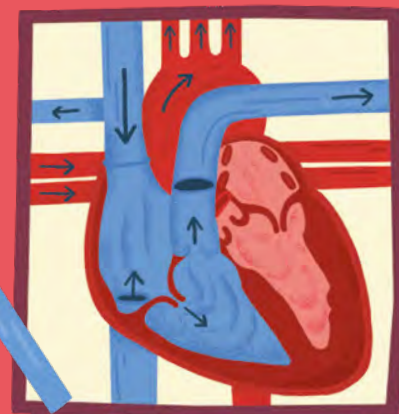
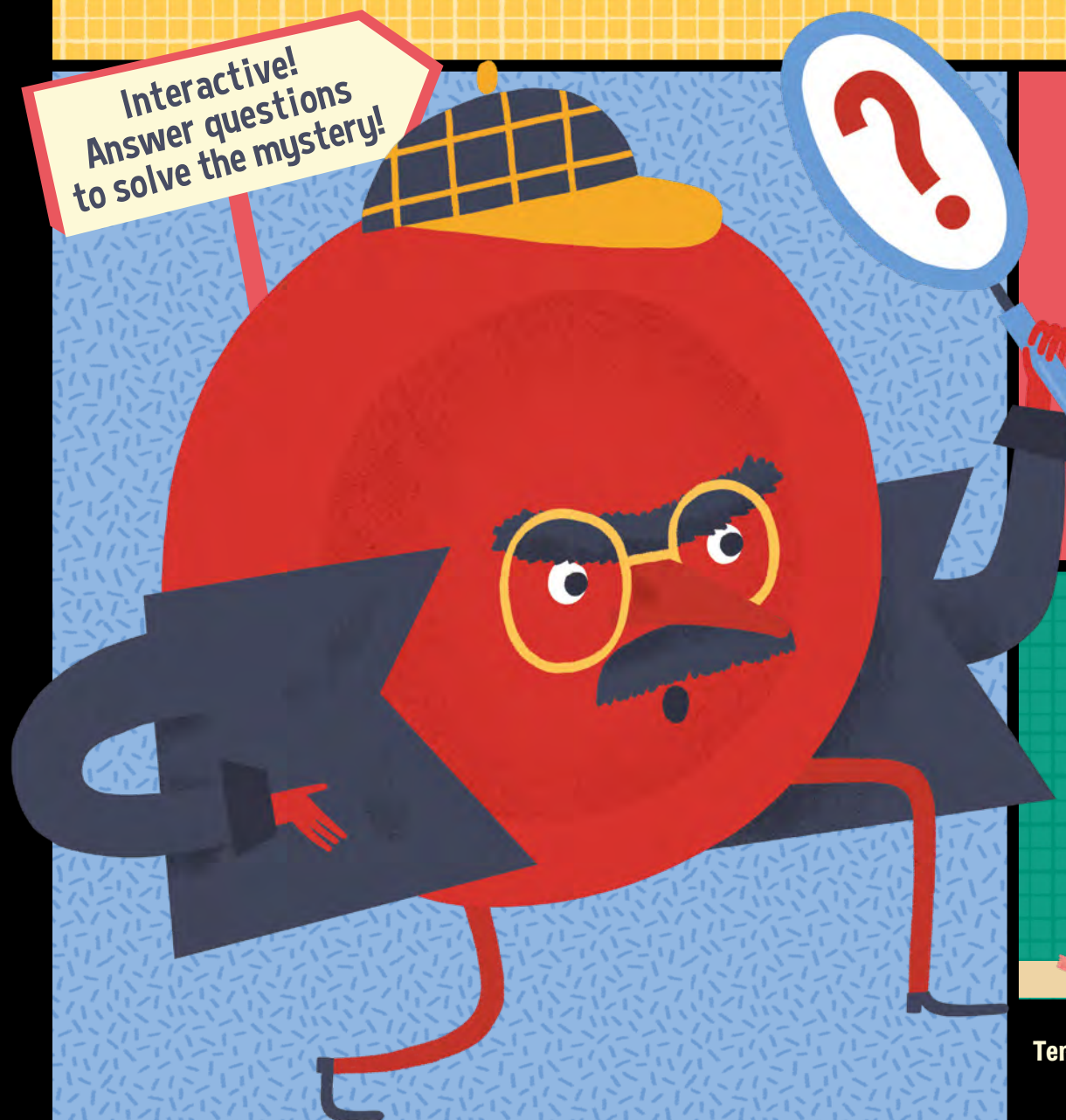


DETECTIVE

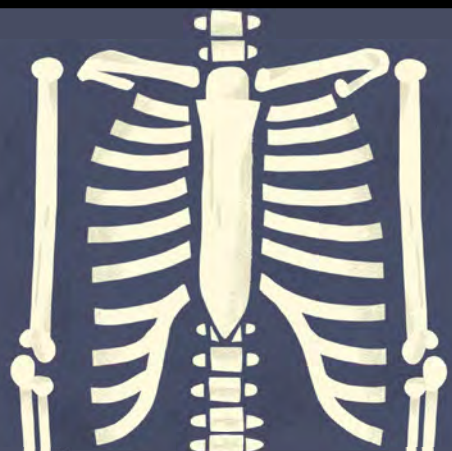
A JOURNEY THROUGH THE HUMAN BODY

BLOODCELL

Interactive!
Answer questions
to solve the mystery!



