VEINS UNDER PRESSURE:THE JOURNEY OF BLOOD AND THE STORY OF GRANDMA'S HEAVY LEGS

This piece explores the fascinating journey of blood circulation through the veins, particularly in older individuals, like our grandmothers. After delivering oxygen to the body, blood must return to the heart, facing the challenge of gravity. Muscle contractions play a vital role in this process; as we move, our muscles squeeze the veins, helping to push the blood upward. One-way valves in the veins prevent backflow, ensuring efficient circulation. However, as we age, these valves can weaken and veins may stretch, making it more difficult for blood to return, often resulting in a heavy feeling in the legs. This underscores the importance of maintaining a healthy circulation throughout life.

INTRODUCTION

Blood circulation is a topic that has long intrigued scientists and physicians. Despite advancements in medicine, understanding how blood flows through the body remains crucial, as circulation problems can lead to serious conditions like heart attacks and strokes. This research project aims to investigate how various factors, such as gravity, physical activity, and the function of venous valves, influence the return of blood to the heart.

Example of blood circulation system:

How does blood circulate through the veins?
It is hypothesized that blood flows through the veins due to the pressure from the heart, the action of surrounding muscles, and the role of venous valves that prevent backflow. Efficient circulation depends on these factors working together, and any disruption could slow down blood flow.

THE EXPERIMENT

Important information

- Date: 1628
- Place: In London, England
- Samples: sick people, corpses, animals

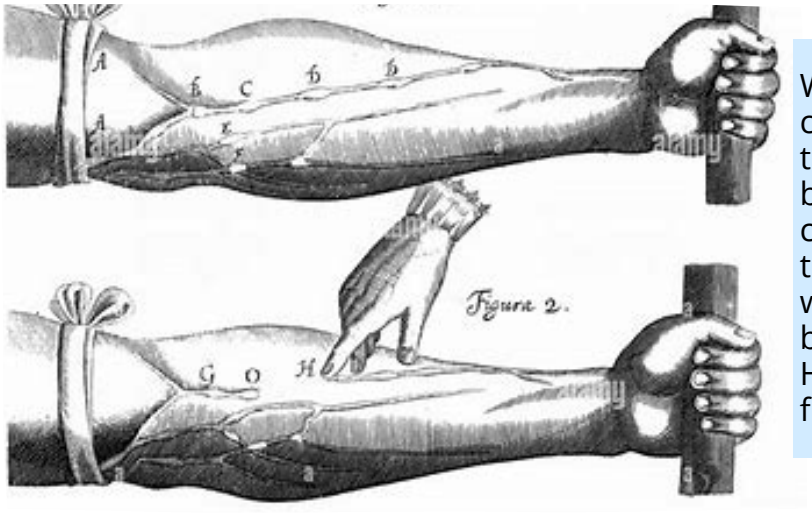
Explanation

William Harvey, an English physician, wanted to prove his hypothesis of circulatory system in which the blood returns on itself, Harvey studied hearts of all types, and measured the average amount of liquid contained in the chambers of a heart.

Harvey measured heart rates in units of time)72 beats per minute), he made calculations and realised that the heart contains more blood than the body, which implies that the blood returns on itself. William Harvey proved this theory with the tourniquet experiment.

William Harvey's tourniquet (as seen in figure 2) experiment helped show how blood moves in the body. He tied a tourniquet around a person's arm to stop the blood flow in both veins and arteries. Then, he loosened the tourniquet a little. This allowed blood to flow into the arm through the arteries, but it couldn't go back through the veins. The veins swelled below the tourniquet, proving that veins carry blood back to the heart. Harvey realised that blood moves in a one-way loop, from the heart through the arteries and back through the veins, showing how blood circulation works.

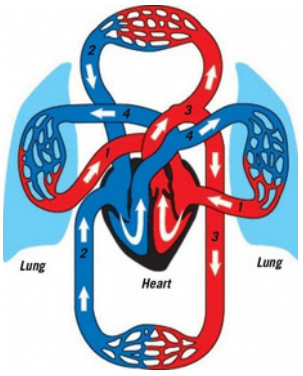
THE RESULTS



William Harvey's experiment

William Harvey's experiments on blood circulation led to groundbreaking results that transformed the understanding of the human body. He demonstrated that blood circulates continuously in a closed system, refuting earlier theories. His experiments showed that the heart works as a pump, propelling blood through the body in a controlled and consistent manner. Harvey proved that arteries carry blood away from the heart, while veins, return it.

A critical finding was his discovery of one-way valves in veins, which prevent the backward flow of blood and ensure proper circulation. Through his observations, Harvey also uncovered the process of pulmonary circulation, where blood is transported to the lungs to receive oxygen before being circulated throughout the body. Lastly, Harvey's experiments refuted Galen's long-accepted belief that blood is consumed and recreated by the liver, instead, revealing that blood moves in a continuous, closed loop. These results marked a major shift in medical science, establishing a new understanding of the cardiovascular system.



Cardiovascular system

THE DISCUSSION

William Harvey's experiments helped him understand how blood really circulates in the body. By studying how the heart pumps blood and how veins have one-way valves, he discovered that blood flows in a continuous loop. His results showed that blood is not made by the liver and used up, as people once thought. Instead, blood moves from the heart, through the body, and returns to the heart, with the lungs helping to oxygenate it. This discovery changed the way we understand the circulatory system and how blood moves.

"FUN" FACT

Imagine your grandma's legs like a busy road for blood. Her heart, like a motor, pumps blood through the arteries down to her feet. But getting the blood back up through the veins isn't as easy. Luckily, her veins have small valves, like doors, that stop the blood from going the wrong way.
As we age, these valves don't work as well, and some blood can get stuck in the lower legs. That's why your grandma's legs can feel heavy or swollen, and you might notice those blue, twisty veins. It's like a traffic jam! When she moves or lifts her feet, she's helping the blood flow back up to her heart. So, when you see her with her feet up, she's just helping her circulation!

Healthy vein Varicose vein

CONCLUSION

William Harvey's work proved that blood circulates in a closed system, driven by the heart, with arteries and veins playing key roles. He also discovered valves in veins and clarified pulmonary circulation. By disproving Galen's theory that blood was constantly produced and consumed, Harvey's discoveries revolutionised medicine, laying the foundation for modern physiology and cardiology. His evidence-based approach marked a shift toward scientific methods in understanding the human body.

William Harvey was born in Folkestone (Kent) on April 1, 1578, and died in Roehampton, London, on June 3, 1657. He was an English doctor. He is best known for discovering and explaining how blood circulates throughout the body, a discovery he presented in his major work "Motu Cordis" in 1628.

Sources:

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