

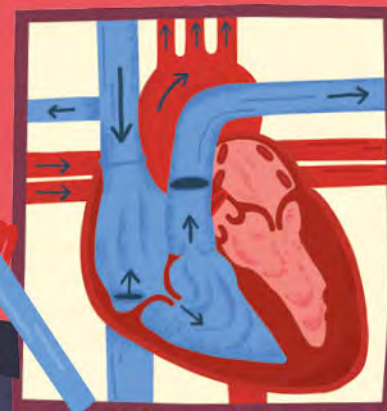
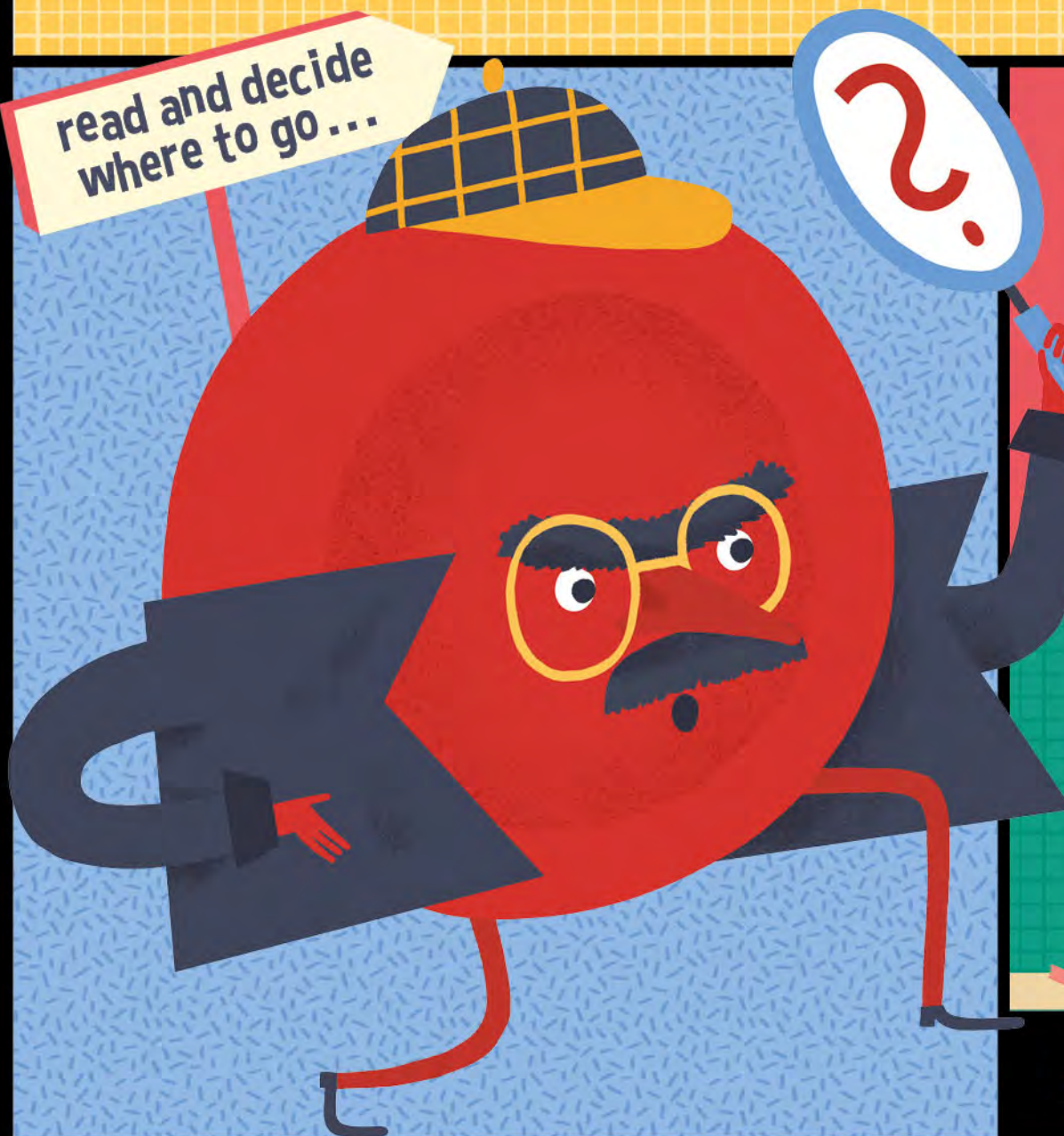
DETECTIVE

A JOURNEY THROUGH THE HUMAN BODY

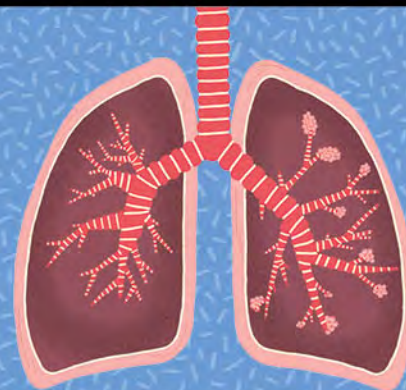
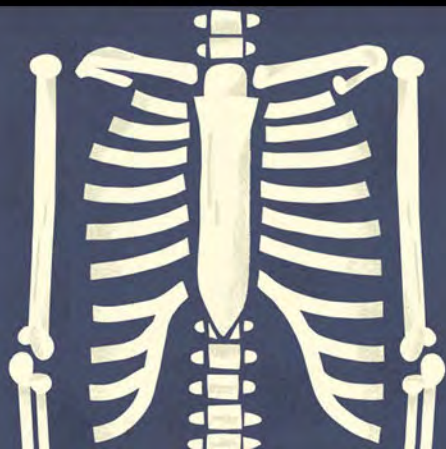
BLOODCELL

GAME
BOOK

read and decide
where to go ...



B4U PUBLISHING

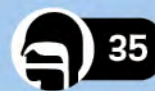




That's right, the body has really got going! When exercising, it uses a lot of oxygen and so needs to distribute it faster around the body. It also needs to take in more oxygen.

By following the loud sounds, we find ourselves at the entrance to the respiratory system—the nasal cavity. When you inhale, air enters the nostrils through this. Try it out for yourself.

Air doesn't hang around here for long, however. Where does it go on to?



