

wellcome
collection

Welcome
to the
Museum

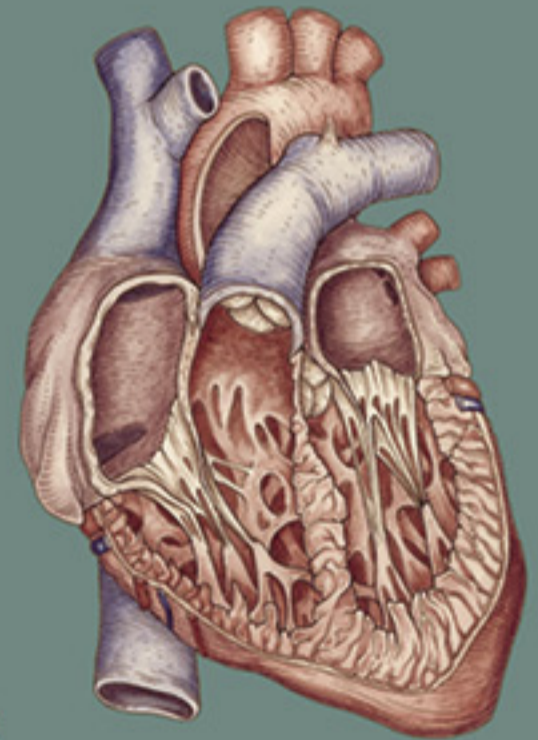
