

11

PART B

The Cardiovascular System

PowerPoint® Lecture Slide Presentation by Jerry L. Cook, Sam Houston University



ESSENTIALS OF HUMAN ANATOMY & PHYSIOLOGY

EIGHTH EDITION

ELAINE N. MARIEB

Blood Vessels: The Vascular System

- Taking blood to the tissues and back
 - Arteries
 - Arterioles
 - Capillaries
 - Venules
 - Veins

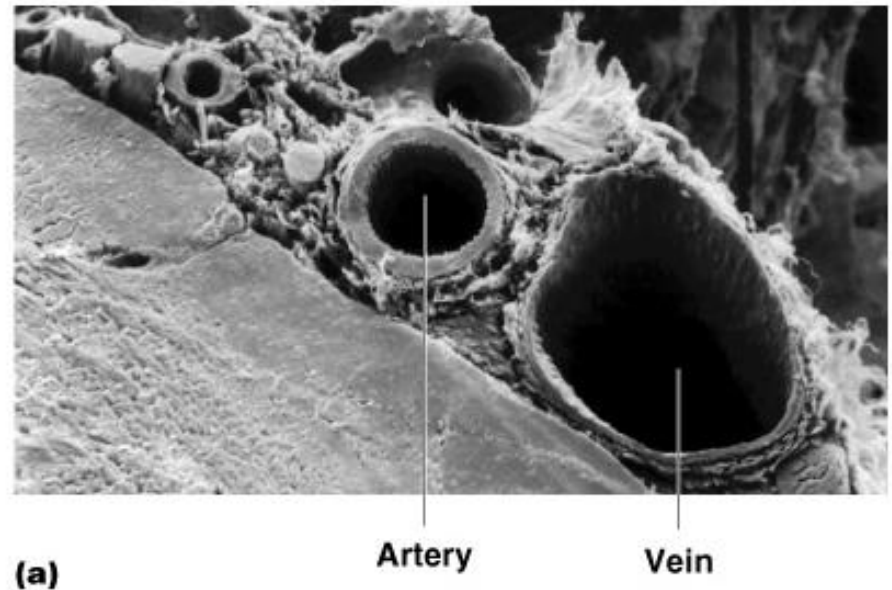


Figure 11.8a

- Arteries: carry blood away from the heart
- Capillaries: sites of nutrient and gas exchange between blood and body cells
- Veins: carry blood toward the heart

