluids throughout the body to transport substances and maintain internal balance.

# Main functions

1. Transport nutrients and oxygen
2. Remove waste
3. Maintain fluid balance
4. Support immune defense

# Cardiovascular System

The cardiovascular system consists of the heart, blood, and blood vessels, forming a closed network that circulates blood throughout the body. It transports oxygen, nutrients, and other substances to tissues while removing waste products.



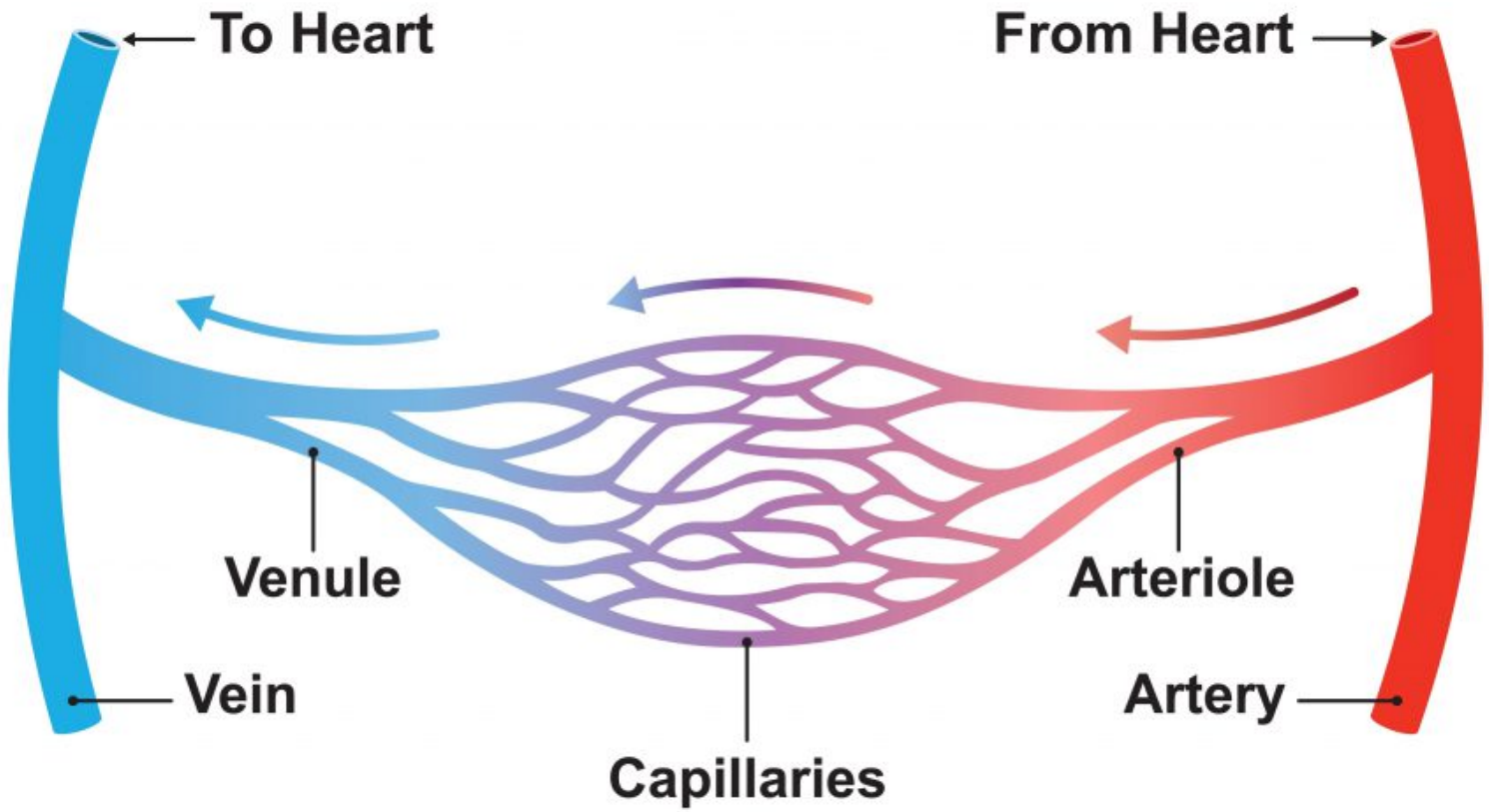
# Components of Cardiovascular System

1. **Heart:** A muscular organ that acts as a pump to circulate blood throughout the body.