35 the nasopharynx and the larynx



14 straight to the stomach



8 straight to the heart



That's right. Oh dear—I've found some here, look. A nice start to our journey through the digestive system!

What should we do about a tooth cavity?



34 go to a dentist



14 pretend we don't know it's there



13 go to a blacksmith



That's right. If you break a bone, your body immediately gets to work on its repair. First, it creates soft tissue that carefully joins the pieces of bone back together. This tissue will gradually turn into new, solid bone.

How long do we have to wait for a fracture to heal?



23

usually
2-3 days



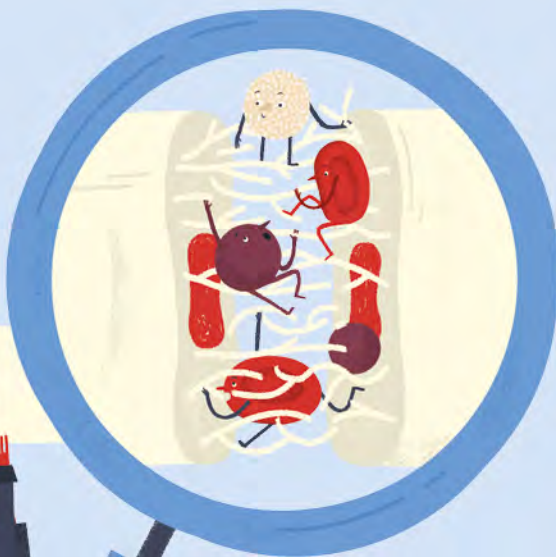
20

usually
6-8 weeks



32

usually
a year



Right! So let's move on to the liver. I blend in easily here—look how many red blood cells there are! Blood (mainly from the digestive system) is filtered in the liver. This is one of the liver's most important jobs.

What does the liver remove from the blood during filtration?



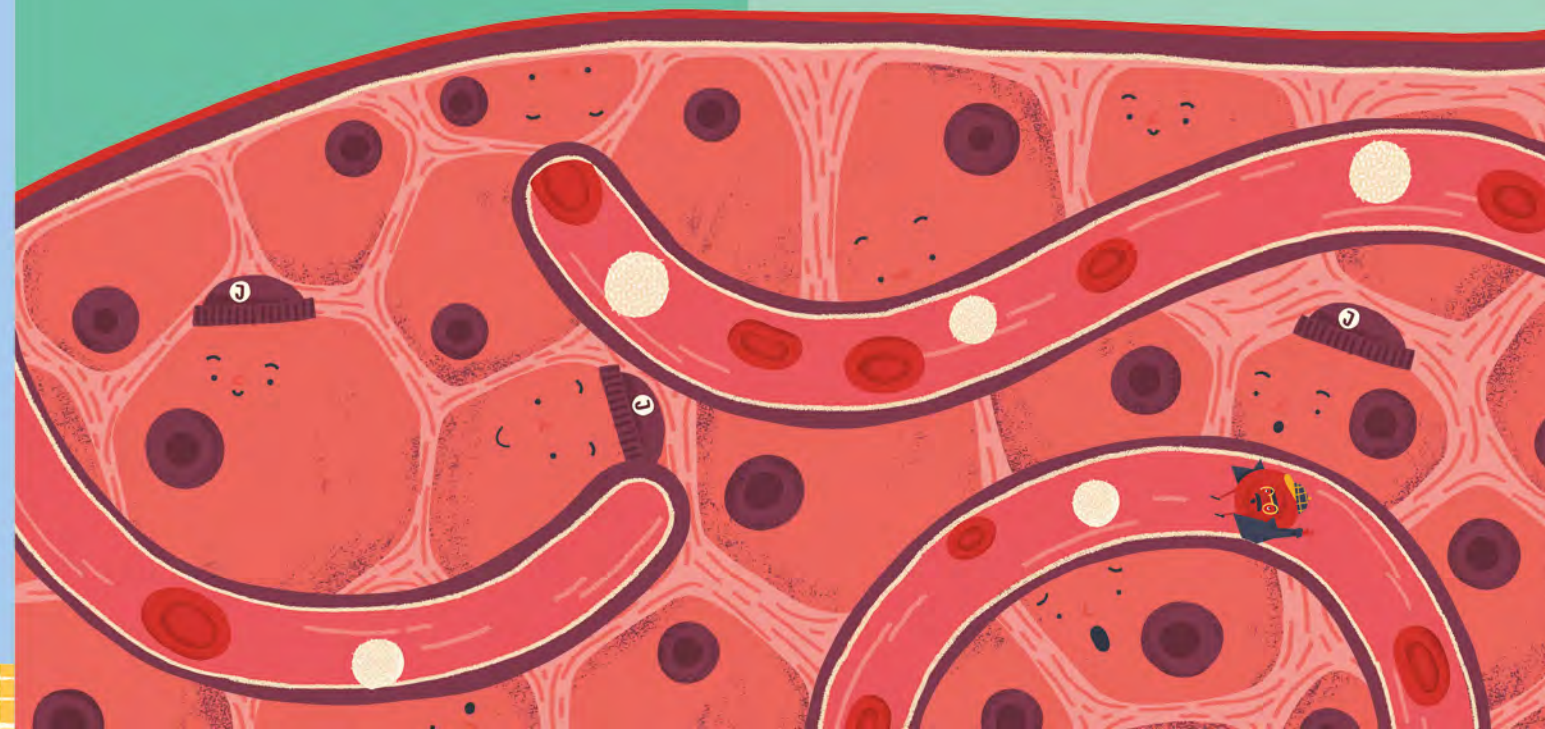
30

vitamins and
nutrients



11

toxins and
bacteria



Try again!
Go back to p. 37.



Try again!
Go back to p. 19.



Try again!
Go back to p. 15.



Try again!
Go back to p. 19.



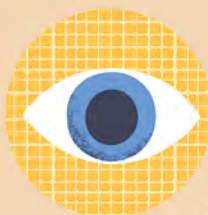
Try again!
Go back to p. 22.