Tereza Kubíčková and Helena Harašťová
Illustrated by Marie Urbánková



Dear reader,
The book you're holding is more than just some old encyclopedia of the human body. It's a winding journey through a great mystery, the success of which depends entirely on your powers of perception and decision-making ability.

The journey begins at the top of page 3. There you will meet the famous Detective Bloodcell, who, being a red blood cell, can move freely throughout the human body.

This book can't be read sequentially, from beginning to end. You'll have to jump from page to page, guided by the correct answers to a series of questions. **Each box in the story will guide you forward.**

If the box you're reading contains a question, only the correct answer will show you where to go next. A possible answer may look like this:

**15**

liver

If you think this is the correct answer, then you will need to turn to the page marked in the black tag (in this case, 15) and find the symbol shown in the white circle (in this case, a spiral).



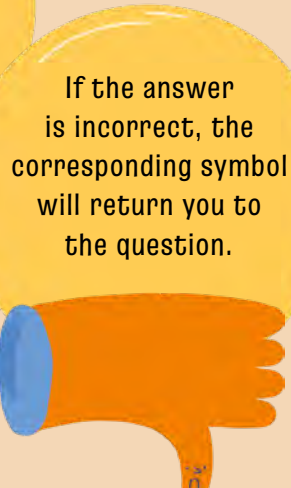
Welcome, dear reader!
I'm Detective Bloodcell.
Whenever a mystery arises in the human body, I take on the case. No clue gets past me! I get to the bottom of everything. You may have heard about how I cracked the case of the lost gallstone—or about my many brilliant solutions to unexplained infections and puzzling bruises. But there's one mystery that still keeps me up at night. **Join me on page 8 to find out more.**

**8**





If you have answered correctly, continue reading.



If the answer is incorrect, the corresponding symbol will return you to the question.

Keep trying until you get the correct answer. Good luck!



 Excellent! The liver can't handle large quantities of alcohol. The body may forgive the occasional drink, given its amazing ability to regenerate, but long-term overuse of alcohol causes inflammation of the liver, possibly leading to irreversible scarring (called *cirrhosis*), which can lead in turn to the loss of this valuable organ.



Which other habits are harmful to the liver?

**18**

smoking and eating a lot of fatty foods

**28**

frequent air travel

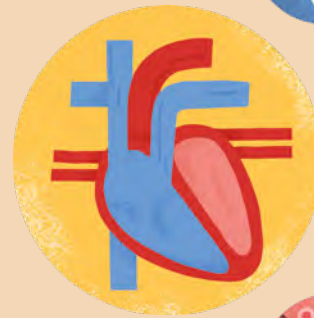
**19**

swimming in chlorinated water

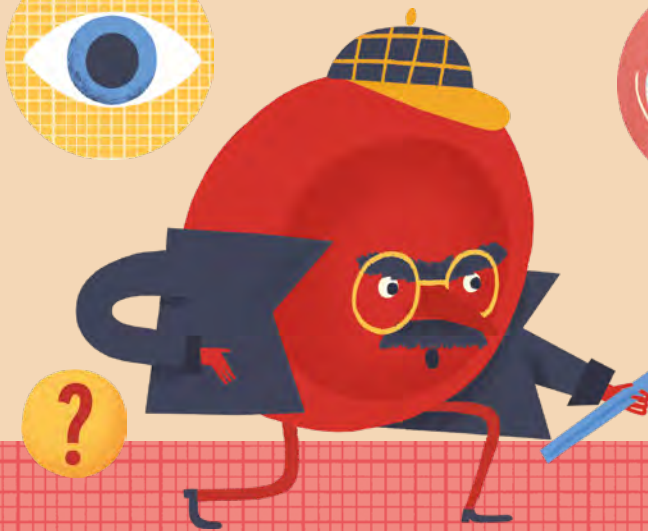


What makes the human body work so perfectly? How can it manage so many complex tasks, day in and day out, without a break? What do all the different body parts do? Despite my vast experience, these questions continue to intrigue me.

Every day, I see billions of cells working in harmony, organs performing their tasks tirelessly, systems running smoothly, without fail. But how? I'm still looking for answers, which is why I need your help. I'll guide you through the human body. In return, you'll help me solve this great mystery. Deal?



Our journey starts with an overview of the body. Head to page . . .



