PhysioEx Lab Report

Exercise 5: Cardiovascular Dynamics

Activity 1: Studying the Effect of Blood Vessel Radius on Blood Flow Rate

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Session ID: session-807b509f-c2bf-3cba-0ced-01058de4a34f

Pre-lab Quiz Results

You scored 100% by answering 5 out of 5 questions correctly.

1. Blood flow is measured in

   You correctly answered: ml/min.

2. Which of the following has the greatest effect on blood flow?

   You correctly answered: blood vessel radius.

3. Which of the following would *not* result in a decrease in the blood vessel radius?

   You correctly answered: vasodilation.

4. The diameter of the blood vessel is the same as

   You correctly answered: two times the radius of the blood vessel.

5. The opening of the blood vessel where the blood flows is called the

   You correctly answered: lumen.

Experiment Results

Predict Questions

1. Predict Question 1: What do you think will happen to the flow rate if the radius is increased by 0.5 mm?

   Your answer: The flow rate will increase.

2. Predict Question 2: Do you think a graph plotted with radius on the X-axis and flow rate on the Y-axis will be linear (a straight line)?

   Your answer: no.

Stop & Think Questions

1 What is the driving force for blood flow?

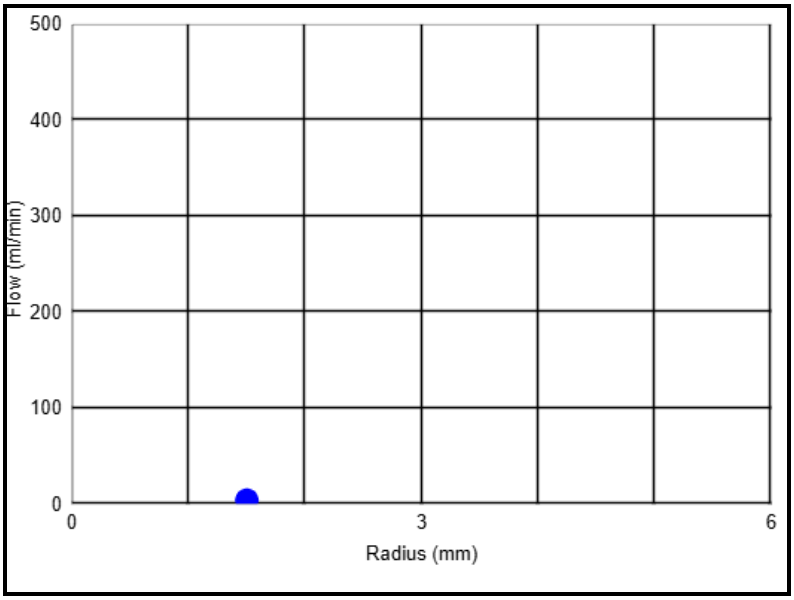
You correctly answered: pressure gradient.

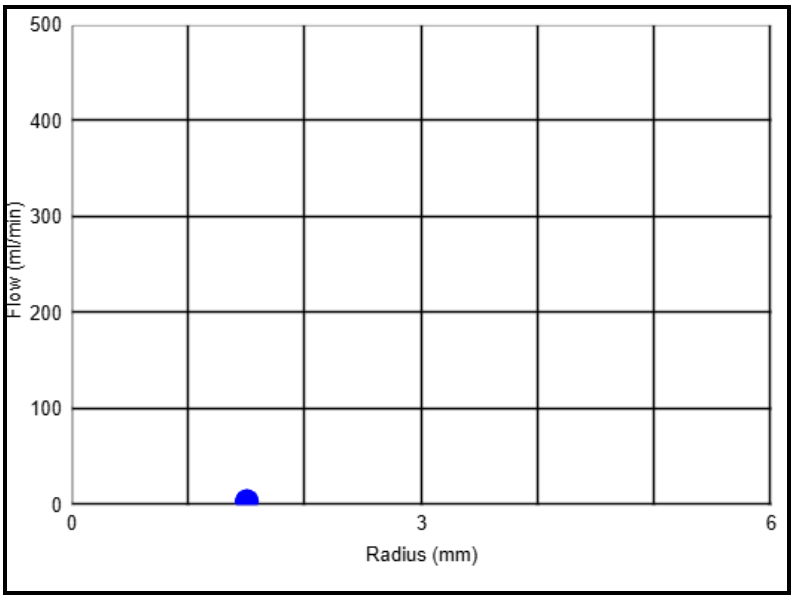
2 How does the body increase the blood vessel radius?