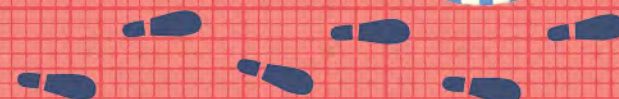
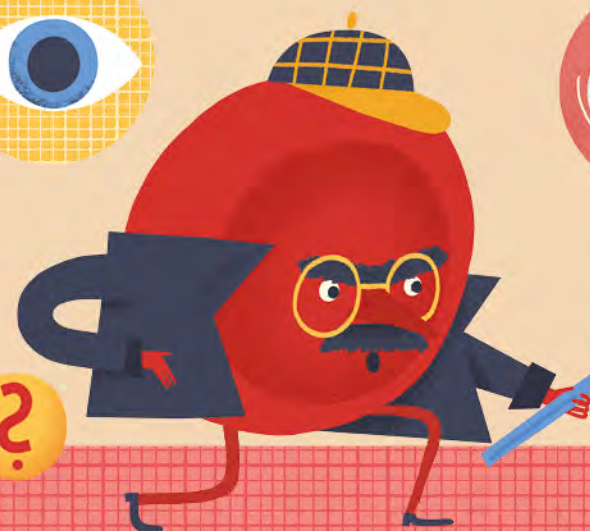
Try again!
Go back to p. 33.



What makes the human body work so perfectly? How can it manage so many complex tasks, day in and day out, without a break? Who makes all this happen? Despite my vast experience, this mystery continues to trouble and fascinate me. Every day I see billions of cells working flawlessly, organs performing their tasks tirelessly, systems running as if they are strangers to tiredness. I'm still looking for answers. Which is why I've invited you. I'll guide you through the human body. In return, you'll help me solve this puzzle. Okay?

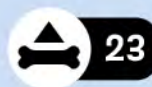


First, let us take a look at the location of our search on page ...



Precisely—the ear is made of cartilage. Unlike bone, cartilage can bend and return to its original shape. Try pressing on your nose. It doesn't stay flat, does it?

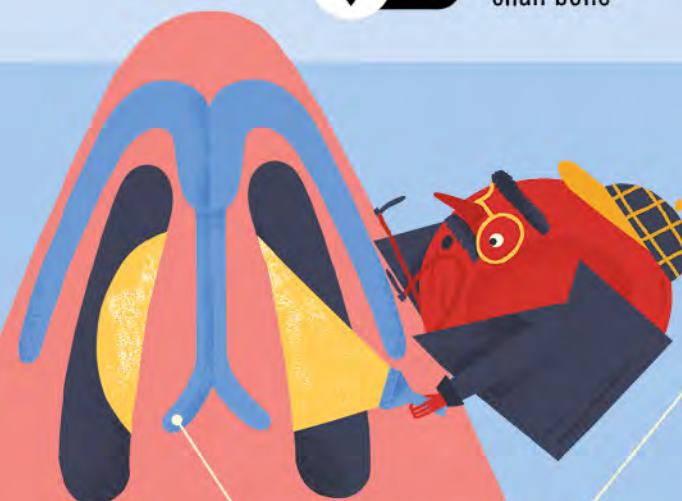
Because it has no blood vessels, when injured, cartilage ...



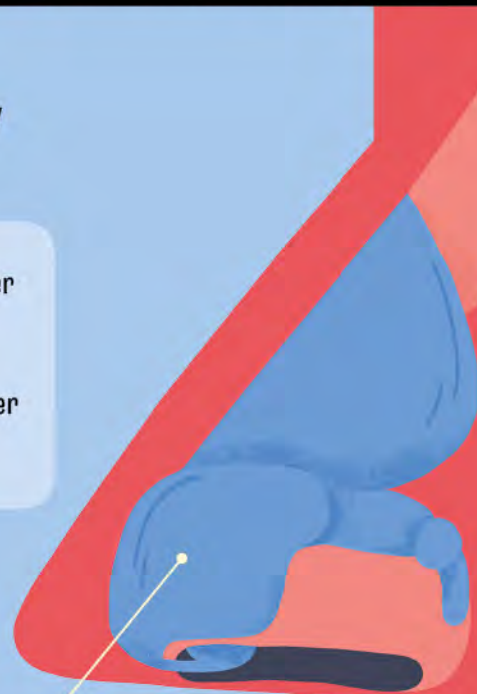
... heals much faster than bone



... heals much slower than bone



cartilage



I have a feeling in my bones that the solution to my mystery is in the skeletal system! We'll see ... Anyway, the skeletal system supports the entire body. It enables the body to stand, walk and sit, and it also keeps the internal organs safe. An adult body has about 206 bones. You, dear children, have even more. As you grow, some of them will fuse.

Imagine if you had no skeleton. What would you look like? A deflated, lumpy balloon? A flattened jellyfish?



The **spinal column** is a group of bones that runs from the head to the pelvis. It protects the spinal cord, an important part of the nervous system.

The **ribs** and **sternum** protect the heart and lungs, which are vital organs.

The **skull** protects the brain and shapes the face. If I had a skull, I'd be a handsome chap!

From here, I should go to the bone cells. What are they called?