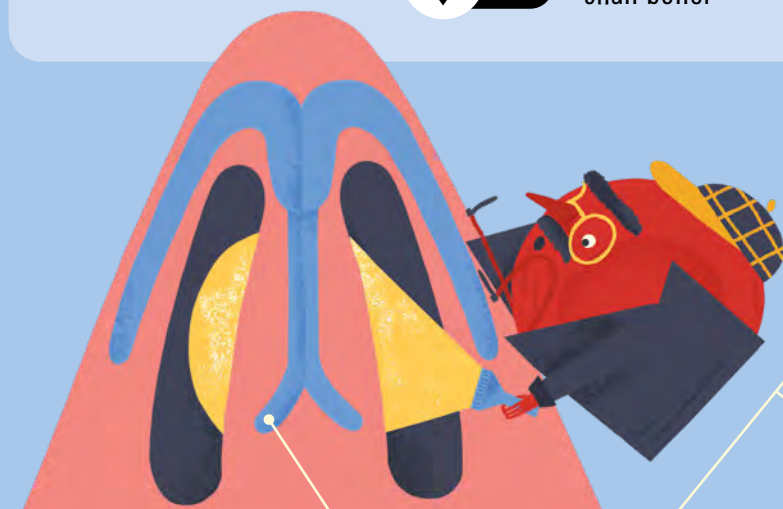
Precisely! The ear is made of **cartilage**. Unlike bone, cartilage can bend and return to its original shape. Try smushing the tip of your nose, which is also made of cartilage. It doesn't stay flat, does it?

Because it has no blood vessels, cartilage:

23 heals much faster than bone.

10 heals much slower than bone.

cartilage



The solution to our mystery must be close. I can feel it in my bones! The skeletal system supports the entire body, enabling it to stand, walk, and sit while also keeping the internal organs safe. An adult body has about 206 bones.

Children's bodies have even more. As they grow, some of their bones fuse together.

Imagine 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 gives shape to the face. If I had a skull, I'd be even more handsome!

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



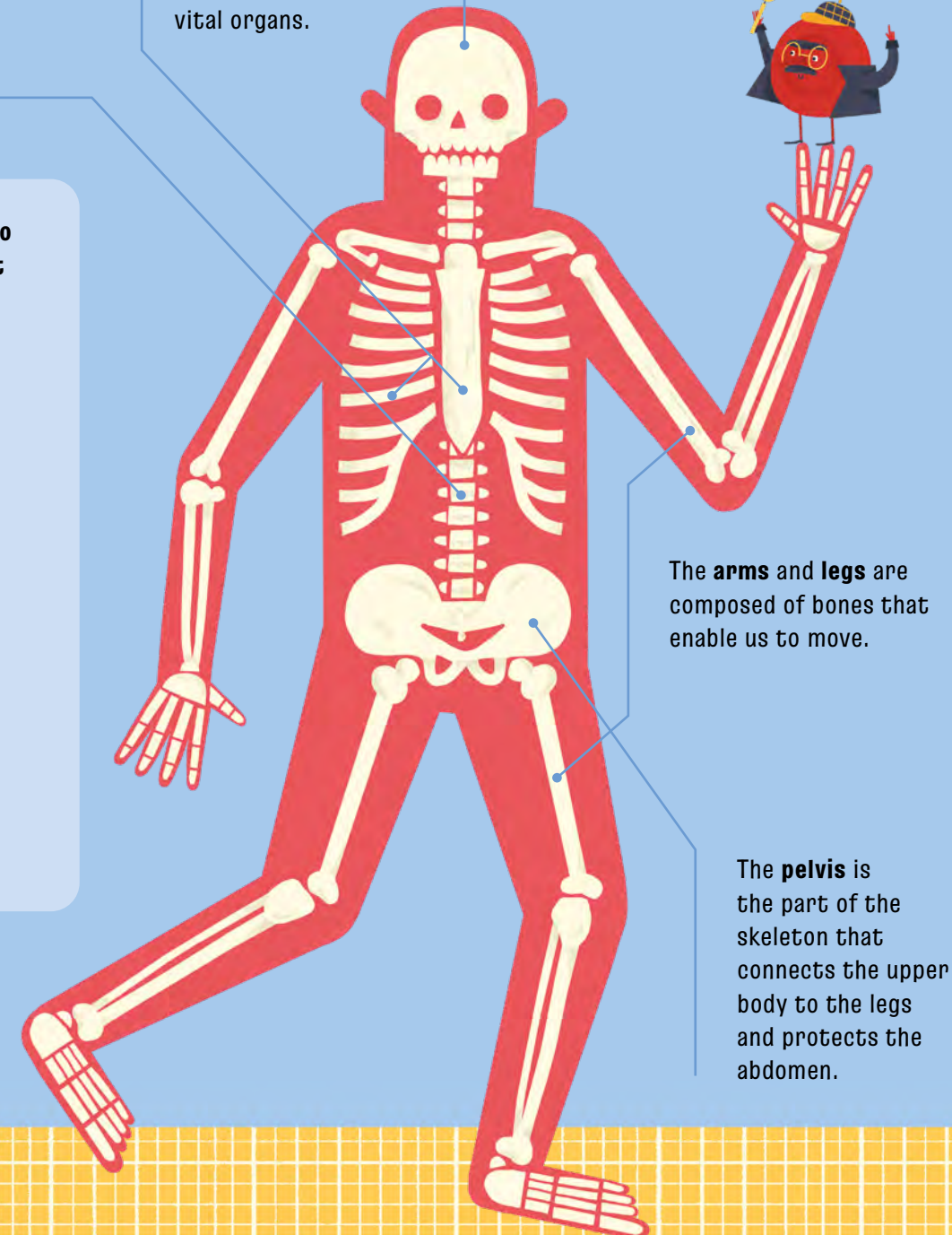
myocytes



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 upper body to the legs and protects the abdomen.