You correctly answered: smooth muscle relaxation.

Experiment Data

Flow Rate (ml/min)	Radius (mm)	Viscosity	Length (mm)	Pressure (mm Hg)
4.0	1.5	1.0	50	100
4.0	1.5	1.0	50	100
12.6	2.0	1.0	50	100
30.7	2.5	1.0	50	100
63.6	3.0	1.0	50	100
117.8	3.5	1.0	50	100
201.0	4.0	1.0	50	100
321.9	4.5	1.0	50	100
490.6	5.0	1.0	50	100

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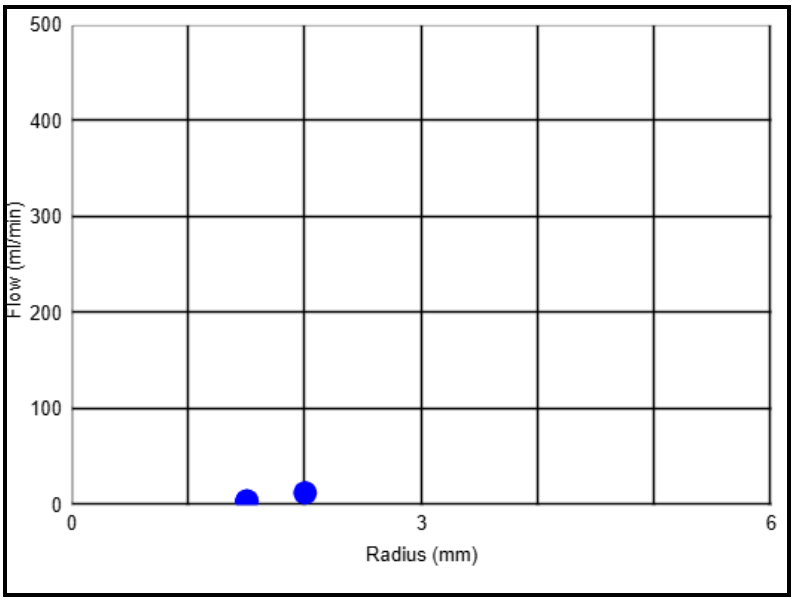
400
300
200
100
0
Flow (ml/min)
0
3
6
Radius (mm)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Flow (ml/min)
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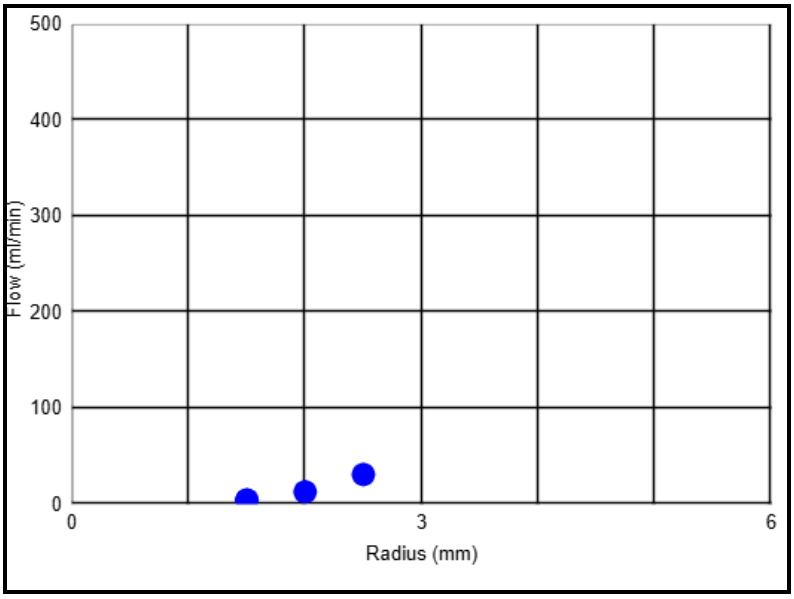