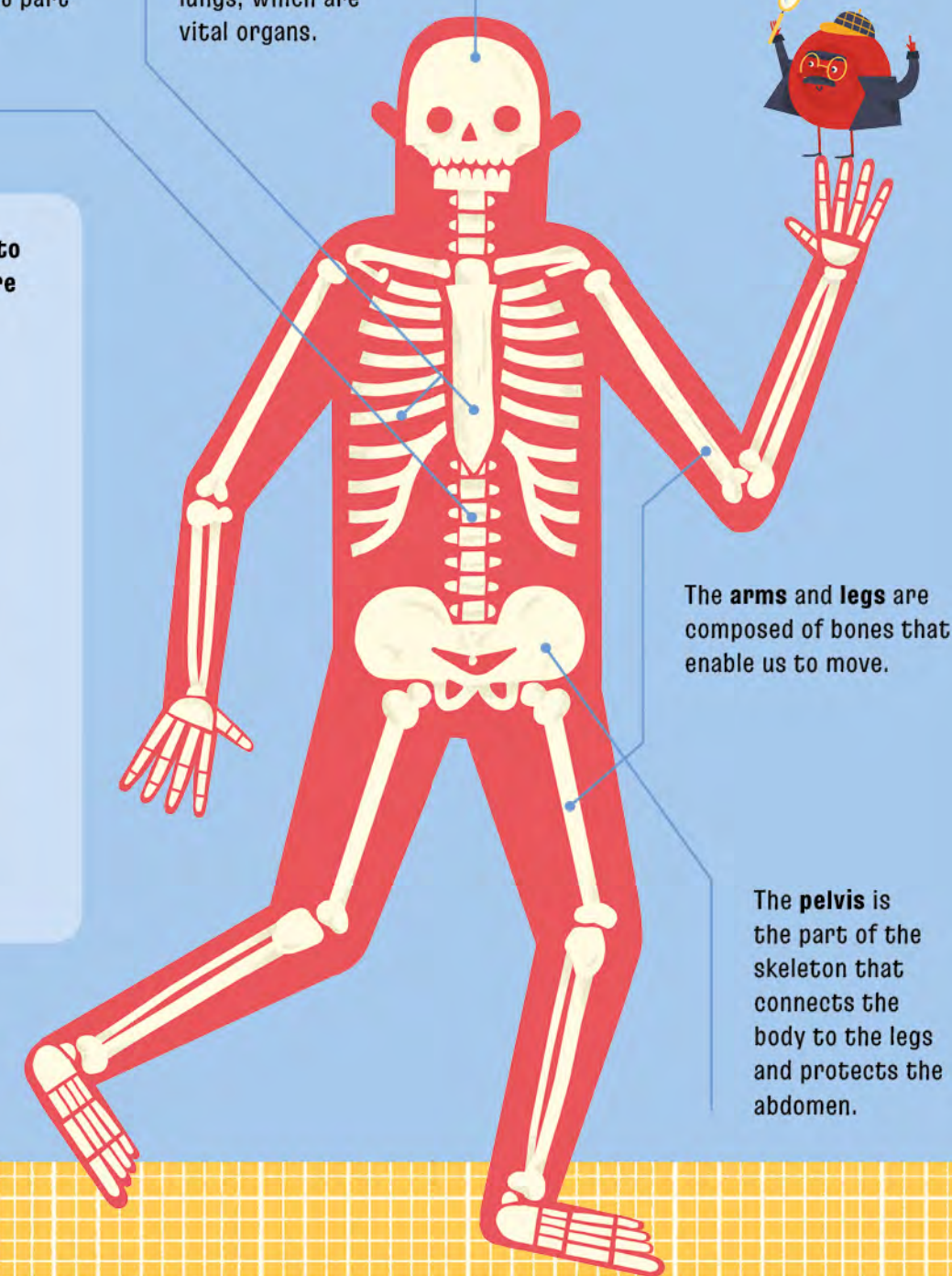
myocytes



osteocytes



hepatocytes



The **arms** and **legs** are composed of bones that enable us to move.

The **pelvis** is the part of the skeleton that connects the body to the legs and protects the abdomen.

Try again!
Go back to p. 32.



Try again!
Go back to p. 26.



Try again!
Go back to p. 6.



Try again!
Go back to p. 37.



Try again!
Go back to p. 39.



Try again!
Go back to p. 42.



That's right—the morsel goes into the oesophagus and then to the stomach. But it's still quite large. What happens next? Well, once again, we see how brilliantly the body works! In the stomach, acids (gastric juices) are waiting to break the morsel into tiny pieces.

How does the stomach cope with the formation of acids in it?

- 14 It is fully resistant to them.
- 42 It wears out quickly and works ever less effectively.
- 41 Its surface is renewed every 3 days.

It is fascinating how many organs medicine can now transplant! Unfortunately, the brain isn't among them. Even so, I would say that modern medicine can perform miracles.

As for the liver, could two people share one liver?

- 34 yes
- 24 no

Yes, the liver cells (hepatocytes) remove toxins and bacteria from the blood. The liver purifies blood that has already passed through the digestive system. As a result, dangerous and harmful substances ingested in food go no further in the body. Ingenious, right? Heave-ho! Wait, liver cells, I'll give you a hand!

By which route does blood from the digestive system reach the liver?

- 24 through the portal vein
- 27 through the digestive vein
- 15 directly through the walls of the stomach

hepatocytes

While we're on the subject of injuries, we may have brought one on! The white blood cells, along with the osteocytes, are on alert. It looks like the body has tripped and one of its bones might be broken!

How do we check this?

- 4 by touch
- 16 by X-ray
- 38 by ultrasound

Yes—the typical healthy adult has 32 teeth. So many teeth wouldn't fit in a child's mouth. The body solves this by giving children 20 milk teeth only. These start to fall out around the age of six, to be replaced by permanent teeth.

Are all the teeth in the mouth the same?

- 27 yes
- 26 no

Yes, in most cases, the two kidneys ensure that the fluids in the body function as they should. I say in most cases because a person can survive with only one. The kidneys perform many tasks. We already know that they obtain substances beneficial for the body from the fluids they take in. They also filter the blood (in this, they are in the same boat as the liver), maintain the balance of important substances in the body, and, most importantly, produce urine. Don't laugh! Without making urine, the body couldn't function. Urine excretes waste products from the body.

Where does urine go on to from the kidneys?

- 22 the small and large intestines
- 19 through the urethra to the bladder



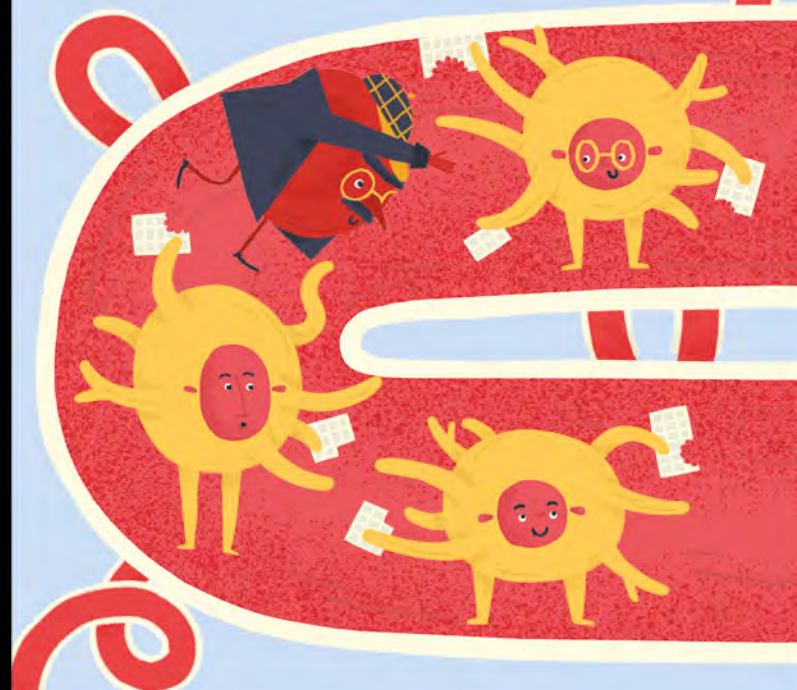
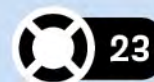