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

Hurry to p. 42!



You're becoming something of an expert! Yes, osteocytes are the most common cells in bone tissue. Excuse me, friends! Sorry to interrupt, but could you please help us get our bearings? Go to p. 23.



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? Isn't that nice of it?

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

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

Basically, the liver is like a small but powerful chemical plant, working tirelessly to keep the body healthy. Have we tracked down our answer at last? Is the liver the reason for the body's incredible harmony? Let's see how it withstands damage.



A person must take care of their liver by maintaining a healthy diet, among other things. Which substances in particular should be avoided?

ethanol, which is contained in alcoholic beverages



coconut oil



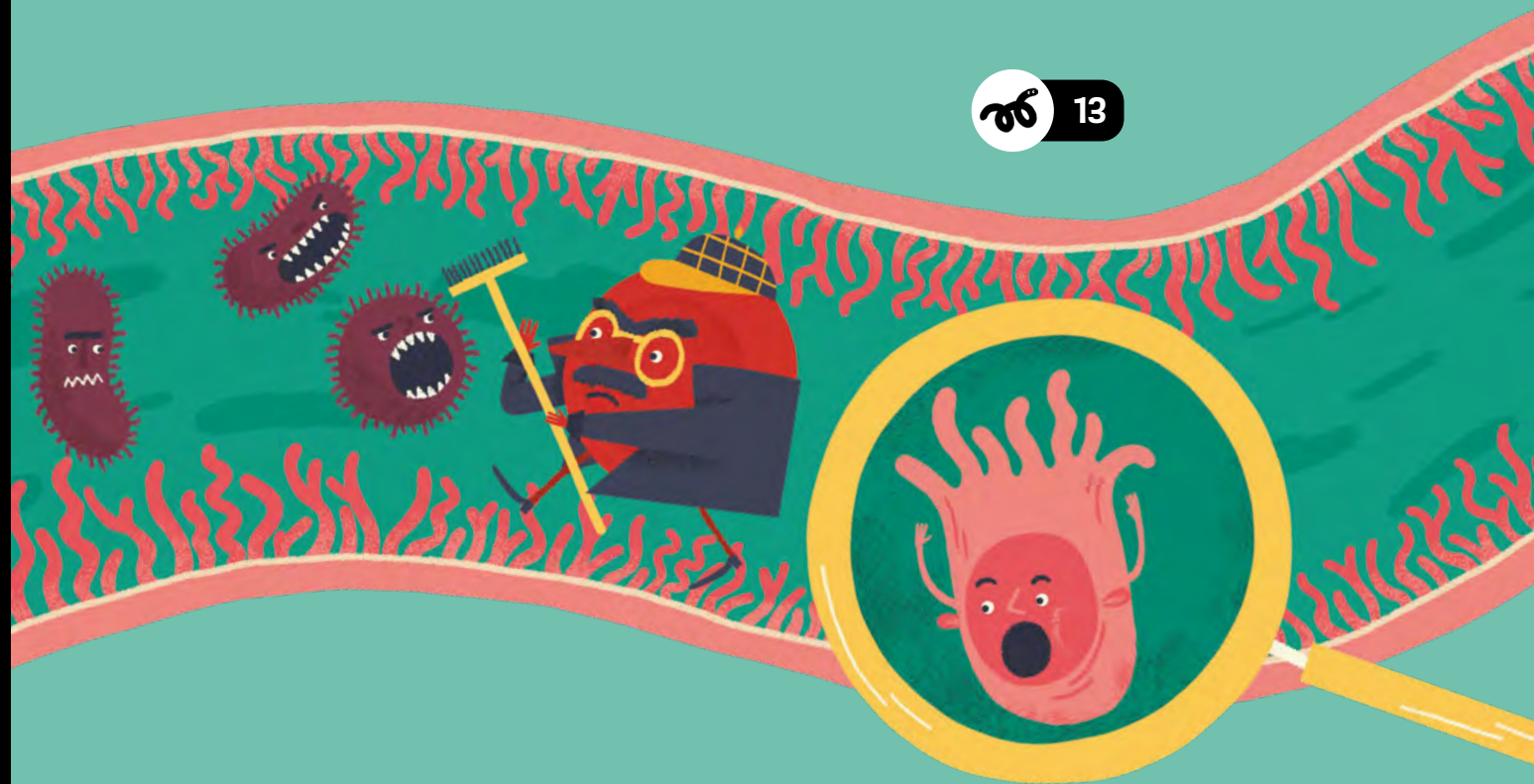
glucose syrup





Yes, the intestines are about 25 feet long, 20 feet of which are the small intestine. But wait—what's going on? Red alert! The enterocytes lining the intestinal wall are calling for help! An unhealthy diet is causing bad bacteria to spread through the intestines! We have to catch them before they do any damage! **Hurry to p. 13!**

13



Easy, right? Urine, produced in the kidneys, travels through the urethra to the bladder, where it waits until the bladder is full. Only then is it excreted from the body. Have you ever, dear reader, been afraid that you won't make it to the toilet in time?