The Vascular System

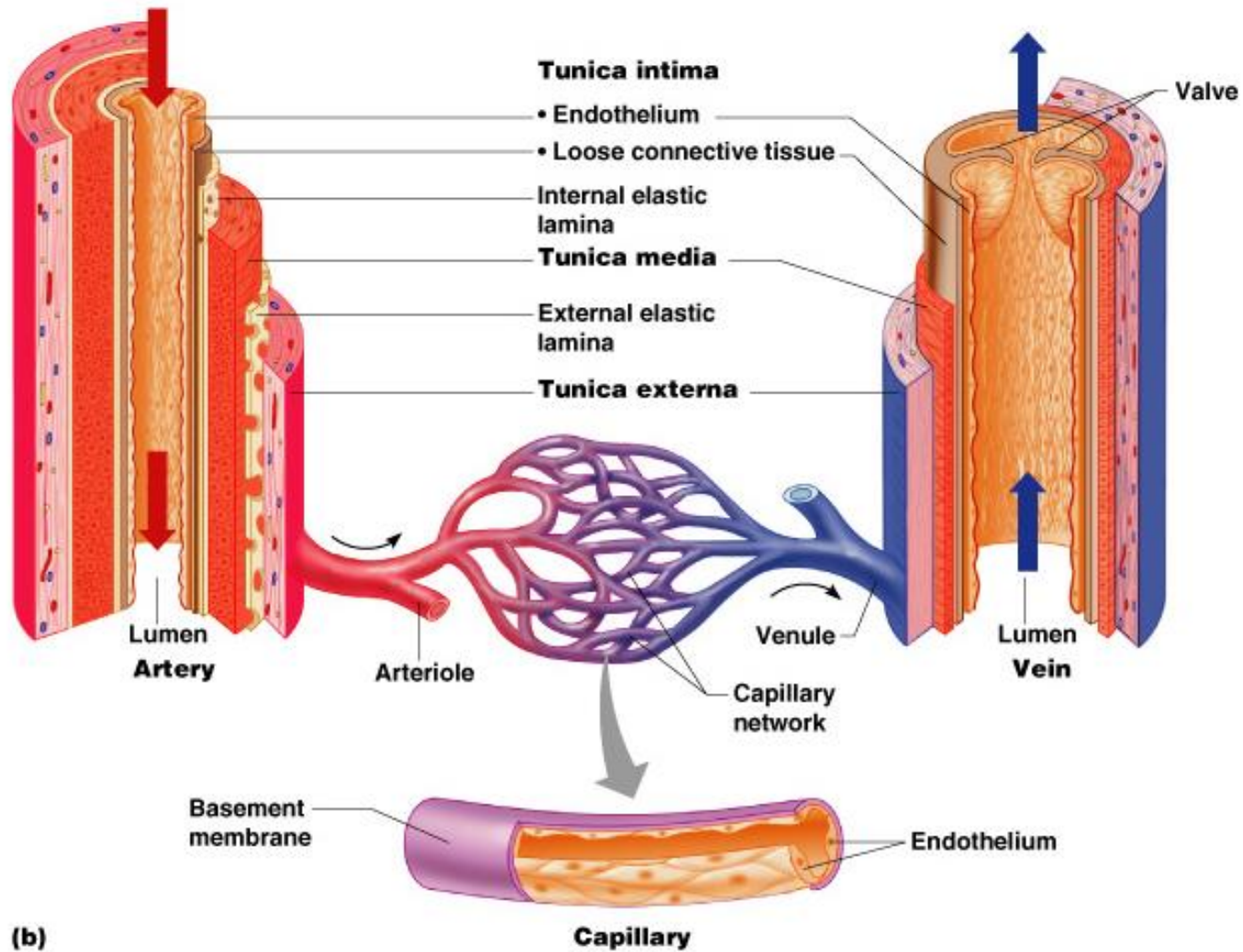


Figure 11.8b

Blood Vessels: Anatomy

- Three layers (tunics)
 - Tunic intima
 - Endothelium (epithelial tissue)
 - Tunic media
 - Smooth muscle
 - Controlled by sympathetic nervous system
 - Tunic externa
 - Mostly fibrous connective tissue

Differences Between Blood Vessel Types

- Walls of arteries are the thickest
- Lumens of veins are larger
- Skeletal muscle “milks” blood in veins toward the heart
- Walls of capillaries are only one cell layer thick to allow for exchanges between blood and tissue

Movement of Blood Through Vessels

- Most arterial blood is pumped by the heart
- Veins use the milking action of muscles to help move blood
- Veins contain one-way valves that prevent backflow of blood