Phew! I always forget how incredibly ... fast ... white blood cells are ... I'm struggling to keep up. Can you beat me to them?

Hurry to p. 42!



You're becoming something of an expert! Yes, osteocytes are among the cells of bone tissue. Excuse me, colleagues, sorry to interrupt. Could you please help us get our bearings? Go to p. 23.



You probably know about X-rays because you've had one before. An X-ray machine uses invisible rays to create pictures of the inside of your body. These pictures help doctors see if any bones are broken.

X-rays penetrate fractures fully; we see them as:



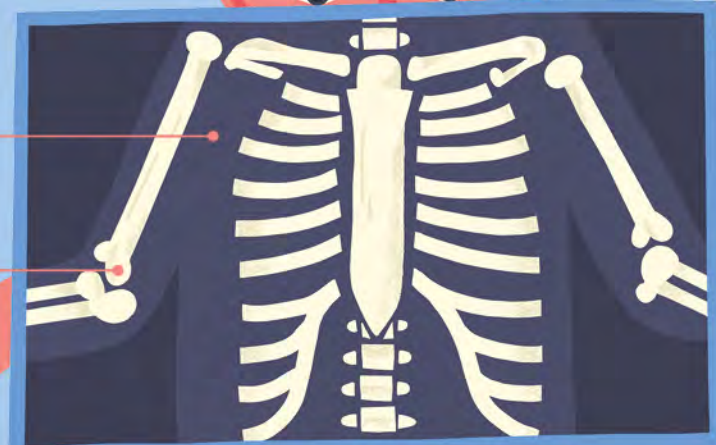
purple



black

X-rays penetrate muscle only partially; we see it as grey.

X-rays do not penetrate bones; we see them as white.

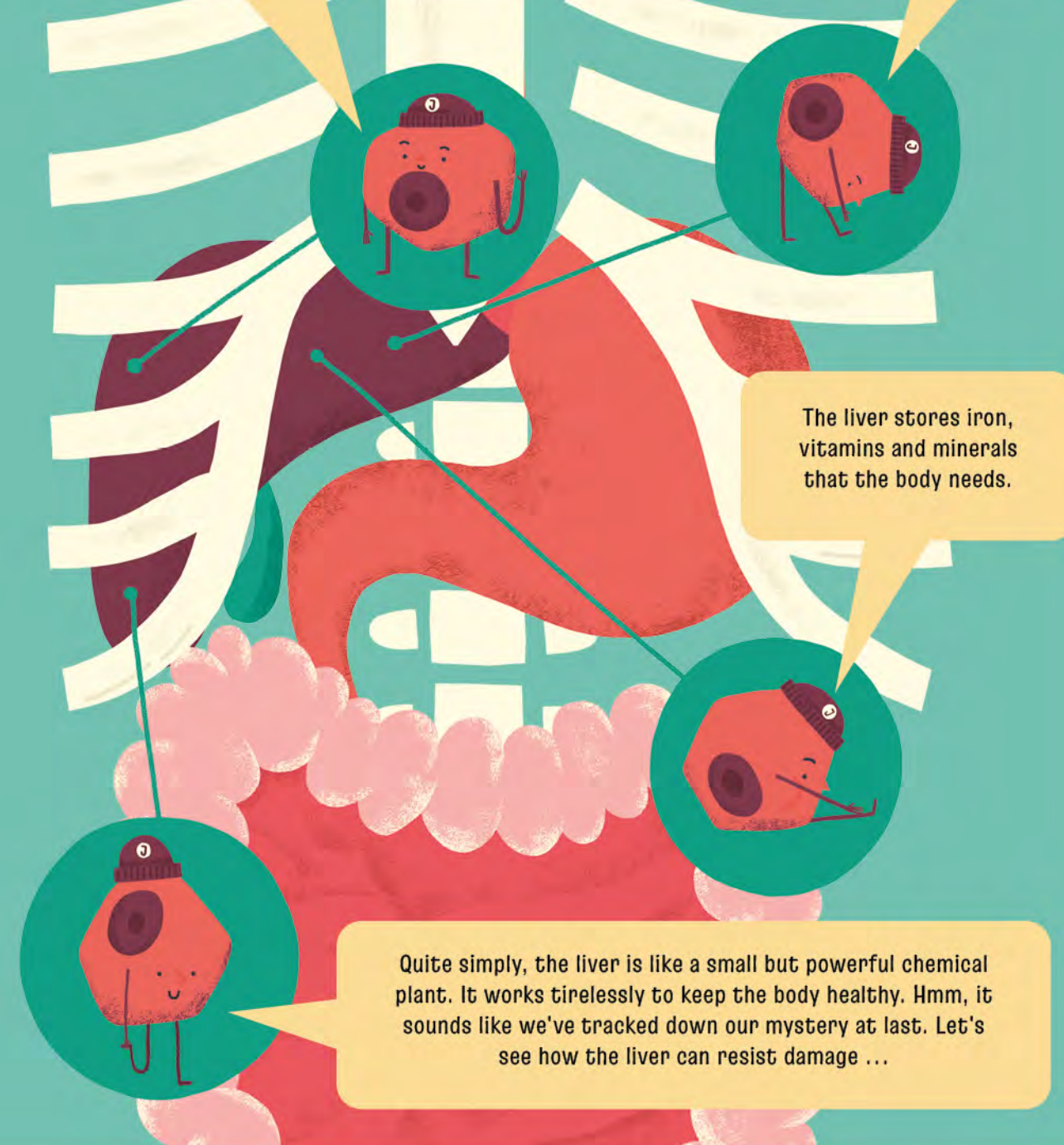


The liver is extraordinarily well protected because it has many important functions. You already know about filtration of the blood, but did you know that the liver also helps the digestive organs monitor levels of sugar, fat and protein? How very kind of it!