When that happens, what's the risk?

15

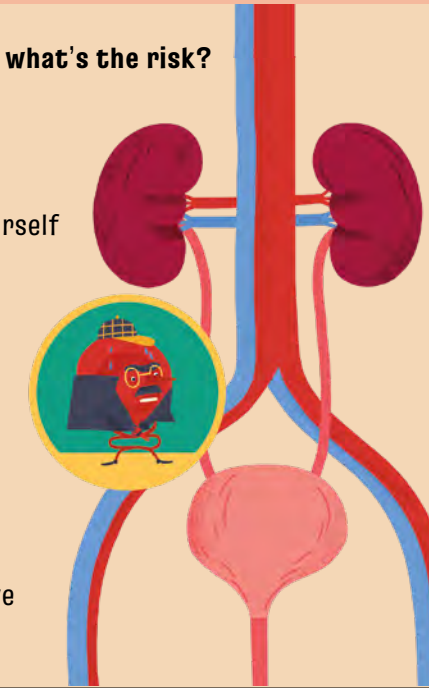
that you will wet yourself

5

that your bladder will burst

25

that you will just have to put up with it



That's right. The body feels so much better when it gets enough water! And the water flow takes us all the way to the kidneys. That's handy—we haven't searched here yet. Oh, hello! Who are you all? No offense, but you look a little like silly straws!

Of course! I should've known! You're kidney cells! You're also called:

26

nephrons

6

freons



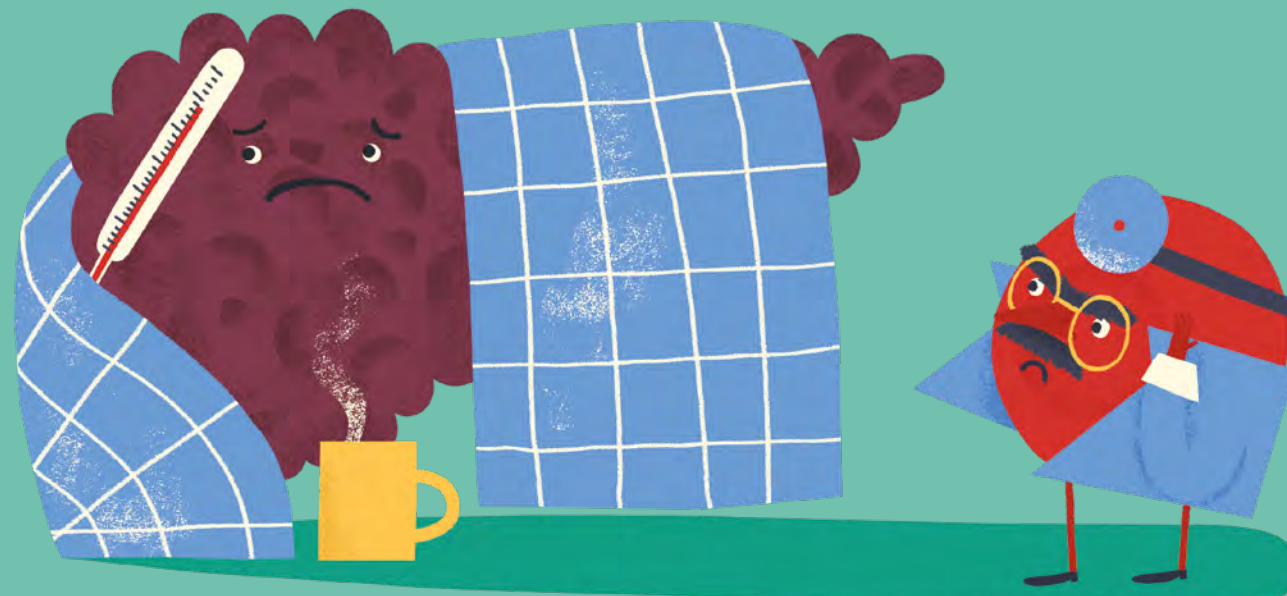
In addition to alcohol, the liver is sensitive to excessive fat intake and smoking, which can also cause it significant damage. And here's the problem, dear reader: Once the liver is permanently damaged (usually after long-term stress, though the culprit could also be an infection or immune disorder), **the body has only one option:**

28

to take medication, as even an irreversibly damaged liver can easily be renewed

37

to replace the damaged liver with a new one



That's right. But the body also has conditioned reflexes, which are learned over time and strengthened by regular repetition. They can also weaken or fade entirely if the signals that trigger them stop appearing. For instance, a person's heart may race when they see a swimming pool if they almost drowned in one years earlier, or a person could start salivating when they catch a whiff of their favorite food.