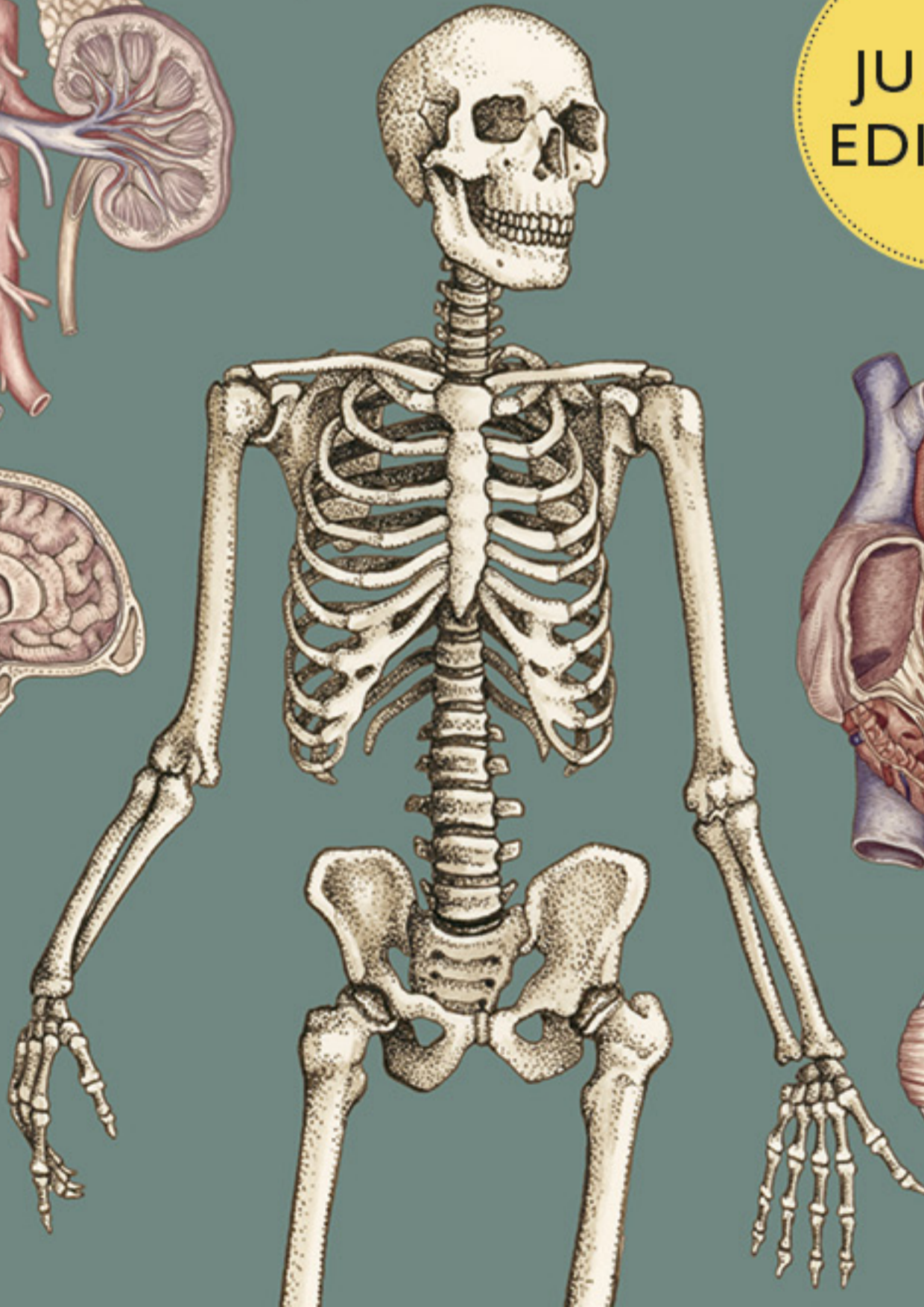
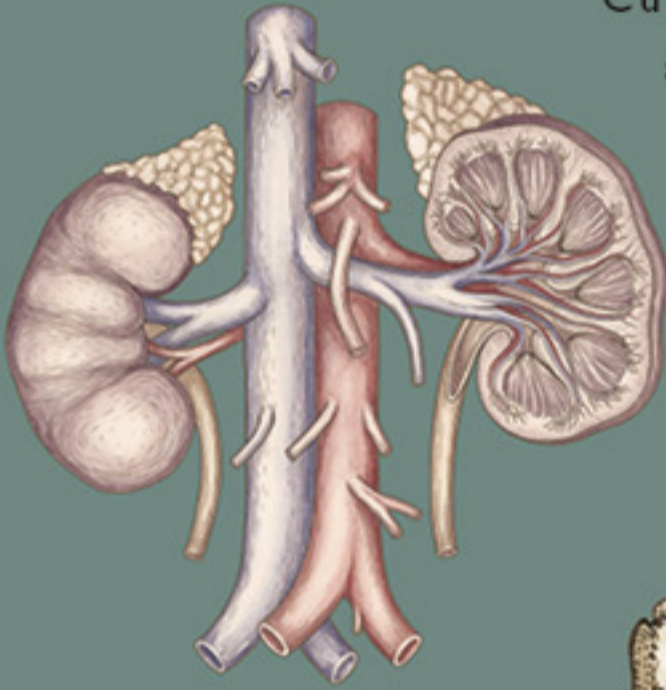
ADMIT ALL



