PhysioEx Lab Report

Exercise 5: Cardiovascular Dynamics

Activity 3: Studying the Effect of Blood Vessel Length on Blood Flow Rate

Name: Jonathan Terrero

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Session ID: session-fc322d4e-a5d7-23d0-4e9a-e54bc3bf1dca

Pre-lab Quiz Results

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

1. When the length of the blood vessel increases, which of the following also increases?

   You correctly answered: both friction and surface area.

2. Blood vessel length decreases

   You correctly answered: when we lose weight.

3. Blood flow is

   You correctly answered: directly proportional to vessel radius to the fourth power.

4. Which of the following correctly describes resistance to flow?

   You correctly answered: Resistance to flow increases with increased vessel length.

Experiment Results

Predict Question

1. Predict Question: What effect do you think increasing the flow tube length will have on the fluid flow rate?

   Your answer: The fluid flow rate will decrease.

Stop & Think Questions

1. What is the relationship between fluid flow and flow tube length?

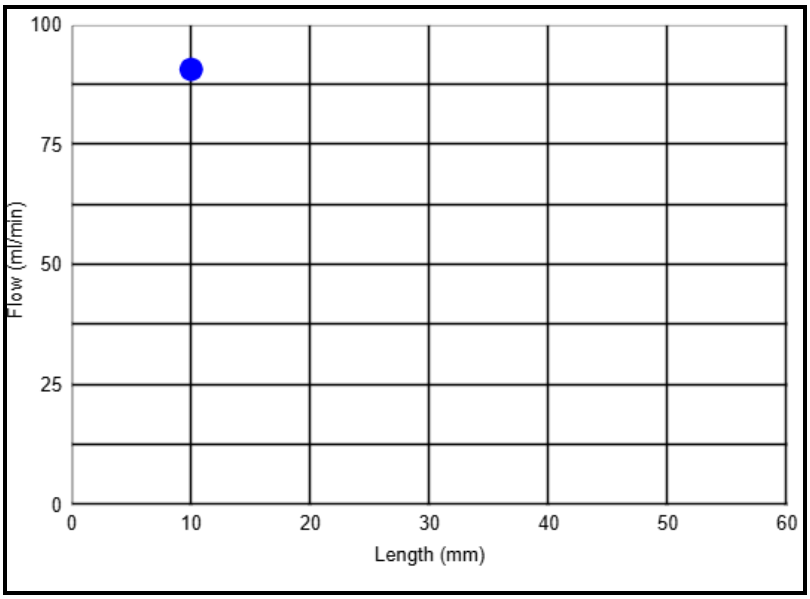
   You correctly answered: They are inversely proportional to each other.

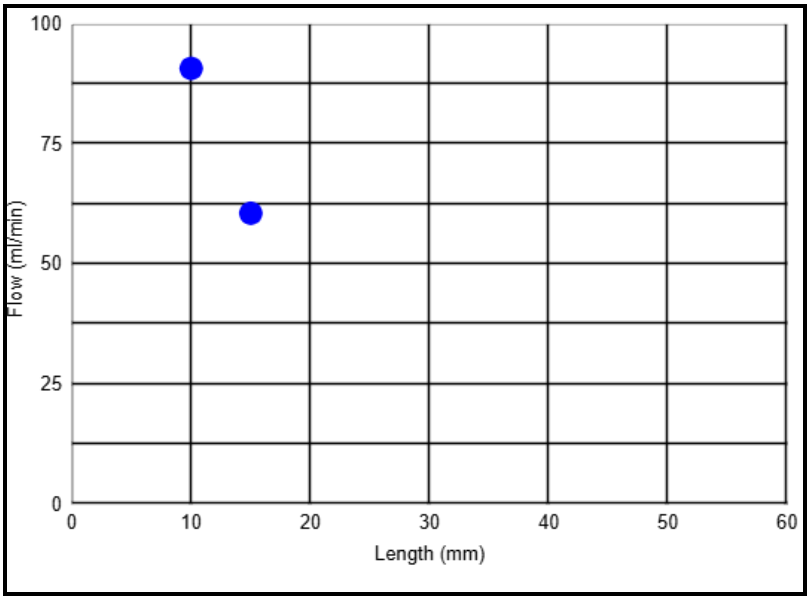
2. Which is more likely to occur on a daily basis?

