

BIO 2402 — Human Anatomy & Physiology  
 Week 8: March 7-13

This week we will be covering the last chapter of the cardiovascular system about blood vessels. You should be able to know the different types of blood vessels, the factors that influence blood pressure, and the difference between baroreceptors and chemoreceptors.

**Remember that the Tutoring Center offers free individual and group tutoring for this class. Our Group Tutoring sessions will be every Wednesday from 6:00-7:00 PM CST. You can reserve a spot at <https://baylor.edu/tutoring>.**

**KEY TERM: Vasoconstrictor, Vasodilator, Elastic Artery, Fenestrated Capillary, Vasomotor Center**

*Blood vessel tunics & tissues*

**Arteries**

**Elastic/conducting:**

large diameter, thick walls, elastic tissue  
 Aorta, brachiocephalic, common carotids, subclavian, common iliac

**Muscular/distributing:**

trans. blood to arterioles, thickest tunica media, less elastic tissue  
 Brachials, mesenterics, femorals, tibials

**Arterioles:** only smooth muscle & endothelium

**Metarterioles:** smaller arterioles, precapillary sphincters regulate blood flow into the capillaries.

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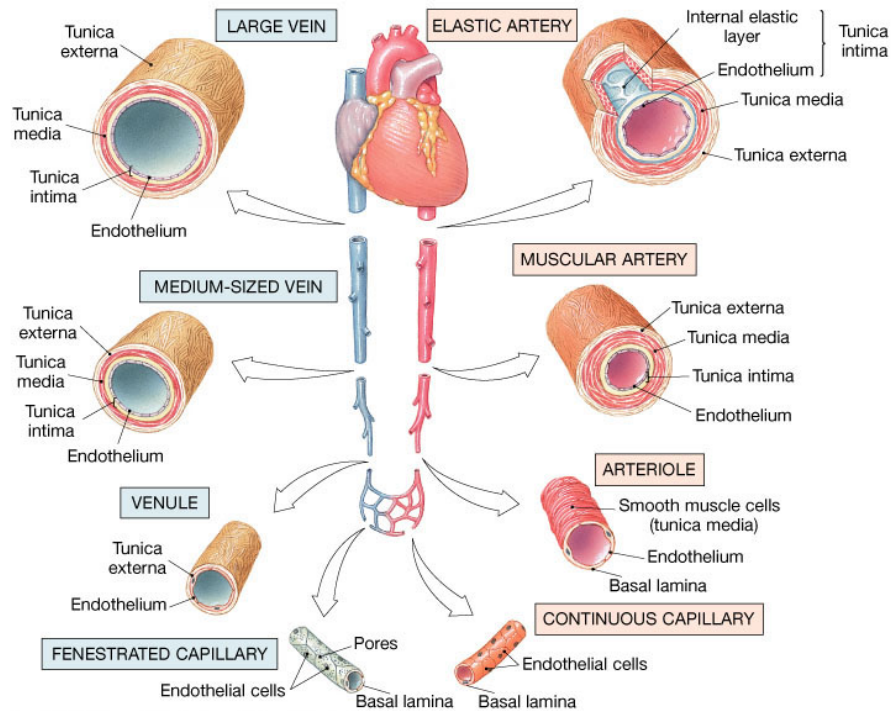
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**Capillaries**

**Fenestrated:** small pores that material can pass through

**Sinusoids:** type of fenestrated capillary in the liver, spleen, pancreas, and bone marrow

**Continuous:** more common, lacks fenestrations

*All of these arteries and veins can be visualized using the diagram above.*

**Blood pressures**

For blood pressure we will focus on capillary dynamics and factors affecting vessel diameter.

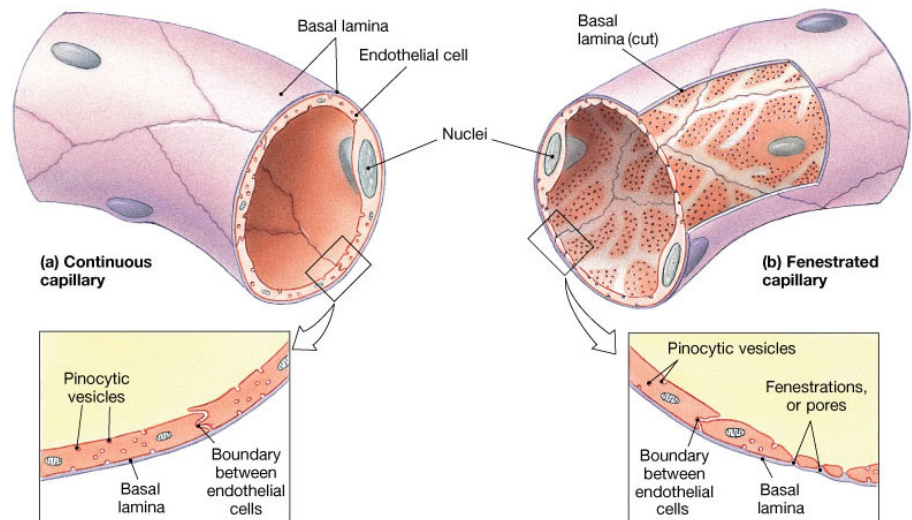
Vasoconstrictors & vasodilators are factors that increase or decrease the diameter of the lumen in the blood vessels. These factors can increase or decrease blood flow and pressure.