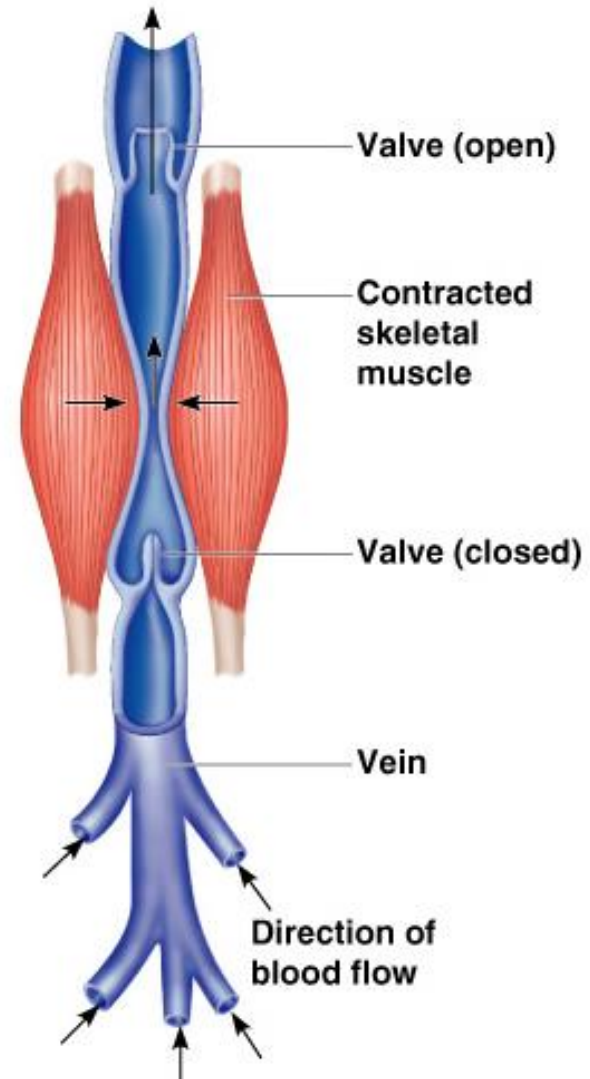


Figure 11.9

Capillary Beds

- Capillary beds consist of two types of vessels
 - Vascular shunt – directly connects an arteriole to a venule (blood bypasses capillary bed)
 - True capillaries – exchange vessels forming capillary beds
 - Oxygen and nutrients cross to cells
 - Carbon dioxide and metabolic waste products cross into blood

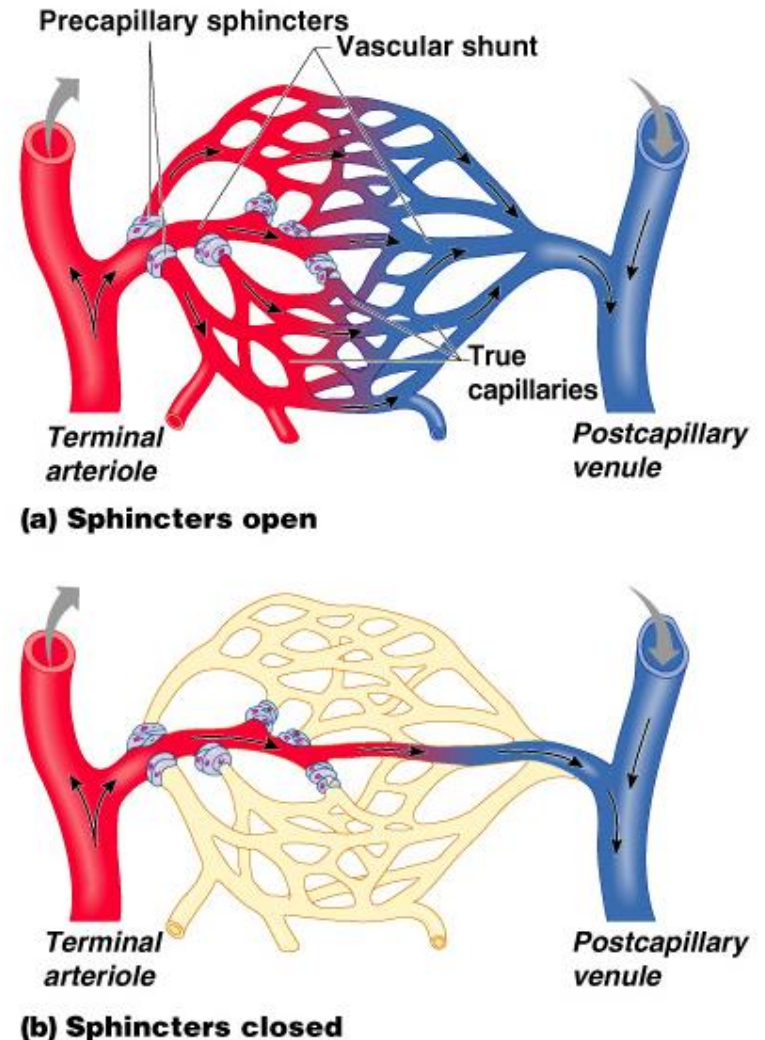


Figure 11.10

Capillary Exchange

- Substances exchanged due to concentration gradients
 - Oxygen and nutrients leave the blood
 - Carbon dioxide and other wastes leave the cells