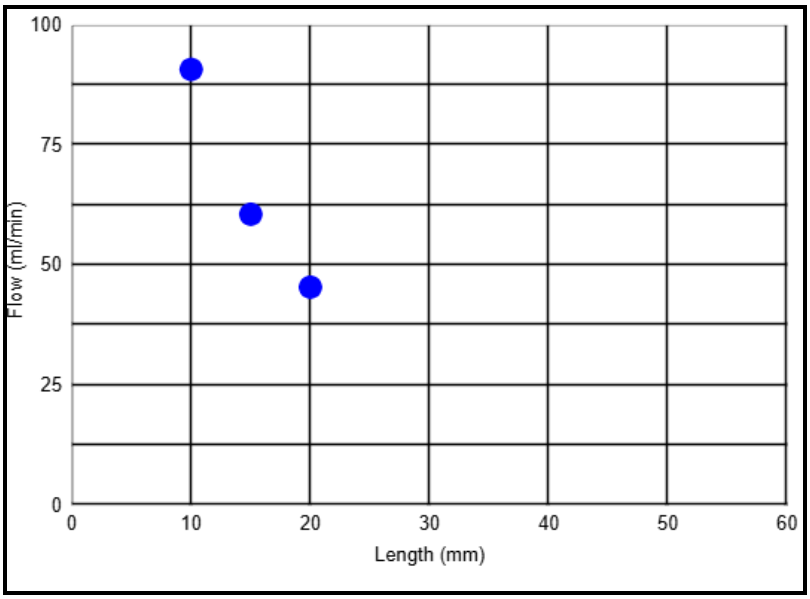
   You correctly answered: changes in blood vessel diameter.

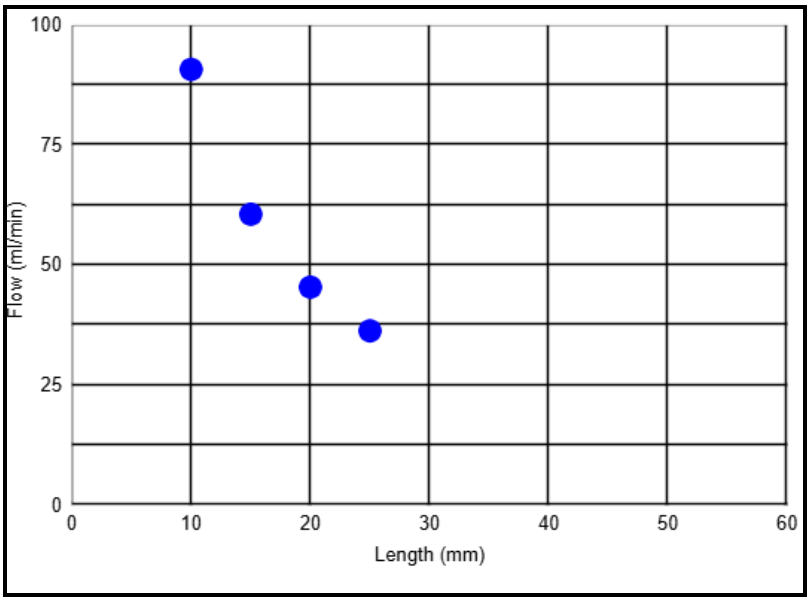
Experiment Data

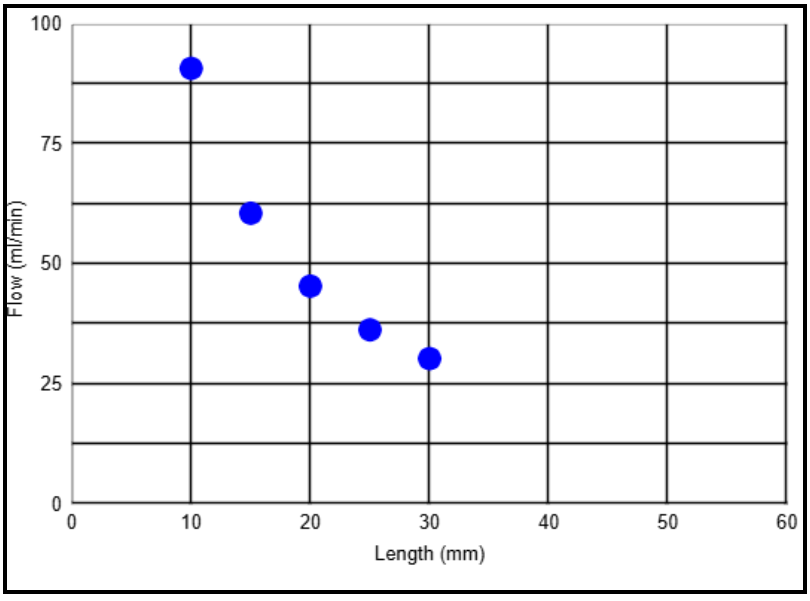
Flow (ml/min)	Radius (mm)	Viscosity	Length (mm)	Pressure (mm Hg)
90.8	3.0	3.5	10	100
60.6	3.0	3.5	15	100
45.4	3.0	3.5	20	100
36.3	3.0	3.5	25	100
30.3	3.0	3.5	30	100
26.0	3.0	3.5	35	100
22.7	3.0	4.0	35	100






100
75
50
25
0
Flow (ml/min)
0
10
20
30
40
50
60
Length (mm)


100
75
50
25
0
Flow (ml/min)
0
10
20
30
40
50
60
Length (mm)


