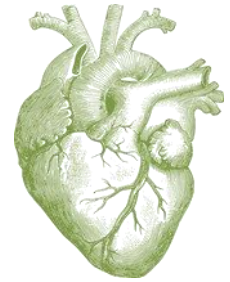


### Task

A group of students were asked to explain why the walls of the left and right ventricles of the heart have different thicknesses.

Here are some of their explanations.

- Which answers show a correct understanding of the heart?
- Choose 3-5 misconceptions. Can you explain how or why it has come about?



'oxygen makes blood thicker'

'the right side is thicker as it pumps blood a long way around the body'

'the ventricles store blood'

'the left ventricle has a thicker wall because it has to pump blood all the way round the body'

'blood travels to the liver to get oxygen'

'the right ventricle is thinner because it pumps blood a shorter distance'

'one side pumps blood into the heart, the other side pumps it out of the heart'

'blood is oxygenated in the heart'



'the left has a thicker wall to push the blood with more force to get it through the body'

'the right side doesn't have a thick wall because the blood is only going to the lungs'

'the left ventricle needs to exert more pressure. The oxygenated blood has to go further'

'the left carries hotter blood'

'the left is thicker because it is a double pump'

'the right ventricle wall is not as thick as the left because it only has to push deoxygenated blood to the lungs'

'the left is pumping blood out. The right is taking blood in'

'the left is thicker to prevent blood escaping'

'blood is at higher pressure so the left needs a thicker wall'

'the right needs to exert less pressure so it has a thinner wall'

'the left ventricle contains more blood'



### Teaching notes

As an alternative to giving out the sheet the statements could be numbered, printed off and fixed around the room.

Give students a time limit tell them to visit/read as many as possible and decide if the statement is correct or not. Quickly go through the answers for each statement without discussing the reasons why.

Give each group of students 3 - 5 misconceptions. They should decide why the ideas are incorrect how they might have come about.

Students could then be given a question to answer under exam conditions such as 'Why do the walls of the left and right ventricles of the heart have different thicknesses?' (2 marks).

E.g. correct answers...

*'the left ventricle has a thicker wall/more muscle (1) because it pumps blood to the body/a greater distance/at higher pressure (1)'*

**OR**

*'the right ventricle has thinner walls/less muscle (1) because it pumps blood to the lungs/shorter distance/at lower pressure (1)'*

### Answers

- a. *'oxygen makes blood thicker'* **incorrect**  
Perhaps this comes from students thinking that oxygen combining with haemoglobin must add bulk to the red blood cells.
- b. *'the right side is thicker as it pumps blood a long way around the body'* **incorrect**  
This misconception can arise from the typical diagram of the heart which shows the left chambers on the right hand side of the diagram.
- c. *'the ventricles store blood'* **incorrect**  
Many students cannot picture the flow of blood through the heart and around the body
- d. *'the left ventricle has a thicker wall because it has to pump blood all the way round the body'* **correct**
- e. *'blood travels to the liver to get oxygen'* **incorrect**  
The lungs often seem to get forgotten
- f. *'the right ventricle is thinner because it pumps blood a shorter distance'* **correct**

### Answers continued

- g. *'one side pumps blood into the heart, the other side pumps it out of the heart'* **incorrect**  
This is quite a common misconception.
- h. *'blood is oxygenated in the heart'* **incorrect**  
Some students get confused by the idea of oxygenated and deoxygenated blood in the heart
- i. *'the left has a thicker wall to push the blood with more force to get it through the body'* **correct**
- j. *'the right side doesn't have a thick wall because the blood is only going to the lungs'* **correct**
- k. *'the left ventricle needs to exert more pressure. The oxygenated blood has to go further'* **correct**
- l. *'the left carries hotter blood'* **incorrect**  
Perhaps there's a link in their minds between oxygen, respiration, heat.
- m. *'the left is thicker because it is a double pump'* **incorrect**  
The heart has a double pump mechanism.
- n. *'the right ventricle wall is not as thick as the left because it only has to push deoxygenated blood to the lungs'* **correct**
- o. *'the left is pumping blood out. The right is taking blood in'* **incorrect**  
Again the role of the heart in pumping blood to the lungs gets forgotten.
- p. *'the left is thicker to prevent blood escaping through the walls'* **incorrect**  
Perhaps students have got the idea of blood being at a higher pressure and so think the wall is thicker to resist that pressure.
- q. *'blood is at higher pressure so the left needs a thicker muscle'* **incorrect**  
The thicker muscle is the cause of the higher pressure not a consequence of it.
- r. *'the right needs to exert less pressure so it has a thinner wall'* **correct**
- s. *'the left ventricle contains more blood'* **incorrect**  
Blood volume entering and leaving the heart is equal.