**Vasoconstrictors:** decrease blood flow in response to  
*The following are local vasoconstrictors that you will need to memorize*

- Angiotensin II
- Ca<sup>2+</sup>
- Endothelin
- Epinephrine/Adrenaline
- Norepinephrine
- Thromboxane
- Vasopressin/ADH

**Vasodilators:** accelerate blood flow in response to  
*The following are local vasodilators that you will need to memorize*

- Adenosine
- CO<sub>2</sub>/H<sup>+</sup> (in tissue)
- Histamine
- Nitric Oxide
- Prostacyclin
- Bradykinin
- Prostaglandins
- Increased Temperature
- ANP
- ADP



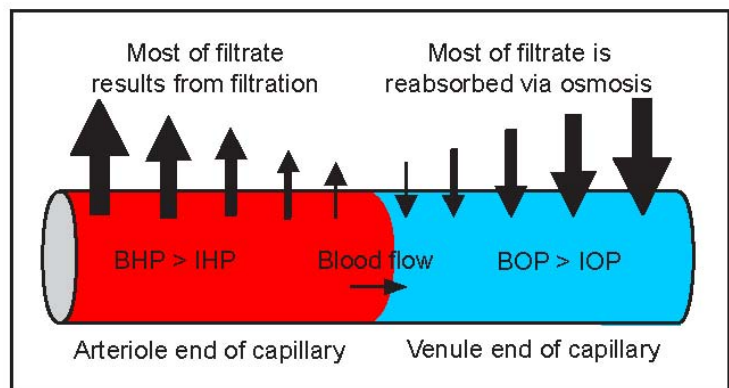
**Capillary Dynamics:**

Capillary dynamics refers to the factors that contribute to the net movement of fluid in capillaries. The two most important factors are *hydrostatic pressure* and *osmotic pressure*. Hydrostatic pressure is the pushing force of a solution, whereas osmotic pressure is the pulling force of a solution based on its salt content.

There are two equations that can be used to represent the pressure relationships in capillaries. One is for the arteriole end:

$$BHP + IOP > IHP + BOP$$

This represents the venule end



**Figure 5-3.** Fluid movement in a capillary

**IHP + BOP > BHP + IOP**

The idea behind these equations is that both the capillary and the surrounding tissues have hydrostatic and osmotic pressures. In the case of the arteriole end, the blood is moving out of the capillary into the tissues, so the blood hydrostatic pressure pushes the blood with more force than the interstitial hydrostatic pressure, and the interstitial osmotic pressure pulls the blood with more force than the blood osmotic pressure.

**Vasomotor Center** & vasoconstriction/dilation

Part of the cardiovascular center in the brainstem. This refers to the effects of the vasomotor center on blood flow in response to blood pressure and blood chemistry which are monitored by baroreceptors and chemoreceptors respectively. Baroreceptors and chemoreceptors are best understood in the following charts.

*Baroreceptor Reflex:* changes in blood pressure  
 Association words -> Aortic & Carotid arteries

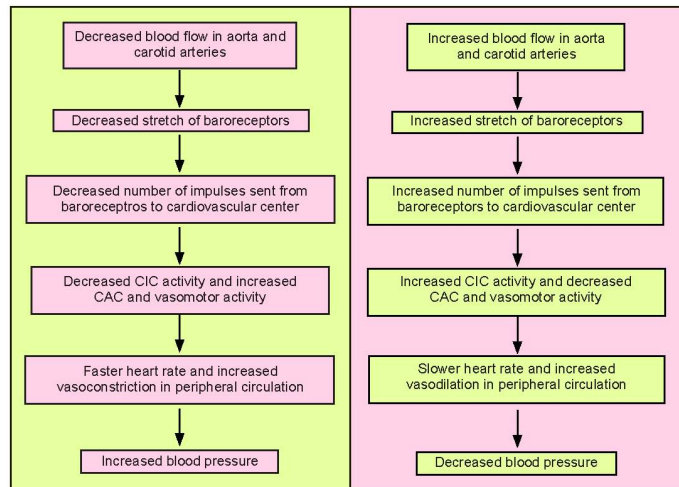


Figure 5-5. Baroreceptor reflex affecting blood pressure

*Chemoreceptor Reflex:* changes in chemical concentrations in blood  
 Association words -> Aortic & Carotid bodies, & central chemoreceptors

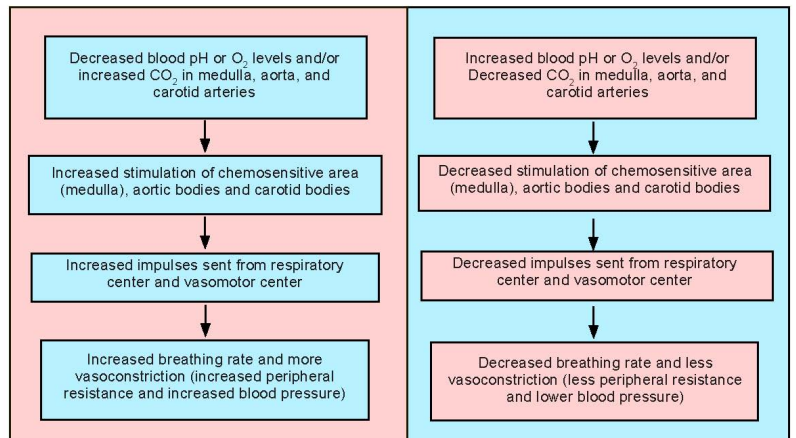


Figure 5-6. Chemoreceptor reflexes affecting blood pressure