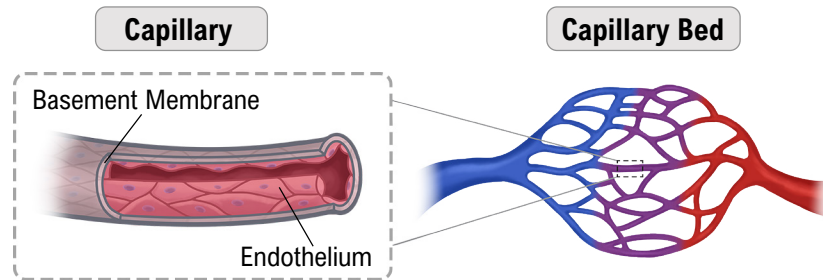


TOPIC: CAPILLARIES

Introduction to Capillaries

- ◆ Recall: **Capillaries:** *smallest* vessels facilitating _____ between blood & tissues (ex. nutrients, gases).
 - Capillary walls _____ smooth muscle & only have a thin *tunica* _____.
 - Form an extensive network of numerous, branched, connected capillaries (*capillary* _____).



Types of Capillaries

- ◆ Structurally, there are _____ types of capillaries based on their structure, prevalence, & permeability:
 1. **Continuous Capillaries:** endothelium forms a *continuous* tube with *intercellular* clefts (_____) between cells.
 2. **Fenestrated Capillaries:** endothelial cells contain *fenestrations* (small _____) with *moderate* permeability.
 3. **Sinusoid Capillaries:** endothelium is _____ *continuous* (larger “holes”).

_____ Capillaries	_____ Capillaries	_____ Capillaries
◆ Most common ◆ Least permeable		◆ Least common ◆ Most permeable
Tight Junctions Intercellular Cleft	Fenestrations	
Found in _____, nervous tissue, connective tissue, muscle tissue.	Found in kidneys (filtration), endocrine glands (secretion), & small intestines (absorption).	Allows diffusion of _____ substances & found in liver, lymphoid organs, bone marrow, & spleen.

TOPIC: CAPILLARIES

EXAMPLE

Which type of capillary would you NOT expect to find in a tissue where relatively large molecules need to be exchanged between blood and surrounding tissues, & smaller molecules need to be exchanged rapidly?

- a) Continuous capillaries. b) Fenestrated capillaries. c) Sinusoid capillaries.

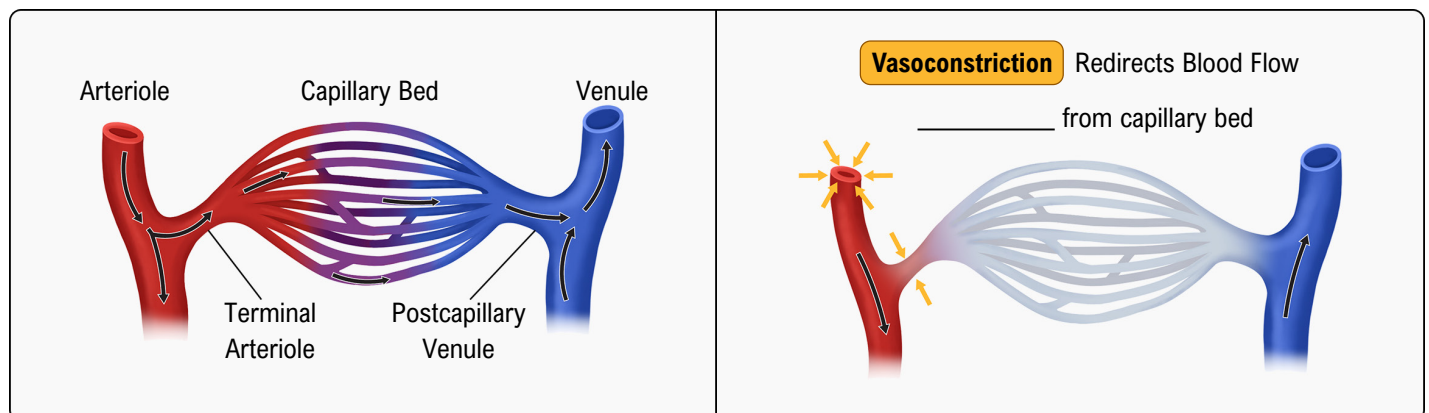
PRACTICE

Which type of capillary is characterized by a discontinuous basement membrane, allowing for the easy passage of larger molecules and cells?