100
75
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Flow (ml/min)
0
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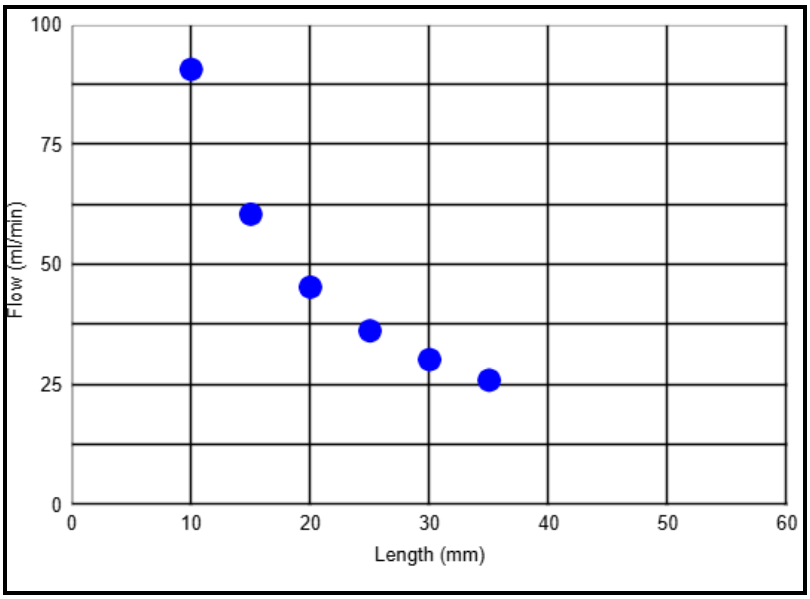
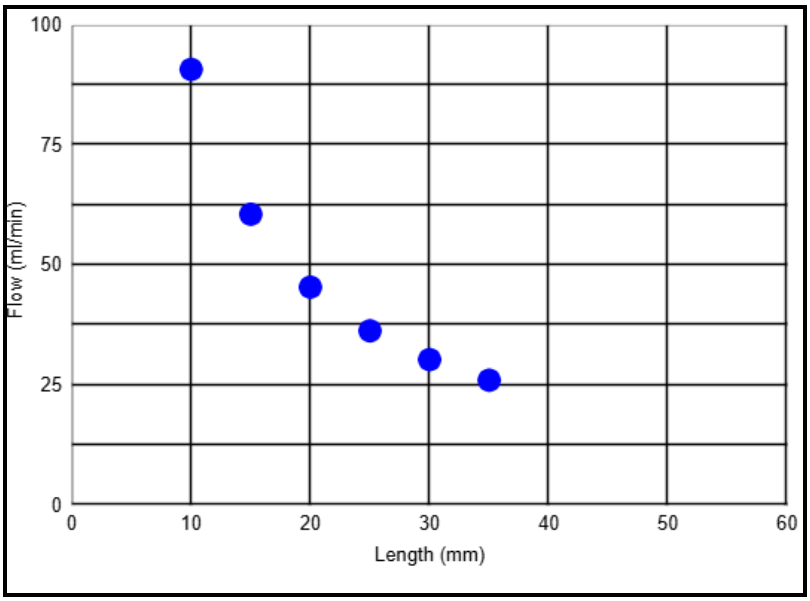
30
40
50
60
Length (mm)





Post-lab Quiz Results

You scored 75% by answering 3 out of 4 questions correctly.

1 Increasing the flow tube length is analogous to increasing blood vessel length. How did this affect the flow rate?

You correctly answered: The flow rate decreased.

2 Which of the following correctly describes the relationships between blood vessel length, resistance, and blood flow?

Your answer: Blood vessel length is directly proportional to resistance and directly proportional to blood flow.

Correct answer: Blood vessel length is directly proportional to resistance and inversely proportional to blood flow.

3 Which of the following correctly describes the relationships between blood vessel radius, resistance, and blood flow?

You correctly answered: Blood vessel radius is inversely proportional to resistance and directly proportional to blood flow.

4 Which of the following describes why the body might require an increase in vessel radius?

You correctly answered: to provide more blood flow and, therefore, nutrients to a particular body part.

Review Sheet Results

1 Which is more likely to occur, a change in blood vessel radius or a change in blood vessel length? Explain why.

Your answer:

A change in blood vessel radius considering changing the length of vessels would require more resources than changing the contractility of the surrounding tissues and muscles associated with a particular vessel in order to change radius.

2 Explain the effect that the change in blood vessel length 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 Explain why you think blood vessel radius can have a larger effect on the body than changes in blood vessel length (use the blood flow equation).

Your answer:

The resistance and rate of flow change on a larger exponential level (by a power of 4) when changing vessel length. Changing vessel radius is more reasonable.

4 Describe the effect that obesity would have on blood flow and why.

Your answer:

Obesity would decrease blood flow rate for a plethora of reasons but strictly based on weight, the body would need to supply blood to areas that already have high resistance due to the mass of surrounding tissues, and this would be accomplished by increasing pressure by decreasing vessel radius and most often times obesity also causes increased vessel length.