



## Review CV Physiology

- Overall design of the circulation
- Blood
- Blood Flow
- Anatomy of the heart
- Blood flow through the heart
- Autonomic regulation of the heart
- Specialized conduction system in the heart
- Electrical activity of the heart- Specialized conduction system
- Electrical activity of the heart- cardiac muscle
- Electrocardiogram
- Contraction of cardiac muscle
- Force of contraction- contractility
- Starling curve- end-diastolic volume – Stroke volume
- Cardiac output

## Review CV Physiology (Cont)

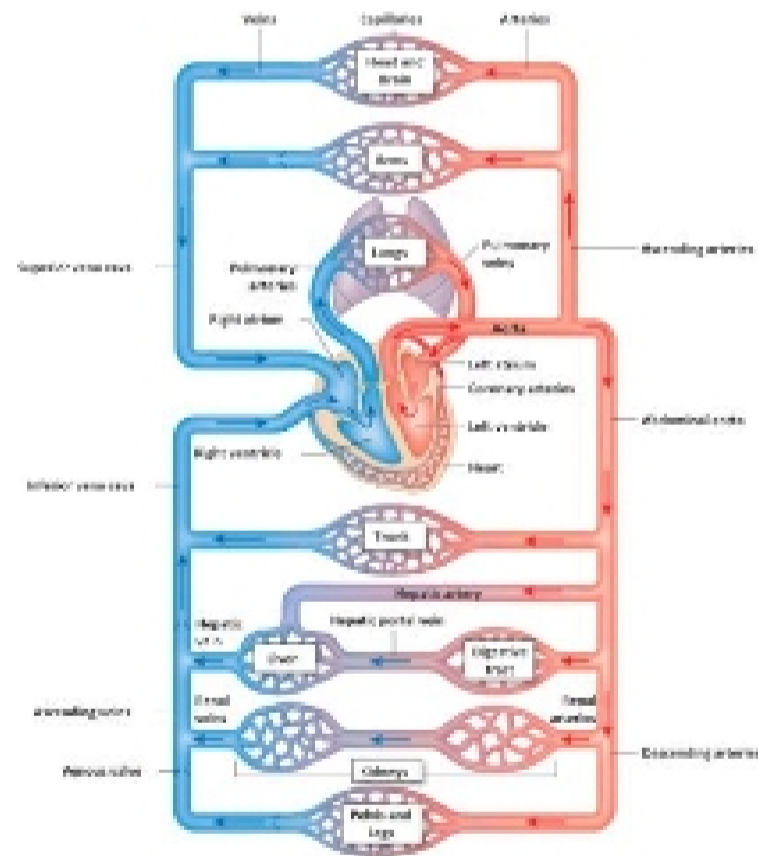
- Overall peripheral circulation-
- Arterial Blood pressure
- Organ blood flow
- Effect of SNA
- Modulators of SNA
- Capillary flow
- Distribution of cardiac output
- Basal tone of arteriolar resistance
- Modulation of arteriolar resistance
- Capillary blood flow

# Review CV Physiology (Cont.)

- Capillary fluid flux- edema
- Venous return
- Short term blood pressure regulation
- Long term blood pressure regulation
- CV adjustments to posture
- CV adjustment to exercise
- Pathophysiology- anemia
- Pathophysiology- electrical
- Pathophysiology- mechanical
  - valve function
  - heart failure
- Pathophysiology- Hypertension
- Pathophysiology- Peripheral circulation

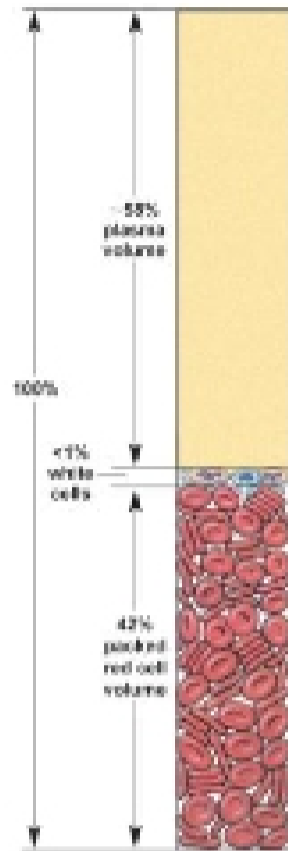
Figure 14-1 The heart is a pump that circulates blood through the blood vessels.

*•120/80 systolic/diastolic*



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Figure 16-3, overview



	MALES	FEMALES
Hematocrit	40%–54%	37%–47%
Hemoglobin (g Hb/dL blood)	14–17	12–16
Red cell count (cells/ $\mu$ L)	$4.5\text{--}6.5 \times 10^6$	$3.9\text{--}5.6 \times 10^6$
Total white cell count (cells/ $\mu$ L)	$4\text{--}11 \times 10^3$	$4\text{--}11 \times 10^3$
Differential white cell count		
Neutrophils	50%–70%	50%–70%
Eosinophils	1%–4%	1%–4%
Basophils	<1%	<1%
Lymphocytes	20%–40%	20%–40%
Monocytes	2%–8%	2%–8%
Platelets (per $\mu$ L)	$150\text{--}450 \times 10^3$	$150\text{--}450 \times 10^3$

1 dextrose (D) = 100 mL

total blood volume is 5-6 L

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## Determinates of Blood Flow

- Pressure difference between two points in the circulation:

$$\Delta P = P_1 - P_2 \propto \frac{1}{R}$$

- Resistance to flow

Radius ( $1/r^4$ ), length ( $1/L$ ), blood viscosity ( $1/v$ )

$$R = 1/r^4$$

- $BF = \Delta P/R$
- BF proportional to  $\Delta P$ , i.e. increase  $\Delta P$  increased BF  
decreased  $\Delta P$  decreased BF (blood flow)
- BF inversely proportional to R  
increase  $\Delta R$  decreased BF  
decreased  $\Delta R$  increased BF

In brain if mean pressure drops, it can adjust