Major Arteries of Systemic Circulation

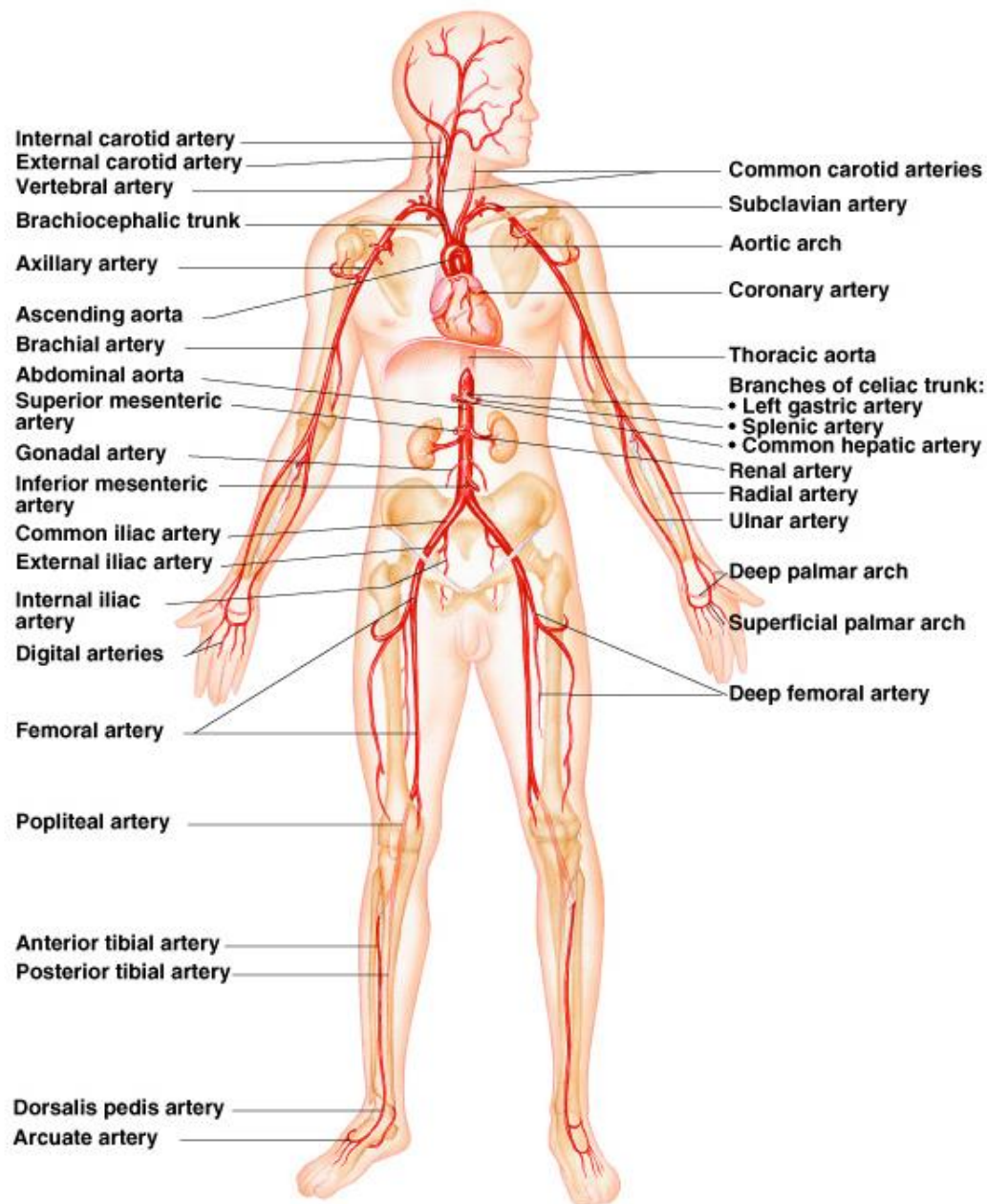


Figure 11.11