Bile, a fluid needed for digestion, is produced in the liver.

The liver stores iron, vitamins and minerals that the body needs.

Quite simply, the liver is like a small but powerful chemical plant. It works tirelessly to keep the body healthy. Hmm, it sounds like we've tracked down our mystery at last. Let's see how the liver can resist damage ...



A person must take care of their liver, of course—among other things, by keeping to a healthy diet. In particular, they should avoid which substance?



ethanol, which is contained in alcoholic beverages



coconut oil



glucose syrup



Fibrin, that's right. That was a quick fix! See how the platelets have sealed the crack in the blood vessel? Amazing! But you probably know as well as I do that the solution to my mystery is not to be found in the blood. Blood serves the entire body, responding to the needs of its parts. Thank you, kind platelets, for your great work, but now we must move on.

What's that? I hear strange sounds that make my blood run fast. Oo, the current is taking me away! What's happening?



6
the body is exercising



42
the body is sleeping



That's right—it takes several weeks for a fracture to heal, even with everyone trying their best. This isn't good news for our search: nor here will we find a perfect guide to the whole body. I'm not running out of ideas yet, though. We're lucky enough to have a few routes across the body still waiting for us. Let's gather new strength for this. We need to take on new energy.



What do you think is the fastest way for the body to get energy?



31 from food



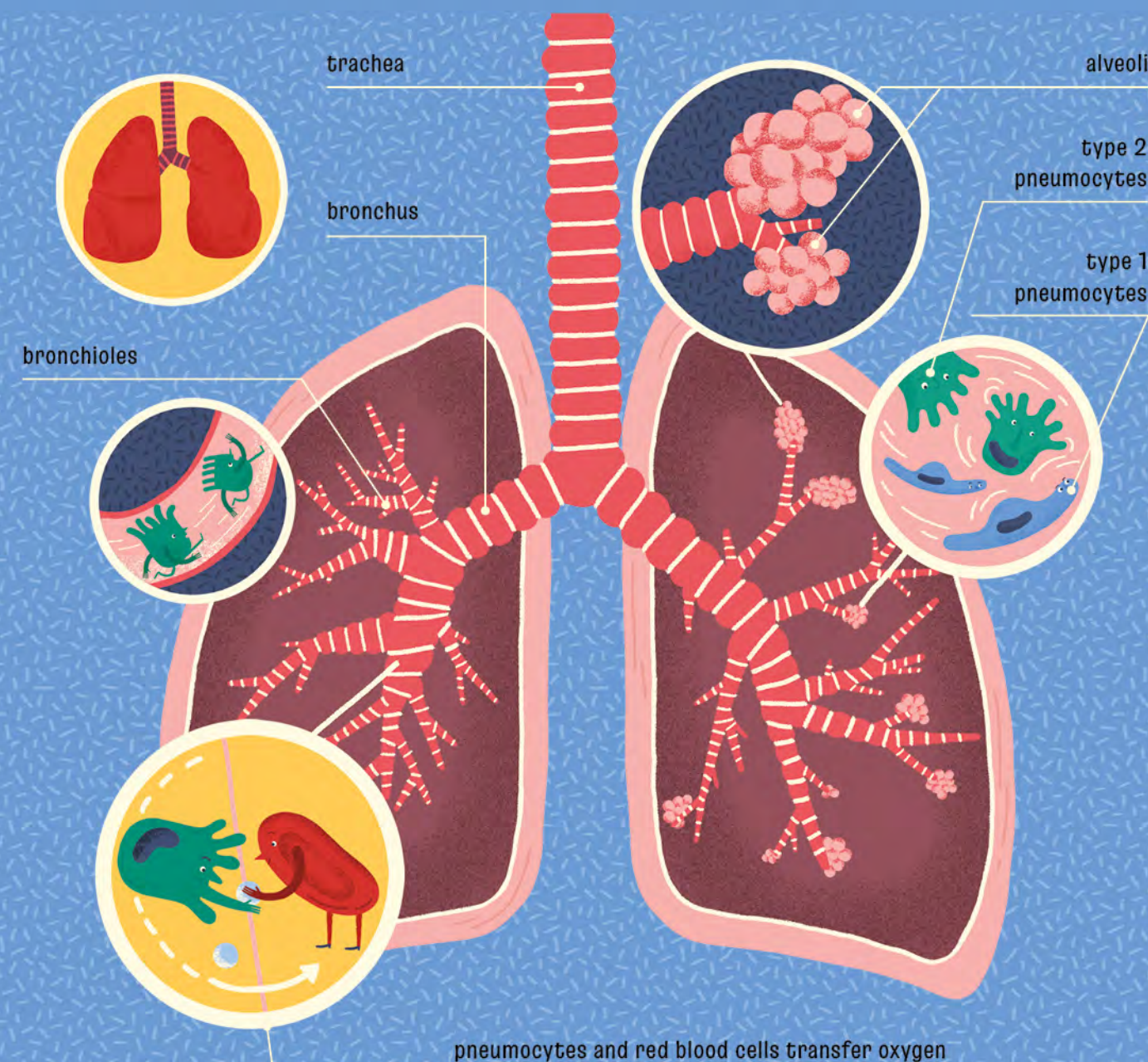
33 from drink



4 from sleep



That's right, the lungs. Let's have a look around. Hopefully we can solve our acute problem here. Lungs comprise two sacs fed by a network of gradually branching tubes called bronchi and bronchioles. These carry air from the upper respiratory tract to the lungs. The lung sacs themselves consist of millions of tiny alveoli, chambers surrounded by a network of blood vessels. It is here that blood cells take in oxygen and give off carbon dioxide.



Hmm ... These colleagues of mine are known as **pneumocytes**, and they are lung cells. They are responsible for the transfer of oxygen and carbon dioxide between the lungs and the blood. If the blood isn't getting enough oxygen, the problem must be here ... Is something wrong, friends? Do you need help? I see you working tirelessly and flawlessly. Could it be at last that ...