Anatomicum

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and JENNIFER Z PAXTON

JUNIOR
EDITION



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The Skull

Underneath the skin and muscles of our head lies the skull, a protective home for the brain and sensory organs (the eyes, ears, nose and tongue). It is formed of 22 individual bones. The top part, or vault, is formed of eight bones and acts like a helmet, shielding the delicate brain inside from injury. The other 14 bones provide shape for the face and jaw. Only one of these, the mandible, or jawbone, can move. This bone is joined to the skull by a hinge joint (see page 16), which lets us open and close the jaw during chewing and talking.

Most of the skull bones have air-filled spaces inside them called sinuses. These make the skull lighter and make our voices clearer by allowing air to vibrate within them. There are also holes called foramina running right through the skull bones. These let the brain connect with other parts of the body via nerves, and allow blood vessels to pass to and from the brain and face.

You might notice that the ears and nose aren't visible. This is because the structure of the nose and ear is made from cartilage. This material is softer and decays more quickly than bone.

After a person dies, their skull might give us clues about them. We can guess the age, sex and ethnicity by studying the skull's size and features. Some scientists study bones to find out about ancient cultures, while others study bones to uncover clues about the cause of death in criminal cases.

Key to plate

1: Adult skull

- a) From the front
- b) From the back
- c) From the base (without jaw): The large central hole in the base of the skull is called the foramen magnum. This is where the spinal cord comes out of the skull to travel down the vertebral column.
- d) From the side

e) Cross-section from the side:

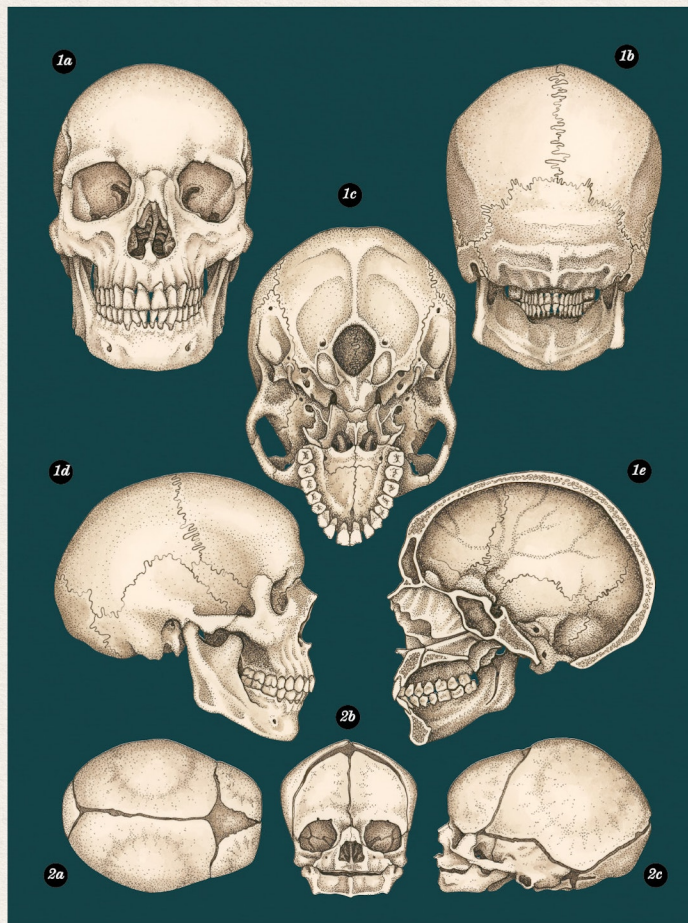
The space inside the skull where the brain sits is called the cranial fossa.