Major Veins of Systemic Circulation

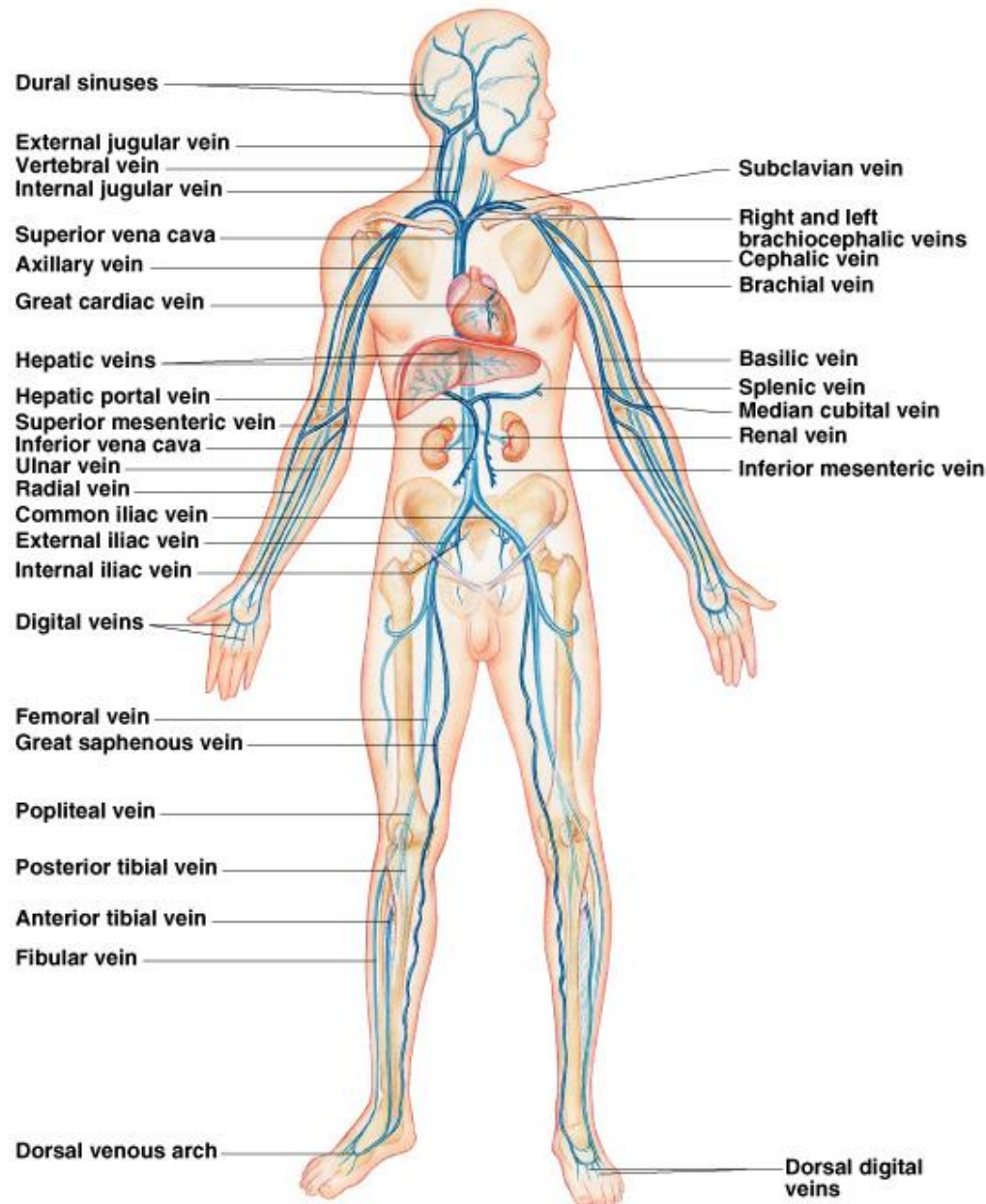