2. **Blood vessels:** A network of tubes that carry blood. These include
   - Arteries (carry blood away from the heart),
   - Veins (return blood to the heart).
   - Capillaries (tiny vessels where exchange of gases, nutrients, and wastes occurs).

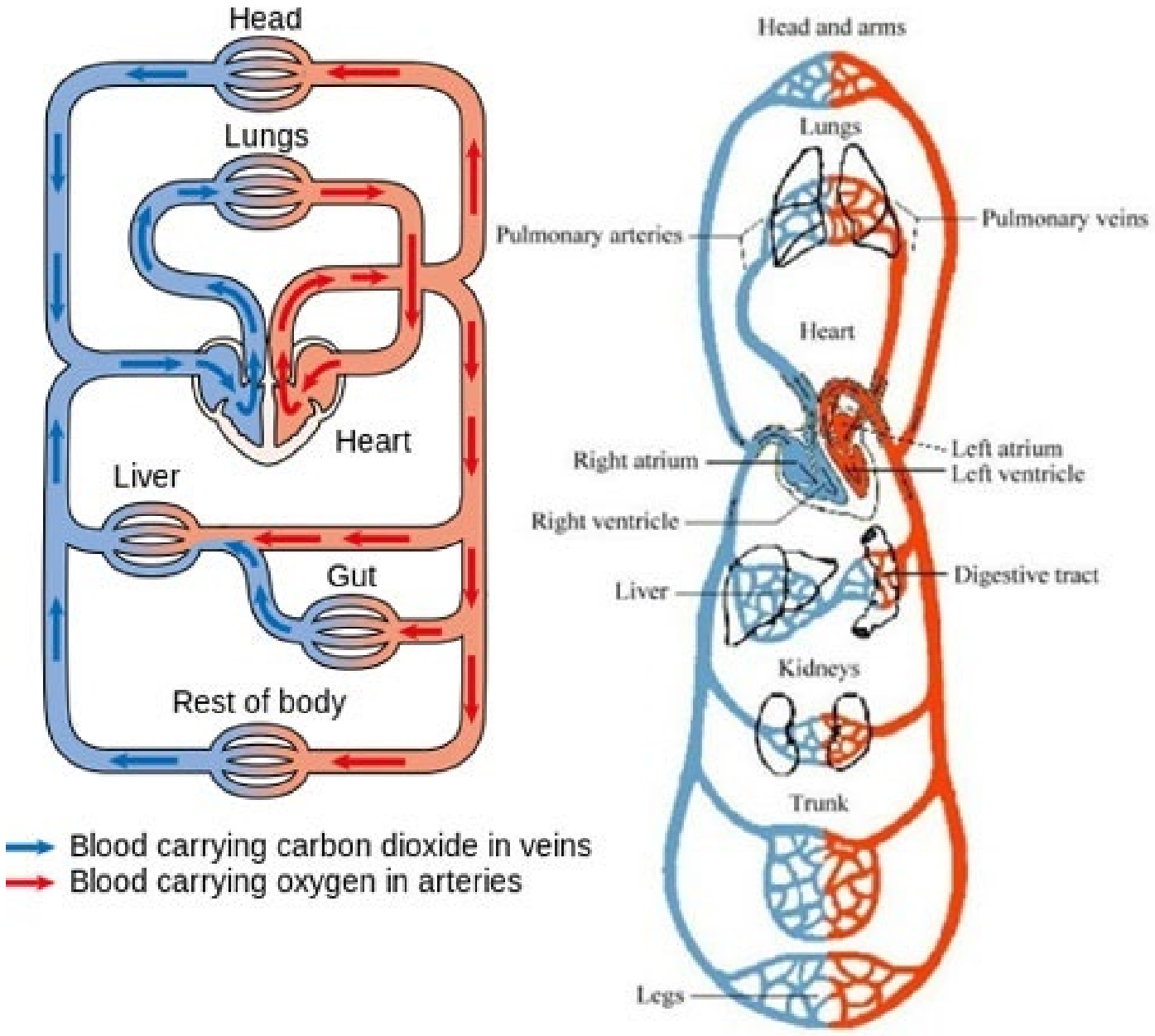
3. **Blood:** A fluid connective tissue that transports oxygen, nutrients, hormones, and waste products.

