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## Heart explained

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### Summary

- The functions of the heart are to pump oxygenated blood around the body, and to deliver deoxygenated blood and waste products (carbon dioxide) to the lungs.
  - The heart consists of four chambers, each separated by valves that only permit blood to flow in one direction.
  - Disorders of the heart include coronary heart disease, angina, heart attack, valve diseases and congenital disorders.
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Your heart is a vital organ. It is a muscle that pumps blood to all parts of your body. The blood pumped by your heart provides your body with the oxygen and nutrients it needs to function.

Your heart is about the size of a clenched fist, and weighs between 300 and 450 g. It lies in the middle of your chest, behind and slightly to the left of your breastbone. If you are of average body weight and size, your body contains about five litres of blood, all of which passes through your heart every minute or so. However, when necessary, such as during exercise, your heart can pump up to four times that amount per minute.

### The four chambers of the heart

Your heart has a right and left side separated by a wall called the septum. Each side has a small collecting chamber called an 'atrium', which leads into a large pumping chamber called a 'ventricle'. There are four chambers: the left atrium and right atrium (upper chambers), and the left ventricle and right ventricle (lower chambers).

The right side of your heart collects blood on its return from the rest of our body. The blood entering the right side of your heart is low in oxygen. Your heart pumps the blood from the right side of your heart to your lungs so it can receive more oxygen. Once it has received oxygen, the blood returns directly to the left side of your heart, which then pumps it out again to all parts of your body through an artery called the aorta.

Blood pressure refers to the amount of force the pumping blood exerts on arterial walls.

### The heartbeat

Each atrium is connected to its ventricle by a one-way valve. The valve on the right side of the heart is called the tricuspid valve, while the valve on the left side is called the mitral valve.

The familiar 'lub-dub' sound of the heartbeat is caused by the rhythmic closing of the heart valves as blood is pumped in and out of the chambers.

The heart rate is regulated by a special cluster of cells situated in the right atrium, called the sinus node. This prompts the atria to contract first; then an electrical impulse is sent to a second node (the atrioventricular node), which is found between the atria and the ventricles. After a brief delay, the ventricles contract. At rest, your heart beats approximately 60 to 100 times a minute.

### Blood vessels of the heart

The blood vessels of the heart include:

- **venae cavae** – deoxygenated blood is delivered to the right atrium by these two veins. One (superior vena cava) carries blood from the head and upper torso, while the other (inferior vena cava) carries blood from the lower body
  - **pulmonary arteries** – deoxygenated blood is pumped by the right ventricle into the pulmonary arteries that link to the lungs
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- **pulmonary veins** – the pulmonary veins return oxygenated blood from the lungs to the left atrium of the heart
- **aorta** – this is the largest artery of the body, and it runs the length of the trunk. Oxygenated blood is pumped into the aorta from the left ventricle. The aorta subdivides into various branches that deliver blood to the upper body, trunk and lower body
- **coronary arteries** – like any other organ or tissue, the heart needs oxygen. The coronary arteries that supply the heart are connected directly to the aorta, which carries a rich supply of oxygenated blood
- **coronary veins** – deoxygenated blood from heart muscle is 'dumped' by coronary veins directly into the right atrium.

## Heart disorders

Some disorders of the heart include:

- **coronary heart disease** – fatty deposits or plaques build up inside one or more of the coronary arteries (atherosclerosis). This narrows the artery. Untreated, coronary heart disease can lead to angina or a heart attack
- **angina** – if the coronary arteries are narrowed, part of the heart muscle may not receive enough blood and oxygen. This causes the sensations of chest tightness and pain that are typical of angina
- **heart attack** – if a coronary artery is blocked, the heart is starved of oxygen and nutrients. Heart muscle cells (myocardial cells) are damaged, and may die without prompt treatment
- **heart murmur** – an audible vibration or humming heard through the stethoscope, caused by somewhat noisy blood flow within the heart. Faulty heart valves are a common cause, but usually a murmur does not indicate an abnormality
- heart valve disorders – for example, a faulty mitral valve allows blood to move backwards from the ventricle into the atrium. This condition is called mitral regurgitation
- congenital disorders – when the heart of a fetus does not develop properly. Problems include the blockage of blood flow inside the heart or blood vessels, abnormal flow of blood within the heart, or the heart itself may be underdeveloped
- **pericarditis** – inflammation or infection of the pericardium, which is the membrane surrounding the heart.

## Symptoms of heart disease

The symptoms of heart disease depend on the type of disorder, but may include:

- chest pain
- tightness in the chest
- shortness of breath
- irregular heartbeat
- unusually fast or slow heartbeat
- light headedness
- fatigue.

## Where to get help

- In an emergency call triple zero (000) for an ambulance
- Your doctor
- Cardiologist

**This page has been produced in consultation with and approved by:**

Heart Foundation

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