



Human Body Systems

Virtual Learning

9-12th PLTW[®] HBS

PLTW[®] 4.3.2 Varicose Veins

April 21, 2020



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Lesson: April 21, 2020

Objective/Learning Target:

Students will be able to identify the structure and function of veins, arteries, and capillaries by investigating the cause of spider and varicose veins. (*Reference: PLTW[®] 4.3.2 Varicose Veins*)



Let's Get Started/Warm Up Activities:

Before we start our lesson today, watch the following videos:

- [Intro to Veins & Arteries](#)
- [Intro to Capillaries](#)

Lesson/Activity:

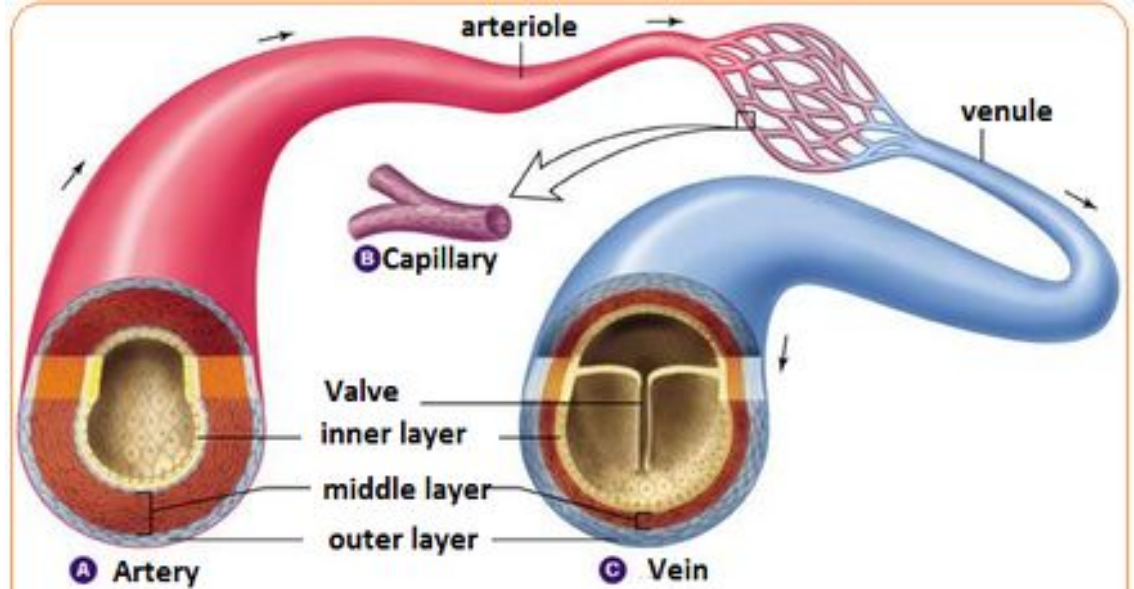
Activity #1:

Draw the diagram of an artery, vein and capillary in your notebook or on a piece of paper. Label all terms. Use colors if available. Write the following notes on the diagram:

- Arteries carry blood from the heart (oxygenated)
- Veins carry blood back toward the heart (deoxygenated)

Blood Flow Diagram Key

	Oxygenated blood
	Deoxygenated blood



At any given moment, about 30% of the blood in your systemic circulation will be found in the arteries, 5% in the capillaries and 65% in the vein.

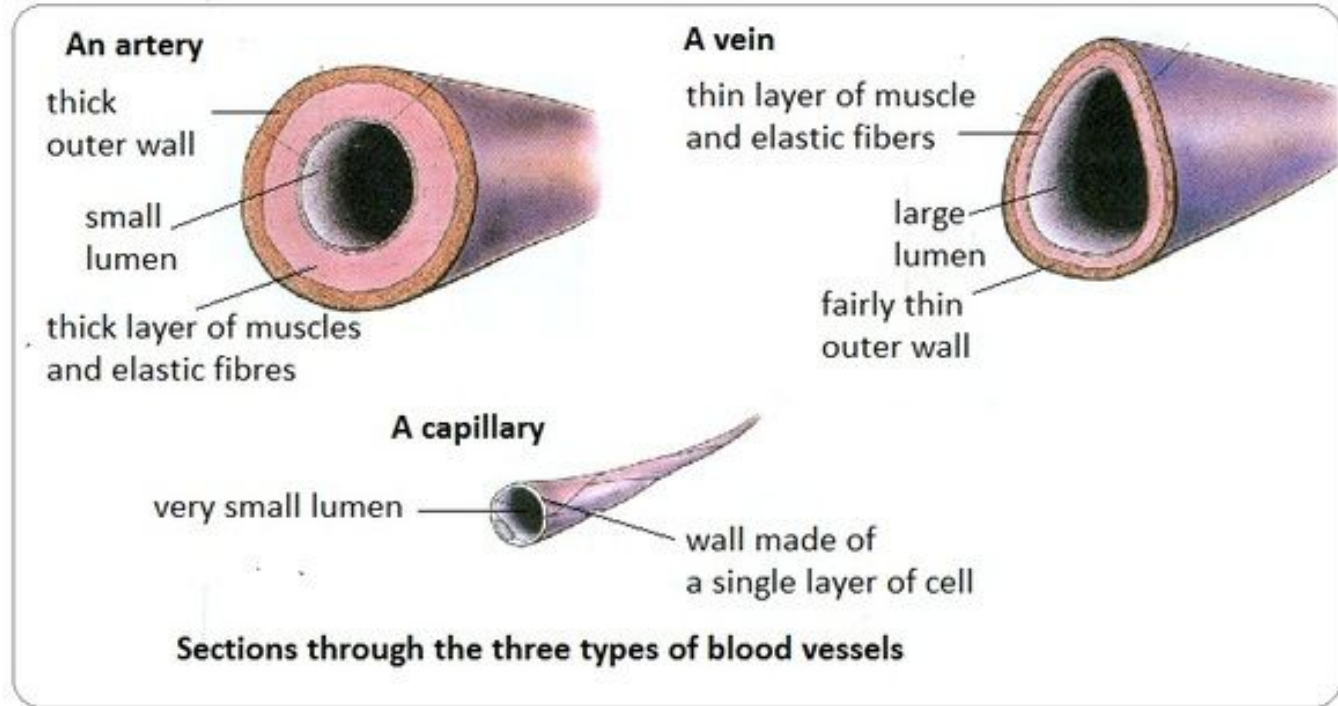
Lesson/Activity continued:

Activity #2:

Draw the cross-section diagrams of an artery, vein and capillary in your notebook or on your piece of paper. Label all terms.

Write the following note under your diagram:

- Lumen: Latin for “an opening,” a lumen is the interior space of a vessel through which blood flows.





Lesson/Activity continued:

Watch video: [Why Do I Have Varicose Veins?](#)

Activity #3:

Watch the video above about varicose veins and complete the following:

1. What is the function of arteries?
2. What is the function of veins?
3. Why do veins below your heart sometimes have problems?
4. How do varicose veins form?
5. What keeps blood in your veins flowing in the right direction without backtracking?
6. List at least four reasons reasons varicose veins can develop.
7. What are two treatment options for people with varicose veins? Describe each treatment.
8. What is the best way to prevent varicose veins?



Lesson/Activity Answers:

Activity #1 Answer(s):

Click [HERE](#) to see the diagram for Activity #1.

Activity #2 Answer(s):

Click [HERE](#) to see the diagram for Activity #2 (scroll down to middle of the page).



Lesson/Activity Answers:

Activity #3 Answer(s):

Click [HERE](#) to watch the video about varicose veins. Fast forward in the video to the times listed below to hear/see the answers to the questions.

1. What is the function of arteries? 0:17
2. What is the function of veins? 0:17
3. Why do veins below your heart sometimes have problems? 0:25
4. How do varicose veins form? 0:32
5. What keeps blood in veins flowing in the right direction without backtracking? 0:35
6. List at least four reasons reasons varicose veins can develop. 0:42-1:26
7. What are two treatment options for people with varicose veins? Describe each treatment.
1:27-2:05
8. What is the best way to prevent varicose veins? 1:53-2:05

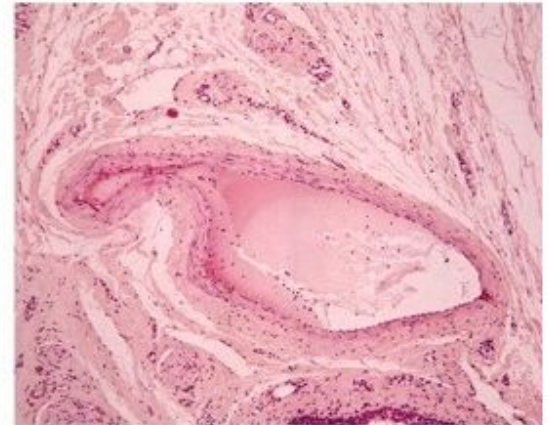
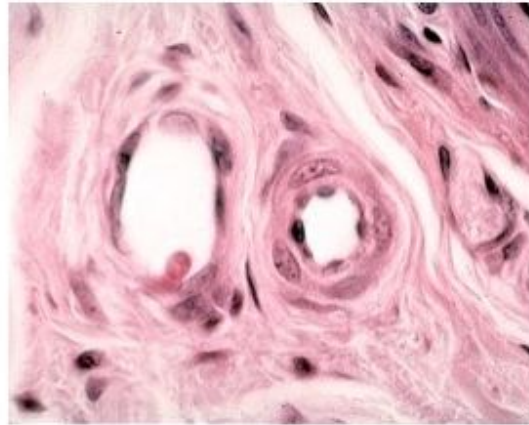
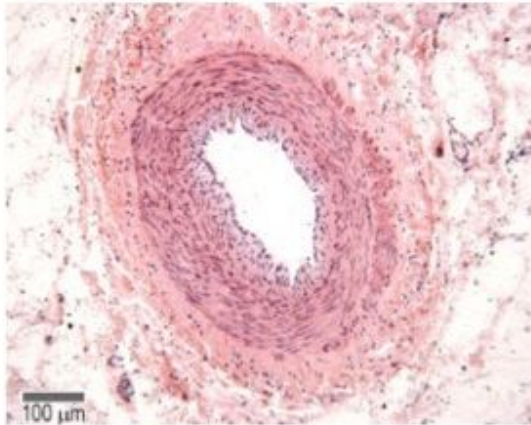
Practice:

Practice #1: Draw the following table in your notebook or on your piece of paper. Make the table large enough to write answers. Click [HERE](#) or use other internet sources to fill in the table below.