# Blood Vessels Structure



# Blood flow in the Cardiovascular system

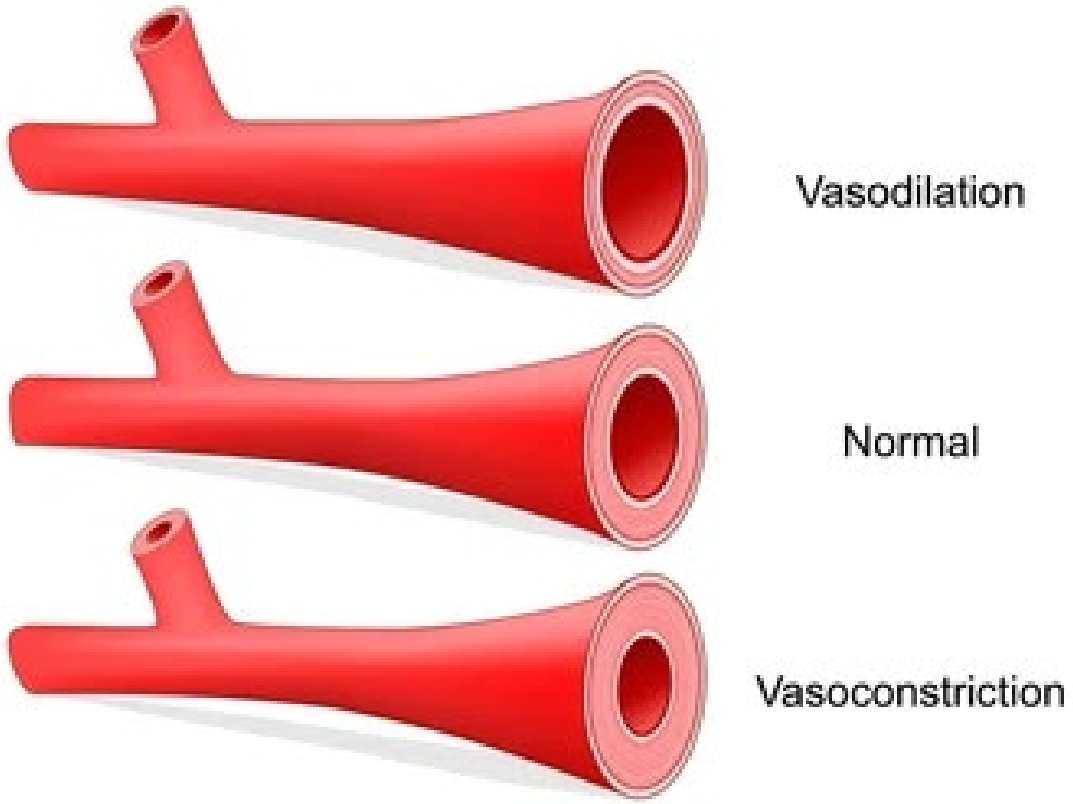
Blood flow in the cardiovascular system is the continuous movement of blood driven by the heart through arteries, capillaries, and veins. It delivers oxygen and nutrients to tissues while removing waste products like carbon dioxide.


Head
Lungs
Heart
Liver
Gut
Rest of body
Blood carrying carbon dioxide in veins
Blood carrying oxygen in arteries
Head and arms
Lungs
Pulmonary arteries
Pulmonary veins
Heart
Right atrium
Left atrium
Left ventricle
Right ventricle
Liver
Digestive tract
Kidneys
Trunk
Legs

# Does blood flow stay the same all the time?

Circulation is not constant; it changes depending on the body’s needs

# Vasodilation and Vasoconstriction



# Peripheral Circulation

Peripheral circulation is the flow of blood to the outer parts of the body, such as the skin, fingers, and toes. It is mainly regulated by changes in blood vessel diameter to control heat loss and maintain body temperature.