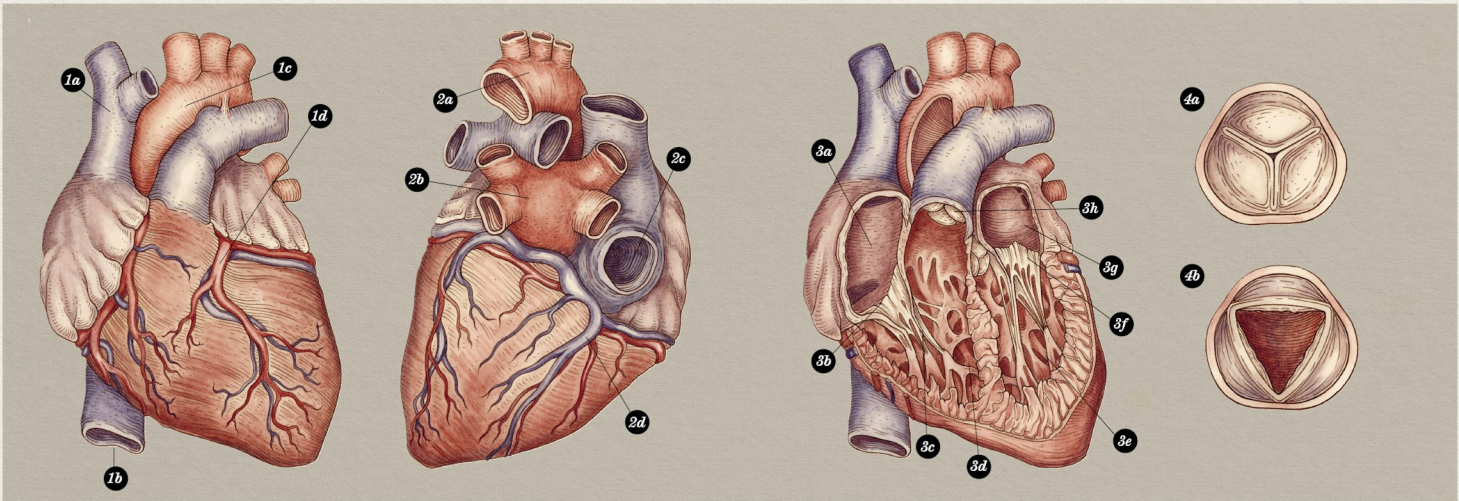
2: Newborn skull

The bones of an adult skull are fused together and cannot move, but in babies, these joints are made of more flexible material. These 'soft spots' mean the skull

can cope with the rapid growth of a baby's brain, from only about 350g at birth to nearly 600g in the first three months.

- a) From the top: The diamond-shaped area is the 'soft spot'.
- b) From the front: Infant skulls have a bigger forehead and a smaller jaw than adults' skulls.
- c) From the side: Note the large forehead and small jaw.





The Heart

The heart is the hardest working muscle in the body, beating over 100,000 times a day. It is only about the size of a fist and acts like two pumps. The right-hand side pumps blood towards the lungs, where it picks up oxygen. Oxygenated blood returns to the heart and the left-hand side pumps it on to the rest of the body. A thick wall called the septum divides the right and left sides and keeps the blood separate.

The pumping action of the heart is produced by cardiac muscle in its walls, which contracts to push blood from one side to the other. There are four chambers (areas) of the heart, which are split into two ventricles at the bottom and two atria at the top.

With each heartbeat, the two atria contract to push the blood inside

them down into the ventricles. Then the ventricles contract, which pushes the blood out of the heart and on to other parts of the body. The heart muscles relax and the chambers refill with blood, ready for the next contraction. One complete cycle of this pattern, or heartbeat, takes less than a second to occur.

Key to plate

1: Heart, front view

- a) Superior vena cava
- b) Inferior vena cava
- c) Arch of aorta
- d) Cardiac blood vessels supplying the wall of the heart

2: Heart, back view

- a) Arch of aorta
- b) Left atrium

- c) Entrance to right atrium via inferior vena cava
- d) Cardiac vessels draining the wall of the heart

3: Internal structure of the heart, front view

- a) Right atrium
- b) Tricuspid valve
- c) Chordae tendinae (heart strings)

- d) Right ventricle
- e) Left ventricle
- f) Mitral (bicuspid) valve
- g) Left atrium
- h) Pulmonary valve

4: Heart valves

- These control the flow of blood in and out of the heart.
- a) Closed
 - b) Open

Immune & Lymphatic Systems

The immune system is a collection of organs, tissues and cells that defend the body from harmful things. A key feature is the leukocyte (white blood cell), which attacks viruses and bacteria. It is found in the blood and in immune organs like the thymus, spleen, tonsils and lymph nodes. The largest of these organs is the spleen, which filters blood and makes leukocytes.

The lymphatic system is a large network of tubes, known as lymphatic vessels, and the lymph nodes. These are clumps of immune tissue in the neck, armpits and groin that act like sieves to filter out harmful things. The lymphatic vessels also mop up lymph, a watery substance that is squeezed out of the body's cells. Too much lymph would make parts of the body swell up, so the lymphatic vessels suck up any excess, clean it and empty it into large veins near the heart to be mixed with blood and pumped round the body.

Key to plate

1: Tonsils

Three sets of tonsils in the neck area help to fight infection.

2: Lymph nodes in armpit

These nodes are small collections of lymphoid tissue in the armpits, neck and groin region.

3: Thymus gland

The thymus gland sits in between the breastbone and the lungs. It is where special defence cells called T-lymphocytes mature.