What's happening?



24 The body is overtired, no longer receiving oxygen and dying.



4 As the person runs, the muscles are consuming more oxygen than the blood cells can deliver.



Try again!
Go back to p. 5.



Try again!
Go back to p. 28.



Try again!
Go back to p. 41.



Try again!
Go back to p. 32.



Try again!
Go back to p. 30.



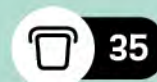
Try again!
Go back to p. 12.





You're right—teeth differ depending on their job. They became specialists in prehistoric times. Do you brush your teeth regularly? You really should, you know. Many parts of the human body renew themselves over time, but your permanent teeth must stay with you for the rest of your life ...

What do we call the tooth damage that often results from inadequate cleaning?



35

a filling



7

a cavity



40

chipping



That's right, we're nephrons. There are between one million and one and a half million of us in each kidney. Our job is to filter blood from the bloodstream by extracting important substances and removing waste. And because it is important which fluids the body receives, we take care that water, ions and other substances are in balance.

What should be our main source of fluids?



8

juices



13

tea and coffee



38

water



Yes, and this lack can lead to anxiety, feelings of sadness, and other mood disorders, as the body can't process the signals giving the person reasons to be happy. A disorder is nothing to be ashamed of, however, and nowadays it can usually be treated by a doctor.

Watch out! A tennis ball is flying straight at us! What are you going to do about it, dear nervous system?



33

It will send a signal to the brain that the ball needs to be caught or dodged.



13

It can't process information that quickly, so the ball will hit us.



This is what the **human body** looks like. Take a good look at its organs and systems (we couldn't fit them all in here): we'll be going into them soon. Which will reveal the perfect workings of the body?

Digestive system

mouth

oesophagus

liver

stomach

large intestine

small intestine

Muscular system

How will we move through the body to reach all its parts?



39

We will swim through the bloodstream.



25

We will walk from bone to bone.



31

We will use bacteria as vehicles.

Nervous system

brain

spinal cord

Respiratory system

upper respiratory tract

lungs

Circulatory system

arteries

veins

heart

Urinary system

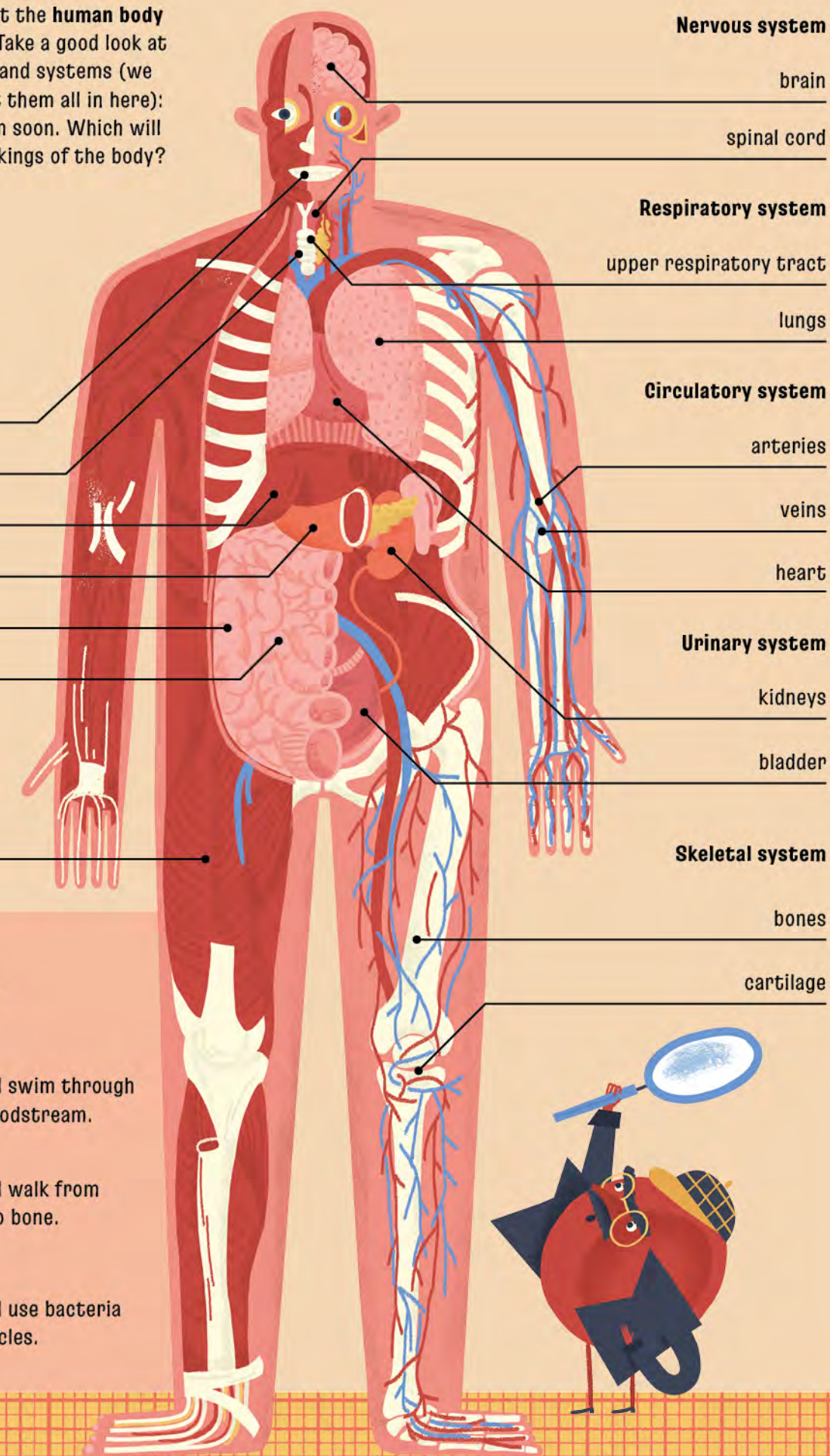
kidneys

bladder

Skeletal system

bones

cartilage





You're right! After the long, fascinating journey through the entire human body that you and I have undertaken, I have at last made my fundamental discovery! It seems that you have too. I now know that the answer and entire solution to our mystery is **COOPERATION**. Cooperation! Simple, right? Yet it took me so long to figure it out ... The perfect functioning of the body is provided for by the interplay of all its organs and systems. You surely want at least one more question. So let's put your newly acquired knowledge into practice.