Reflexes are great because they make the body react instantly. Most of the time, people don't act reflexively. Instead, they think through their actions ahead of time, and this thinking happens in the brain.



Which vital body part connects commands from the brain to nerves in the body?

7

the stomach

35

the vertebrae

29

the spinal cord



Fibrin, that's right. See how the platelets sealed the crack in the blood vessel? Amazing! But you probably suspect, as I do now, that the solution to our great mystery won't be found in the blood. Blood serves the entire body, responding to the needs of all its parts. Thank you, kind platelets, for your work, but now we must move on.

What's that? I hear a strange sound. Oh, the current is carrying me away! What's happening?



The body is exercising.



The body is sleeping.



Correct! It takes several weeks for a fracture to heal, even under the best circumstances. I think we've seen enough to know that the answers to our questions won't be found here. But I'm not out of ideas yet! There are still other areas to take our investigation. We *will* discover what makes the whole body work so perfectly together!



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



from food



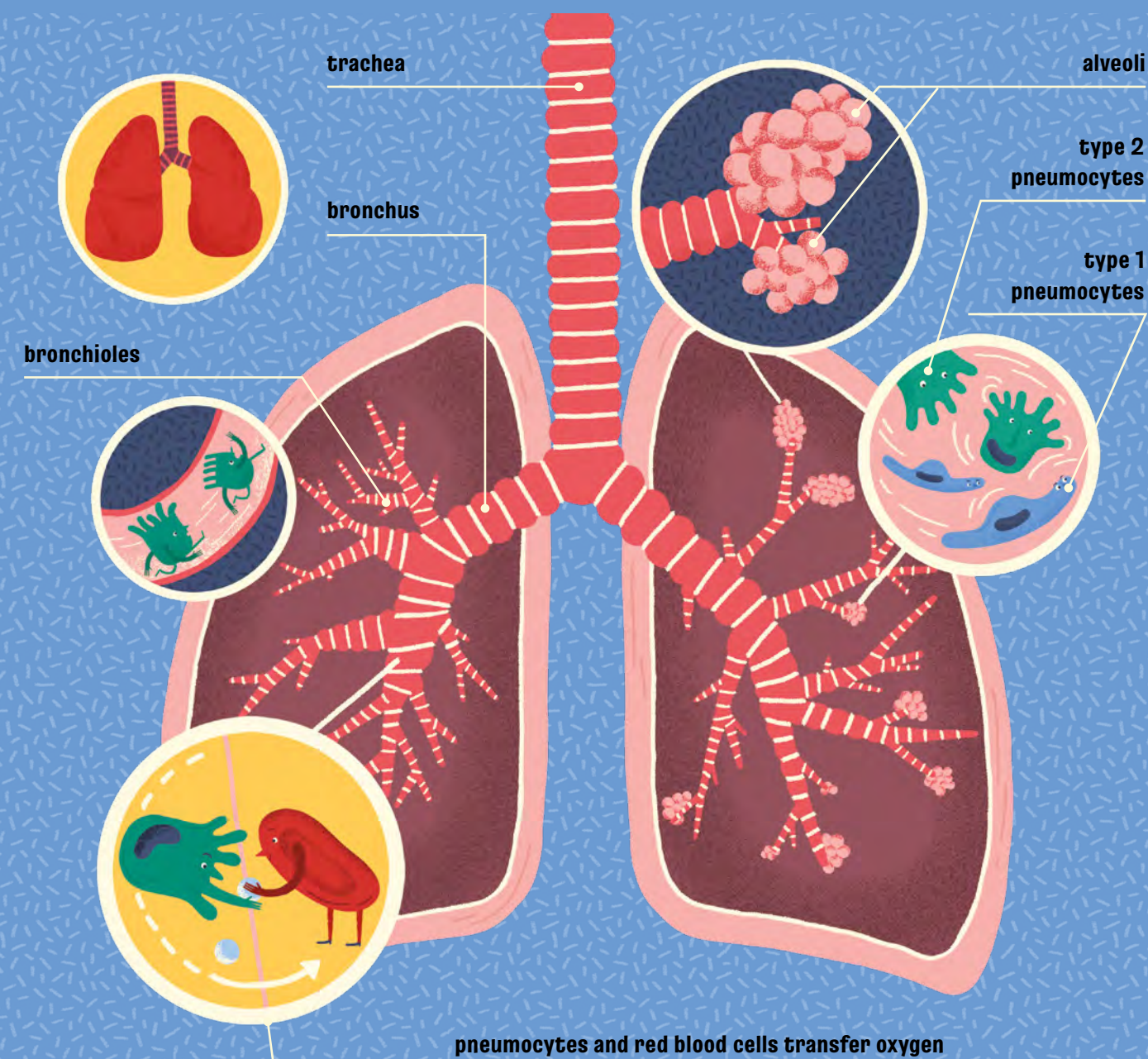
from drink



from sleep



Here we are at the lungs. Let's have a look around for a solution to our problem. The lungs are made up of two organs, fed by a network of branching tubes called **bronchi** and **bronchioles**. These carry air from the upper respiratory tract to the lungs. The lungs themselves consist of millions of **alveoli**, tiny air sacs surrounded by blood vessels. It's here that blood cells pick up oxygen and drop off carbon dioxide.