- a) Continuous capillaries. c) Sinusoid capillaries.
b) Fenestrated capillaries. d) Muscular capillaries

General Structure of Capillary Beds

- ◆ Recall: **Capillary Bed:** an extensive _____ of numerous, branched, connected capillaries.
 - ▶ **Terminal Arteriole:** region near _____ of an arteriole.
 - ▶ **Postcapillary Venule:** _____ blood from a capillary bed.
- ◆ **Microcirculation:** blood flow *through* capillary bed (terminal arteriole → capillary bed → postcapillary venule).
 - ▶ Arterioles can *vasoconstrict* to _____ blood flow away from capillary beds.



TOPIC: CAPILLARIES

EXAMPLE

If the body requires blood in skeletal muscles, _____ in the digestive system will _____.

- | | |
|-------------------------|------------------------------------|
| a) Veins; constrict. | c) Terminal Arterioles; dilate. |
| b) Capillaries; dilate. | d) Terminal Arterioles; constrict. |

PRACTICE

Which of the following areas of the body has the highest concentration of capillary beds?

- | | |
|---------------------|-----------------------|
| a) Skeletal muscle. | c) Connective tissue. |
| b) Joints. | d) Cartilage. |

PRACTICE

Which of the following best describes the microcirculatory flow of blood (microcirculation)?

- a) Terminal Arteriole → Arteriole → Capillary Bed → Postcapillary Venule.
- b) Arteriole → Terminal Arteriole → Capillary Bed → Postcapillary Venule.
- c) Postcapillary Venule → Capillary Bed → Terminal Arteriole → Arteriole.
- d) Capillary Bed → Postcapillary Venule → Arteriole → Terminal Arteriole.