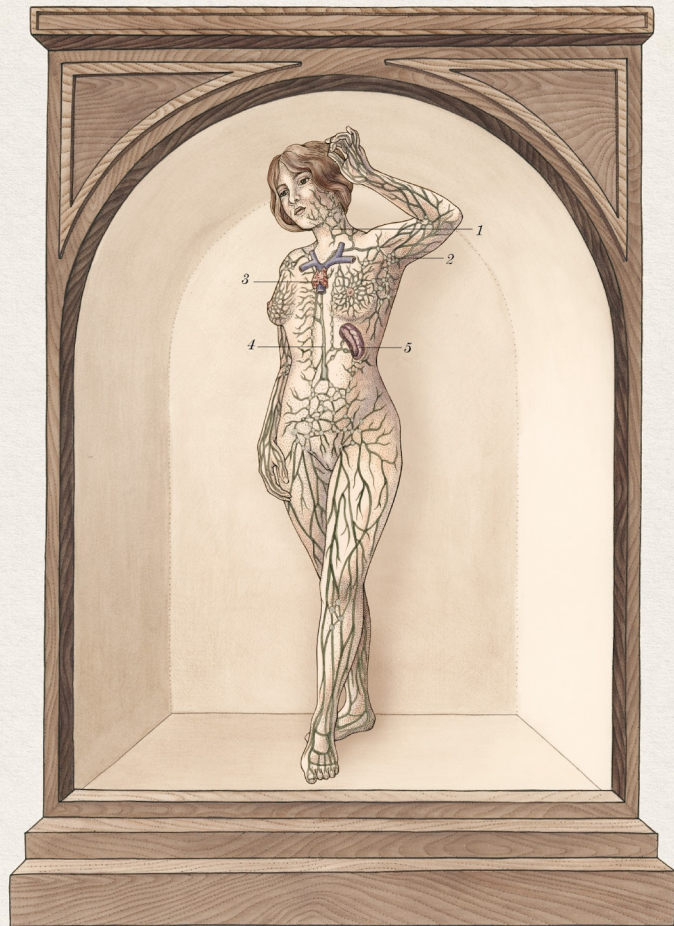
4: Thoracic duct

This is the largest of the lymphatic vessels in the body. It transports lymph from the

rest of the body to the veins near the heart, where the lymph returns to the blood as it circulates.

5: Spleen

A soft, dark-red organ shaped like a jellyfish. The spleen stores blood, filters it and makes white blood cells.



The Eyes

The eyes are a pair of ball-shaped organs, set within the skull in two spherical holes called orbits. Their job is to receive light and turn this information into electrical signals that the brain can understand as images.

Light enters the eye through a small hole called the pupil and is focused by the cornea, a clear shield that also protects the eye. Around the pupil is the iris, a ring of coloured muscle that gives eyes their colour and adjusts the size of the pupil. In bright light, the iris makes the pupil smaller, reducing the amount of light that can pass through. In low light, the pupil expands to let more light in. After light has entered the eyes it passes through the lens, which bends the light and focuses it onto the back of the eyeball.

The back of the eye is called the retina. It has millions of light-detecting sensor cells which translate light messages into electrical signals for the brain. These electrical signals are sent to the brain via an optic nerve at the back of each eye. The whole process happens in a fraction of a second.

Key to plate

1: Retina (back of the eye)

The sensory layer at the back of the eyeball containing the optic nerve, which links the eye to the brain.

2: Eye muscles

- a) Front view
- b) Side view

Three pairs of skeletal muscles attach to the outside of each eye, letting them move, roll and even cross.

3: Iris and pupil

The pupil is a hole in the centre of the iris, a ring of pigmented tissue. The pupil is where light enters the eye to travel towards the retina.

4: Inside the eyeball

- a) Cornea
- b) Iris
- c) Pupil
- d) Lens
- e) Vitreous humour: A clear,

gel-like liquid filling the eyeball

f) Retina
g) Optic nerve: This carries sensory information from the eye to the brain.

5: Tear production

- a) Tear (lacrimal) gland
 - b) Tear duct
- Eyelashes, eyelids and tear production all protect the eyes from damage.

