

Your Name _____

School Name _____



University of Cape Town
Pathology Learning Centre

GRADE 10 WORKSHEET HYPERTENSION & THE HEART



To start, some terminology

What is the technical name for heart muscle?

Answer:

How is it different to, say, a muscle in your arm?

Answer:



How big is this heart?

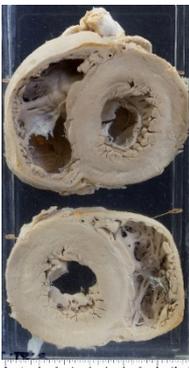
How much do you estimate that this heart weighs, in grams?
(Best guess wins a prize here!)

Answer:

What is the 'normal' weight for an adult human heart?

Answer:

- 250 - 350g
- 500 - 600g
- ±1kg



Measuring the heart

Here is a second heart, cut transversely (horizontally).
Measure the thickness of the wall of the left ventricle (the normal thickness is 12-15 mm in an adult).

Answer: LV wall = _____mm

So, these two hearts are both from patients who had hypertension, and each is enlarged by a very muscular left ventricle. The left ventricle is overgrown or "hypertrophic".

Can you explain why hypertension would cause this?

Clue: (Arterial) blood pressure is the pressure of the blood (pumped by the heart) against the resistance of the network of arteries running through the body.

Answer:



Image credit: www.schwarzenegger.com

Think of bodybuilders who push weights in the gym (i.e. work against resistance) to enlarge their muscles

Even without hypertension, the wall of the left ventricle is normally 3 x thicker than the wall of the right ventricle - Why is this so?

Answer:

It may seem like a good thing to have a heavy muscular heart but...

eventually the heart with its thick, stiff walls will struggle to keep pumping hard enough, and heart failure (cardiac failure) will result.

Other consequences of hypertension

Like the heart, high pressure in the smaller arteries causes their muscular walls to become thicker, and consequently they become narrower inside - this is known as *arteriosclerosis* or “hardening of the arteries”, and can cause lower blood supply to organs, in particular the kidneys and eyes.

High pressure also damages the inner lining of the arteries, which encourages fatty deposits to form - this is known as *atherosclerosis*. (Note the difference in spelling). Atherosclerosis can cause blockages in arteries, which also cuts down blood supply to organs such as the kidney and eyes.

People who have hypertension for a long time (years) and do not receive treatment, often have damage to their kidneys, and may have poor eyesight.