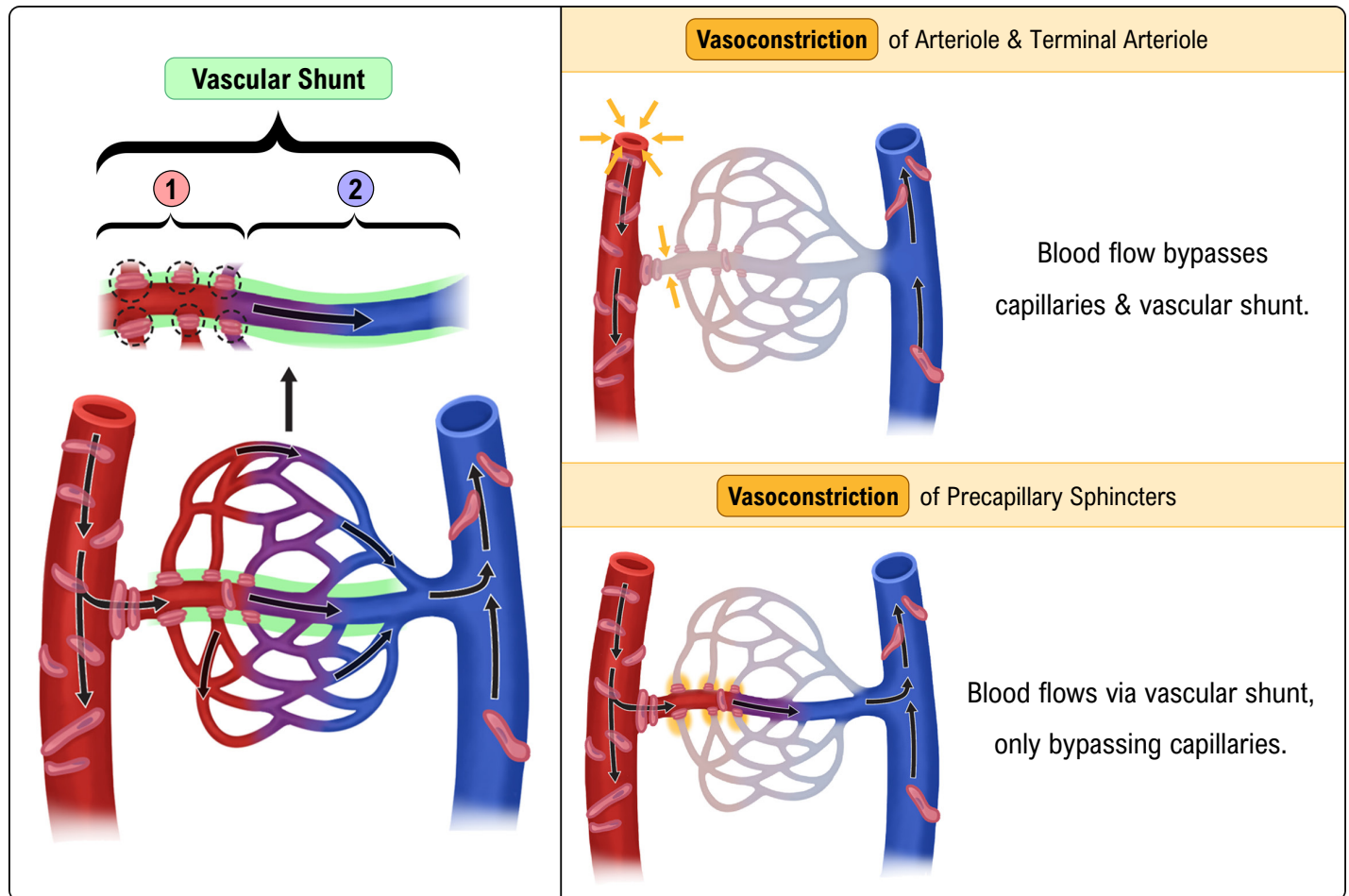
TOPIC: CAPILLARIES

Structure of Mesenteric Capillary Beds

- ♦ _____ (serous membranes of digestive system) have a *specialized* capillary bed structure.

Vascular Shunt

- 1 **Metarteriole:** transitional blood vessel containing ____ *capillary sphincters* on its branches.
 - **Precapillary Sphincters:** smooth muscle rings acting as _____ for blood flow control.
- 2 **Thoroughfare Channel:** metarteriole continuation _____ smooth muscle.



EXAMPLE

Which scenario results in dilation of arterioles & precapillary sphincters in mesenteric capillary beds?

- Increased CO_2 concentration in mesenteries.
- Adequate O_2 concentration in mesenteries.
- Increased pH level near mesenteries.
- A greater need for blood elsewhere in the body.

TOPIC: CAPILLARIES

PRACTICE

Which scenario results in constriction of arterioles & precapillary sphincters in mesenteric capillary beds?

- a) Increased metabolic activity in mesenteries.
- b) Decreased pH level near mesenteries.
- c) Low O₂ concentration in mesenteries.
- d) A greater need for blood elsewhere in the body.

PRACTICE

Which structure regulates blood flow distribution in mesenteric capillary beds & diverts blood from one area to another based on local metabolic needs?

- a) Precapillary sphincters.
- b) Arteriole valves.
- c) Capillary gates.
- d) Venous pumps.

PRACTICE

Which of the following correctly describes the flow of blood through a mesenteric capillary bed when the precapillary sphincters are constricted?

- a) Terminal arteriole > metarteriole > capillaries > thoroughfare channel > postcapillary venule.
- b) Terminal arteriole > metarteriole > thoroughfare channel > postcapillary venule.
- c) Terminal arteriole > vascular shunt > capillaries > postcapillary venule.
- d) Terminal arteriole > thoroughfare channel > metarteriole > postcapillary venule.