Where do you think I'm going next?



to the liver



to the lungs



to the brain

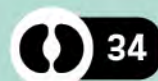


That's right. To fight bad bacteria, the body must recruit more good bacteria. This is easiest done through a proper diet, which is found in sour milk-based products, fermented and fresh vegetables and fruit, whole-grain bread, yeast, and pulses.

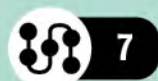
The digestive system has so much work to do! Its metaphorical shoulders seem to bear responsibility for the health of the entire body, which sounds like a chore. Fortunately, the stomach and intestines have a helper on whom they can rely.



Who is it?



the kidneys



the liver



You're right, of course—the body takes energy from food. Food passes through the digestive system, where a lot happens to it.

Food enters the body through the **mouth**.

Then the body mixes and breaks it down in the **stomach** ...

... before finally it passes into the **intestines**, where the necessary nutrients are absorbed.

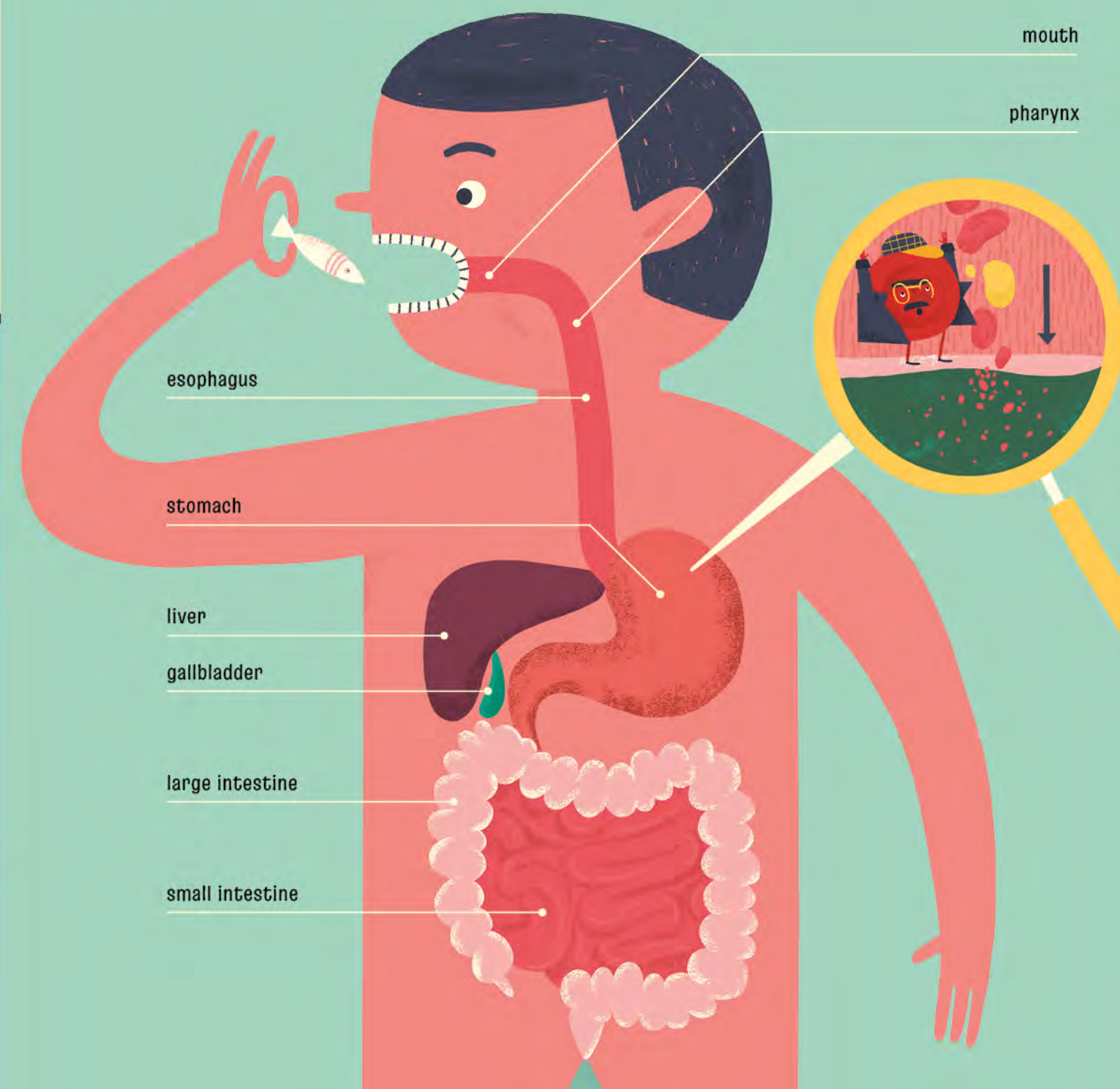
What the body doesn't need, it **excretes** as waste.

Did you know that the digestive system is up to 8 metres long? We're in for quite a ride, like on a helter-skelter! In the process, maybe we'll find the solution to our mystery ...

Let's go to page 41.



41



mouth

pharynx

esophagus

stomach

liver

gallbladder

large intestine

small intestine



Try again!
Go back to p. 24.



Try again!
Go back to p. 27.



Try again!
Go back to p. 35.



Try again!
Go back to p. 34.



Try again!
Go back to p. 33.



Try again!
Go back to p. 7.



DETECTIVE BLOODCELL:

A JOURNEY THROUGH THE HUMAN BODY

Written by Tereza Kubíčková and Helena Haraštová

Illustrations by Marie Urbánková



Detective Bloodcell is no ordinary detective. He will guide you through the entire human body during his investigation! However, you will need your own sharpness and wit, because you will only be able to read the whole book if you answer the detective's tricky questions correctly. Only the correct answers will show you the way forward. An encyclopedia about the human body has never been so entertaining, and learning about individual cells, organs, and their functions has never been so playful and fun!



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