# Effect of Temperature

**Cold Temperature → Vasoconstriction**

- Blood vessels **narrow**
- Less blood reaches the skin
- Heat is conserved inside the body

**Visible effects:**

- Skin becomes pale
- Skin feels cold
- Capillary refill becomes slower

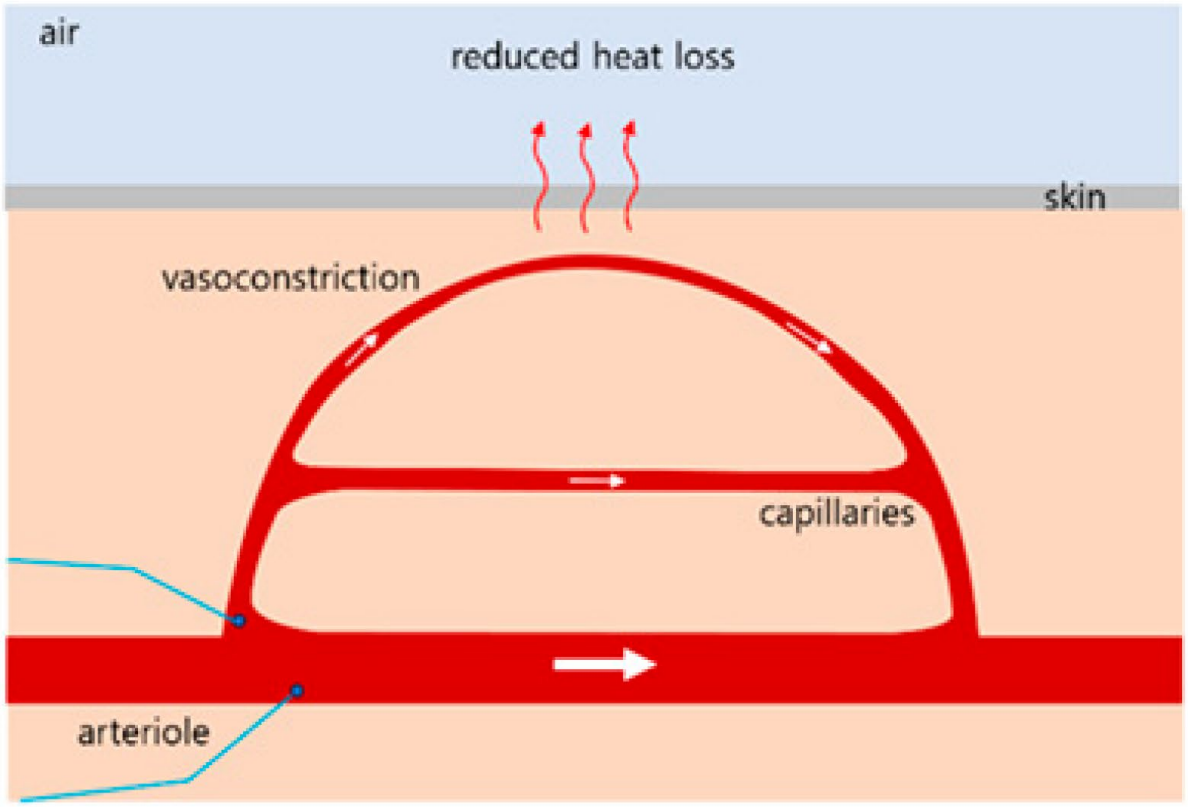
# Effect of Temperature

**Warm Temperature → Vasodilation**

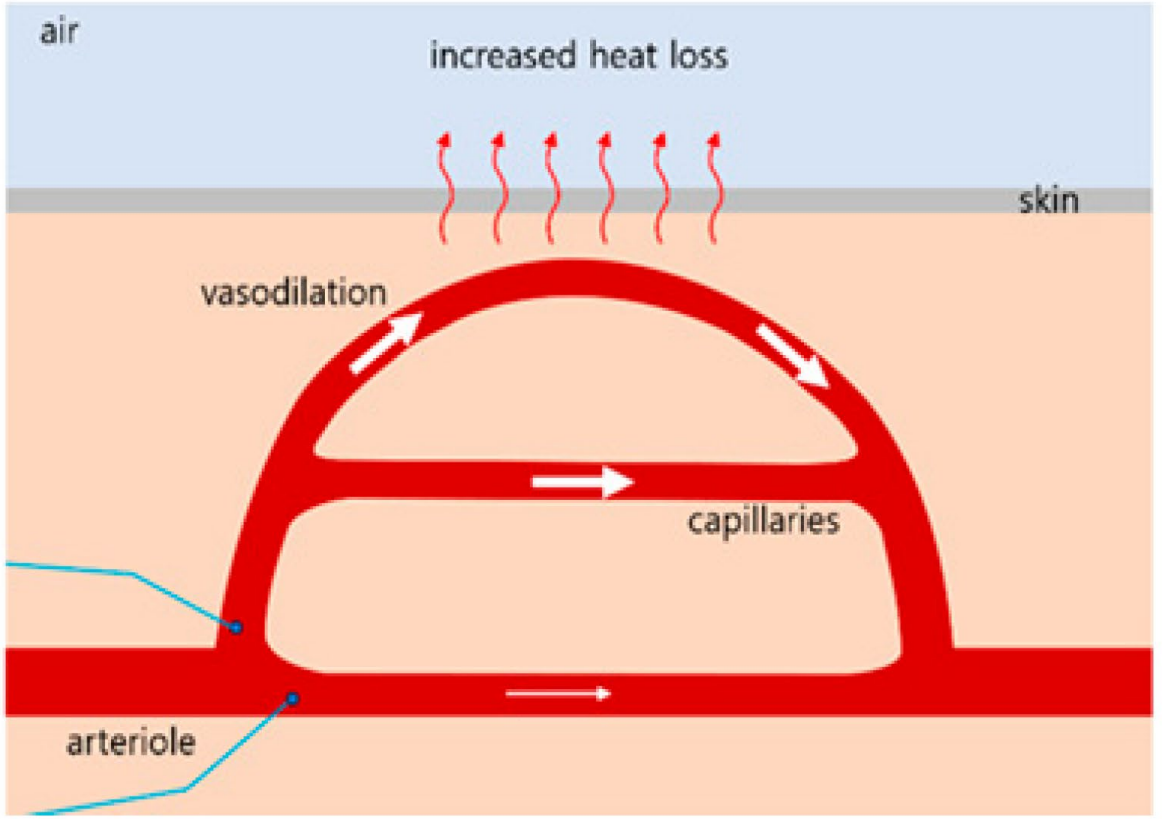
- Blood vessels **widen**
- More blood flows to the skin
- Heat is lost to the environment

**Visible effects:**

- Skin becomes red
- Skin feels warm
- Faster capillary refill




**Cold Temperature**




**Warm Temperature**

# Capillary Refill Time (CRT)

CRT = time needed for blood to return after pressure

**How does it work?**

- Press fingertip: blood leaves the area
- Release: blood returns

# Practical Session:

Effect of Temperature on Peripheral Circulation

# Objective

1. To examine the effect of temperature on peripheral blood circulation
2. To observe changes in blood flow under cold and warm conditions
3. To relate these changes to vasoconstriction and vasodilation

# Materials

- Cold water (with ice)
- Warm water (37–40°C)
- Stopwatch
- Tissue or towel
- Data recording sheet
- Water bath

# Procedure

- Measure normal capillary refill time (CRT) by pressing the fingertip for 5 seconds and recording the time for color to return.
- Place one hand in cold water for 1–2 minutes, then measure CRT and observe skin color.
- Place the other hand in warm water for 1–2 minutes, then measure CRT and observe skin color.
- Record and compare results for normal, cold, and warm conditions.

# Expected Observations

- Cold: pale skin, delayed refill time
- Warm: red/pink skin, faster refill time

| Condition | Capillary Refill Time (CRT) |
| --- | --- |
| Normal | |
| Cold | |
| Warm | |