Figure 11.12

Arterial Supply of the Brain

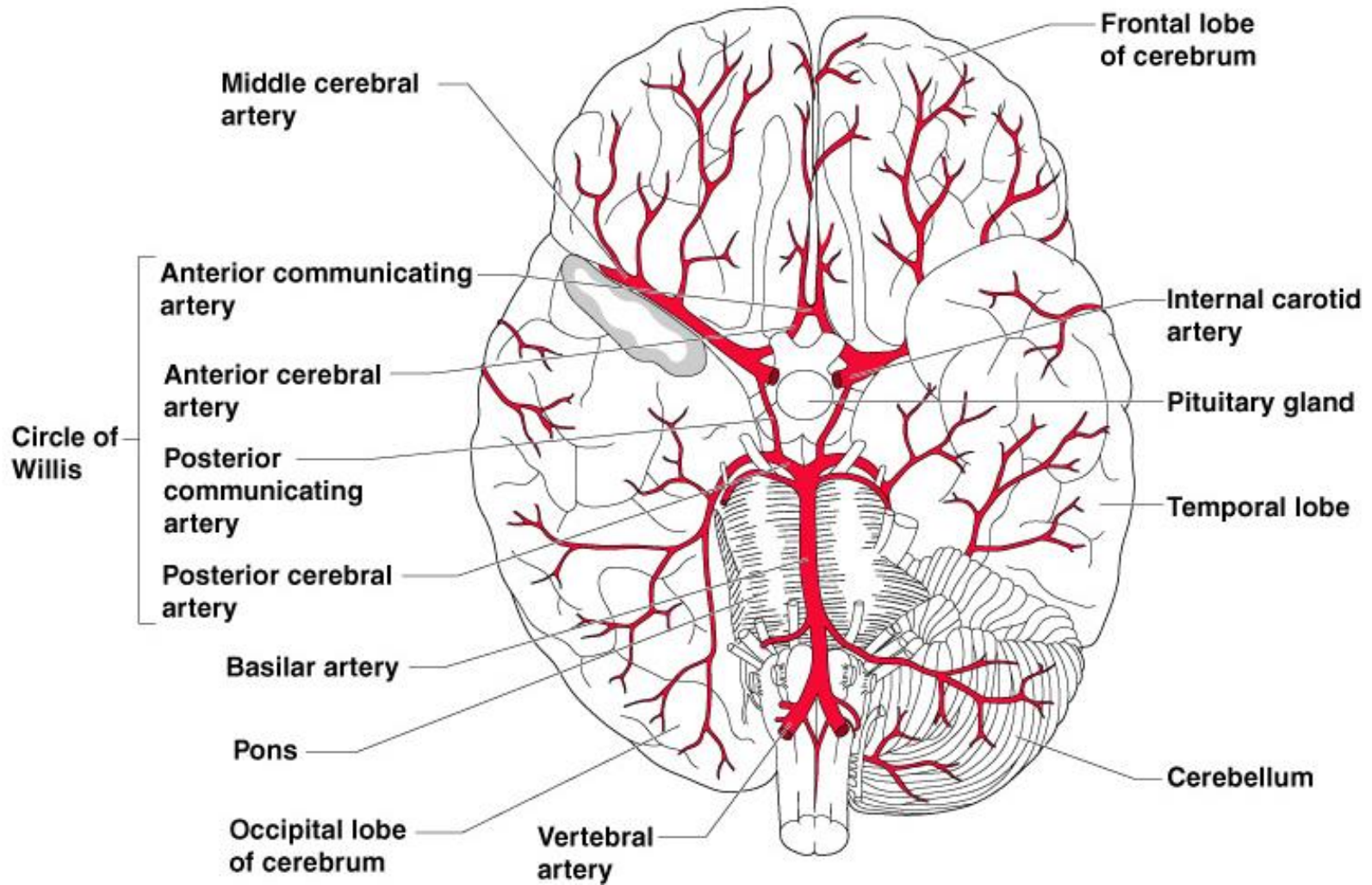