Radius (mm)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Flow (ml/min)
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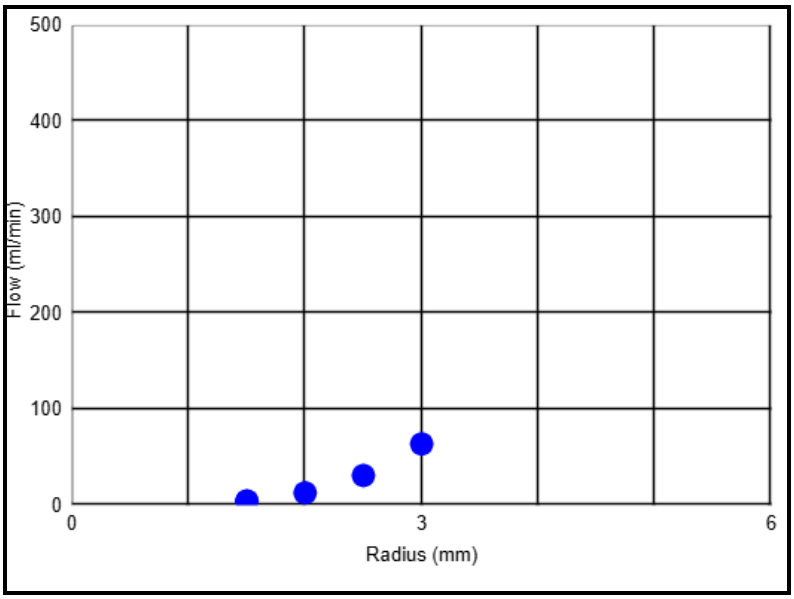
Radius (mm)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Flow (ml/min)
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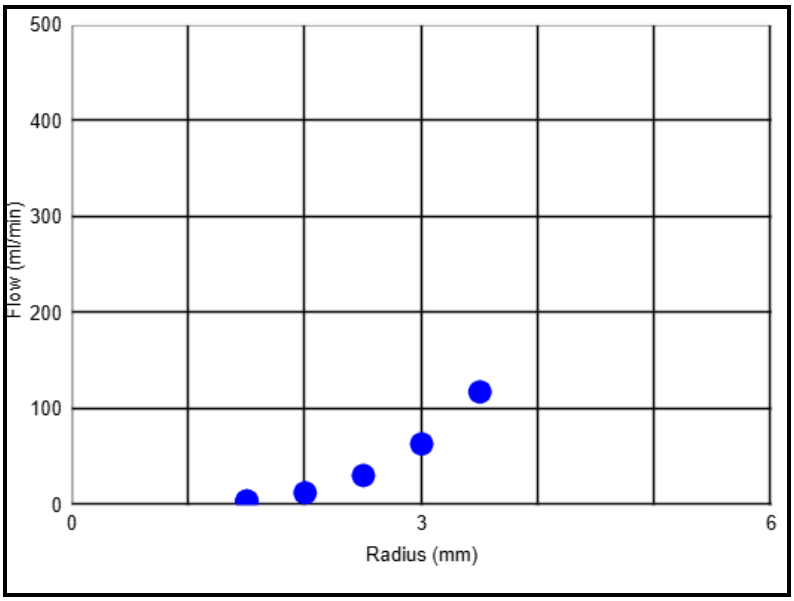
Radius (mm)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Flow (ml/min)
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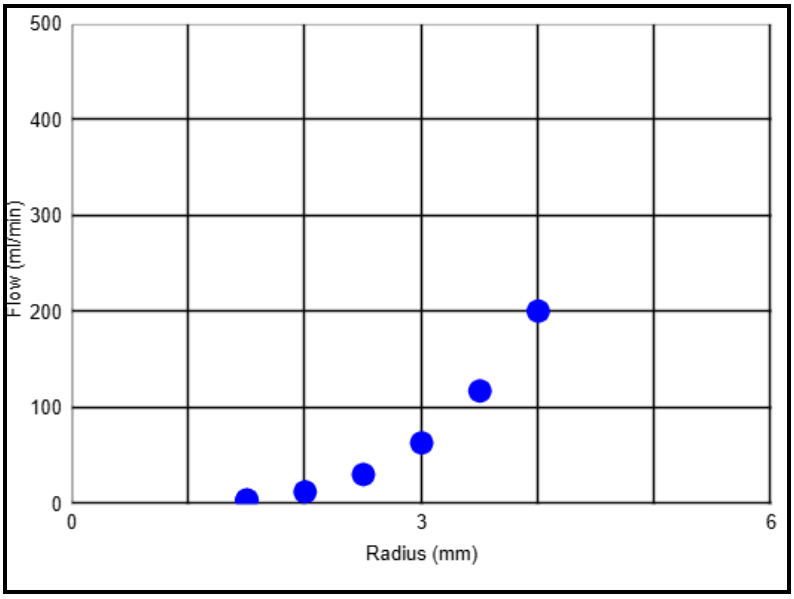
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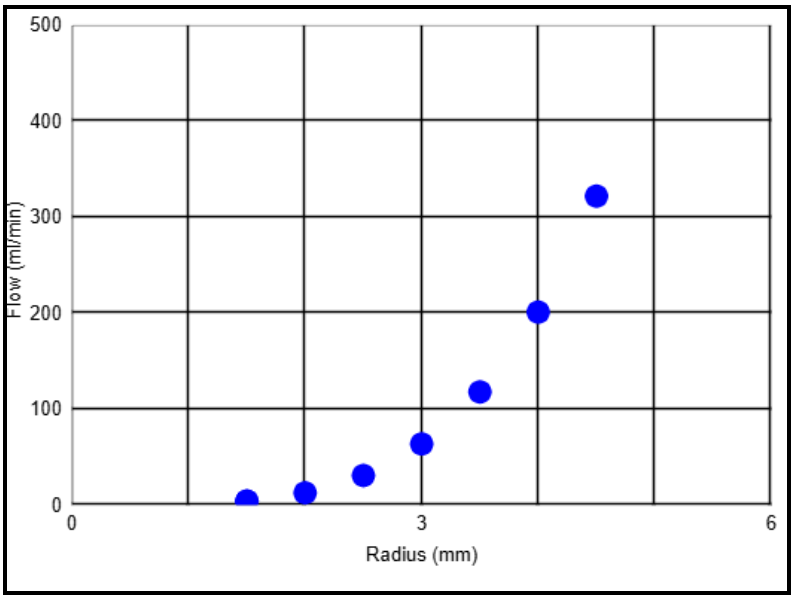
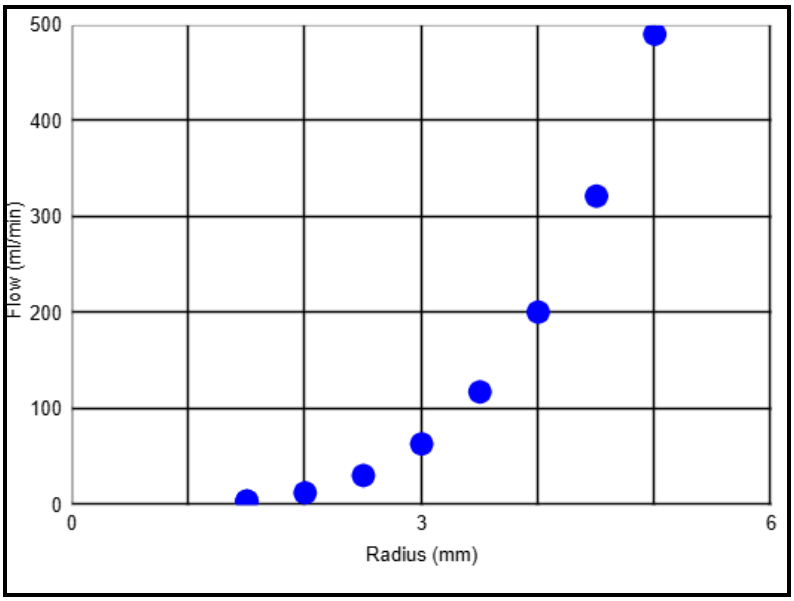
Flow (ml/min)
0
3
6
Radius (mm)