These colleagues of mine are **pneumocytes**, alveolar cells 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, but I can see that the pneumocytes are still doing their job. Is something wrong, friends? Do you need help?

What could be the problem?



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



As the body exercises, its 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.



You're right, teeth differ depending on their job. Do you brush your teeth regularly? You really should, you know. Many parts of the human body renew themselves over time, but you only get one set of adult teeth to last your whole life!

What do we call the tooth damage that comes from not brushing enough?



35

a filling



7

a cavity



40

chipping



incisors

canines

molars

premolars



That's right, Detective. We're nephrons. There are between 1 and 1.5 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's important which fluids the body receives, we make sure that water, ions, and other substances stay in balance.

What should be our main source of fluids?



8

juices



13

tea and coffee



38

water



Yes, and this shortage can lead to anxiety, 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 can the nervous system do to help?



33

It can 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.



Here's a diagram of a human body. Labeled are just some of its systems and organs, which we'll soon be visiting. Could one of them hold the answer to our question?

Digestive system

mouth

esophagus

liver

stomach

large intestine

small intestine

Muscular system

muscles

Nervous system

brain

spinal cord

Respiratory system

upper respiratory tract

lungs

Circulatory system

arteries

veins

heart

Urinary system

kidneys

bladder

Skeletal system

bones

cartilage

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



39

We can swim through the bloodstream.



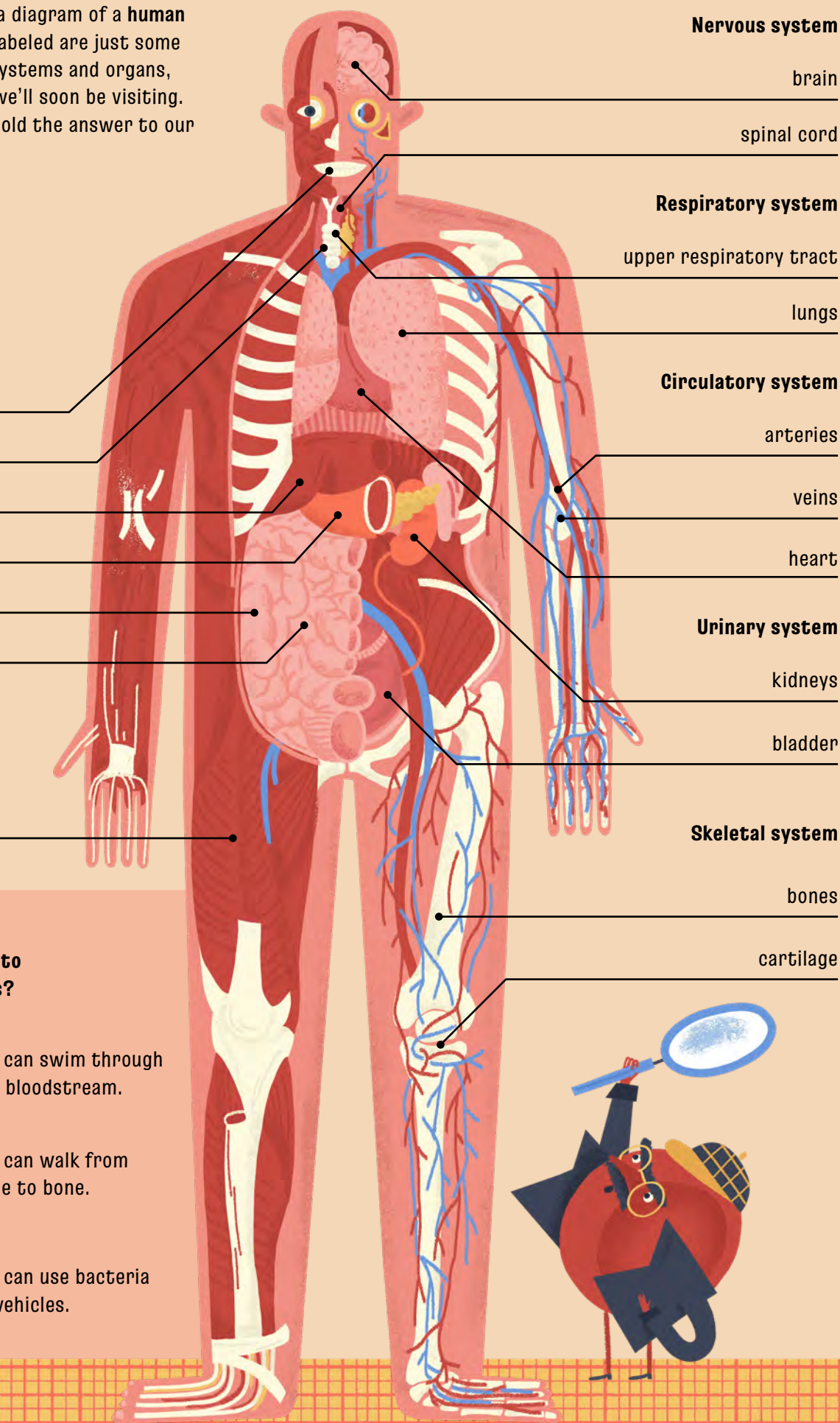
25

We can walk from bone to bone.