	Arteries	Capillaries	Veins
Function			
Structure of wall			
Lumen			
Valves			
How structure fits function			

Practice continued:

Practice #2: Draw the following microscopic images in your notebook or on your piece of paper. Using what you know about blood vessels, label the images as either capillary, vein or artery. Note: When comparing size, note that the middle image is more magnified than the image on the left or right.



Practice Answer(s):

Practice #1 Answer(s):

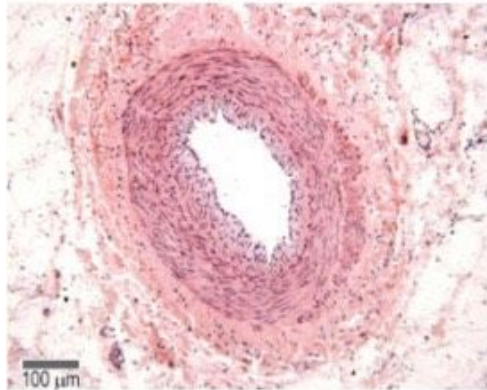
Click [HERE](#) or see the table at the right to view the practice table answers.

	Arteries	Capillaries	Veins
Function	Carry blood away from the heart at high pressure	-Supply all cells with their requirements -Take away waste products	Return blood to the heart at low pressure
Structure of wall	- Thick , strong -Contain muscles , elastic fibres and fibrous tissue	Very thin , only one cell thick	- Thin -Mainly fibrous tissue -Contain far less muscle and elastic tissue than arteries
Lumen	- Narrow -Varies with heartbeat (increases as a pulse of blood passes through)	- Very narrow -Just wide enough for a red blood cell to pass through	Wide
Valves	(-)	(-)	(+) Prevent backflow
How structure fits function	-Strength and elasticity needed to withstand the pulsing of the blood, prevent bursting and maintain pressure wave -Helps to maintain high blood pressure , preventing blood flowing backwards	- No need for strong walls, as most of the blood pressure has been lost -Thin walls and narrow lumen bring blood into close contact with body tissue, allowing diffusion of materials between capillary and surrounding tissues. -White blood cells can squeeze between cells of the wall	- No need for strong walls, as most of the blood pressure has been lost - Wide lumen offers less resistance to blood flow

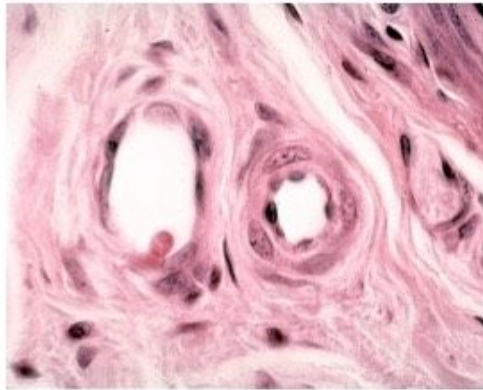
Practice Answer(s):

Practice #2 Answer(s):

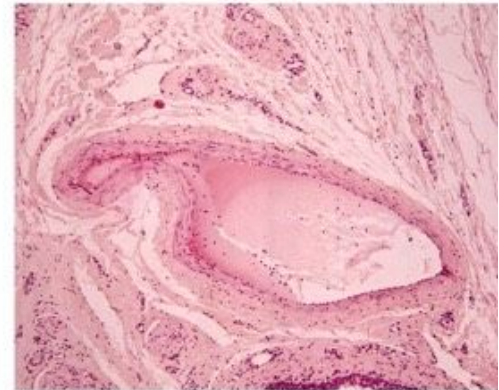
See microscopic images below. An artery has a narrower lumen and thicker wall than a vein. A capillary is smaller than either an artery or vein.



Artery



Capillary*



Vein

* The capillary is a significantly smaller structure and thus is shown at a substantially higher magnification than the artery and vein



Additional Practice and/or Resources:

Learn More:

[HBS Unit 4.3.2 Flashcards](#)

Test your knowledge of blood vessels by clicking on the link above.

[WebMD: Varicose Veins and Spider Veins](#)

Read more about the causes, risk factors, symptoms, and treatments of varicose veins and spider veins.

[Treatments for Varicose Veins](#)

Check out this video that illustrates the various medical interventions available for the treatment of varicose veins.