Post-lab Quiz Results

You scored 100% by answering 4 out of 4 questions correctly.

1 The variable that you altered in this activity was

You correctly answered: vessel radius.

2 Vessel radius and fluid flow

You correctly answered: are directly proportional.

3 After a heavy meal, when we are relatively inactive, we might expect blood vessels in the skeletal muscles to be somewhat _____ and the blood vessels in the digestive organs to be somewhat _____.

You correctly answered: constricted, dilated.

4 When you increased the flow tube radius, the fluid flow rate

You correctly answered: increased.

Review Sheet Results

1 Explain how the body establishes a pressure gradient for fluid flow.

Your answer:

The viscosity of the fluid and vessel radius are the main determining factors for rate of fluid low and pressure. In short, the body creates areas of high and low pressure and fluids flow from high to low pressure.

2 Explain the effect that the flow tube radius change had on flow rate. How well did the results compare with your prediction?

Your answer:

My assumption was correct and verified by the data collected.

3 Describe the effect that radius changes have on the laminar flow of a fluid.

Your answer:

An increase in radius reduced the chances of turbulence and allows for more fluid flow meaning laminar can be achieved easier.

4 Why do you think the plot was not linear? (Hint: look at the relationship of the variables in the equation). How well did the results compare with your prediction?

Your answer:

My assumption was correct and verified by the data collected. The graph shows an exponential increase in flow in comparison to increase in vessel radius.