Figure 11.13

Hepatic Portal Circulation

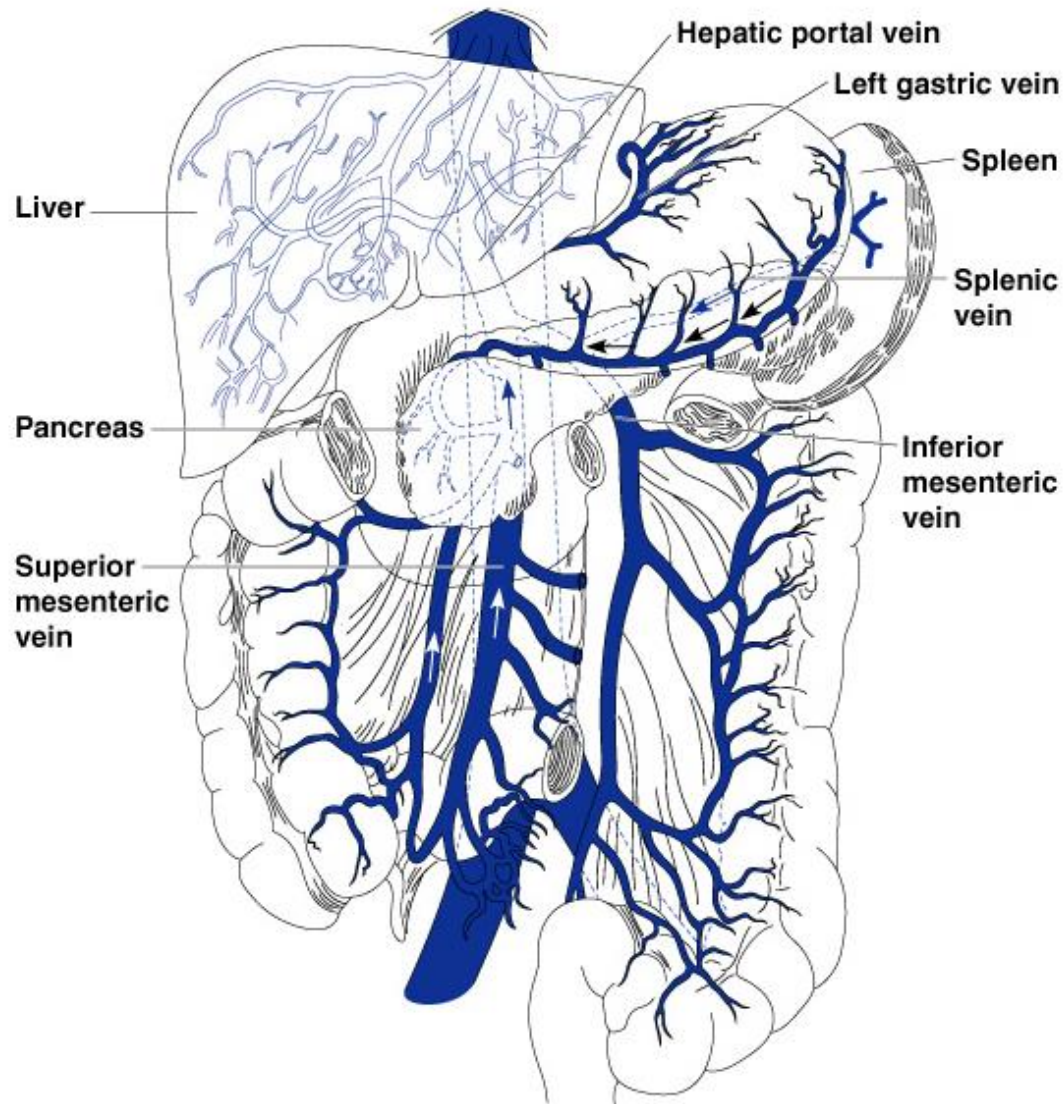


Figure 11.14