

vascular system 1: High-Yield Overview

Blood Vessel Types



Arteries

Large, medium, and arterioles carry blood away from heart



Veins

Large, medium, and venules return blood to heart



Connections

Capillaries, sinusoids, and anastomoses enable exchange

Three-Layer Vessel Structure

Tunica Adventitia

Outermost layer

- Loose CT with collagen
- **Vasa vasorum**, nerves
- Prevents over-distension

Tunica Media

Middle layer

- **Circular** smooth muscle
- Elastic fibers
- **Regulates blood flow**

Tunica Intima

Innermost layer

- Endothelium (**simple squamous**)
- Subendothelium (loose CT)
- Internal elastic lamina (arteries)

Artery Classification



Large Elastic

Aorta, pulmonary - **resist pressure changes** with elastic recoil



Medium Muscular

Distribute blood to organs via smooth muscle regulation



Small Arterioles

Regulate capillary blood flow

Key Differences: Arteries vs Veins

Elastic Arteries (Aorta)

- Media: 70% of wall, **fenestrated** elastic membranes
- Thick intima with subendothelium
- IEL **not prominent** (similar to media)
- adventitia with vasa vasorum

Muscular Arteries

- Media: 4-40 layers smooth muscle
- **Prominent wavy IEL** (pink in H&E)
- External elastic lamina present
- Thick wall, narrow rounded lumen
- **Thin adventitia without** vasa vasorum
- **Rapid** flow of arterial blood

Medium Veins

- Thin media, poor in elastic fibers
- **No IEL**, has valves (semilunar folds)
- **Thick adventitia** (thickest layer)
- Thin wall, wide **collapsible** lumen
- **Slow** flow of venous blood

Clinical Pearls



Venous Valves

Prevent backflow; absent in small and large veins. Core contains elastic tissue.



Vasa Vasorum

Nourish large vessel walls; found in **adventitia** and outer media.



Exchange Sites

Occurs in capillaries AND postcapillary venules (endothelium rich in actin).

High-Yield Fact: Fenestrae in elastic laminae facilitate **diffusion** through arterial walls. The number of elastic membranes in the aorta increases with age.