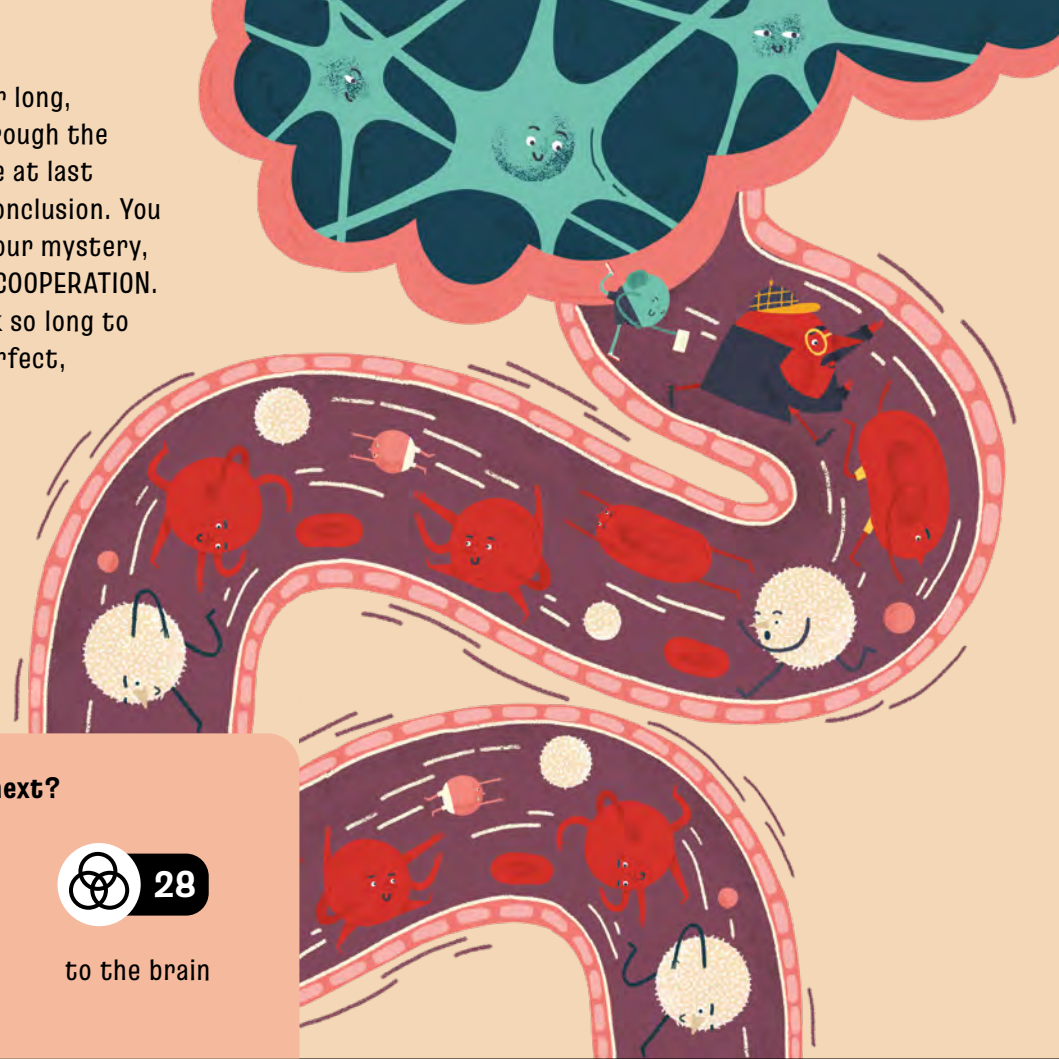
31

We can use bacteria as vehicles.





You've got it! After our long, fascinating journey through the entire human body, I've at last come to a satisfying conclusion. You see it, too, right? The solution to our mystery, the answer to our big question, is **COOPERATION**. Cooperation! Simple, right? It took so long to figure it out because the body's perfect, harmonious operation comes from the interplay of *all* its organs and systems. Now, let's put your newly acquired knowledge to the test!



Where do you think I'm going next?



to the liver



to the lungs



to the brain



To fight bad bacteria, the body must recruit more good bacteria. The best way to do this is through a diet that includes sour dairy products, fermented and fresh vegetables and fruit, whole-grain bread, yeast, and pulses.

The digestive system has so much work to do! It's responsible for the health of the entire body, which is a heavy burden to bear. Fortunately, the stomach and intestines have a reliable helper.



Who is it?



the kidneys



the liver

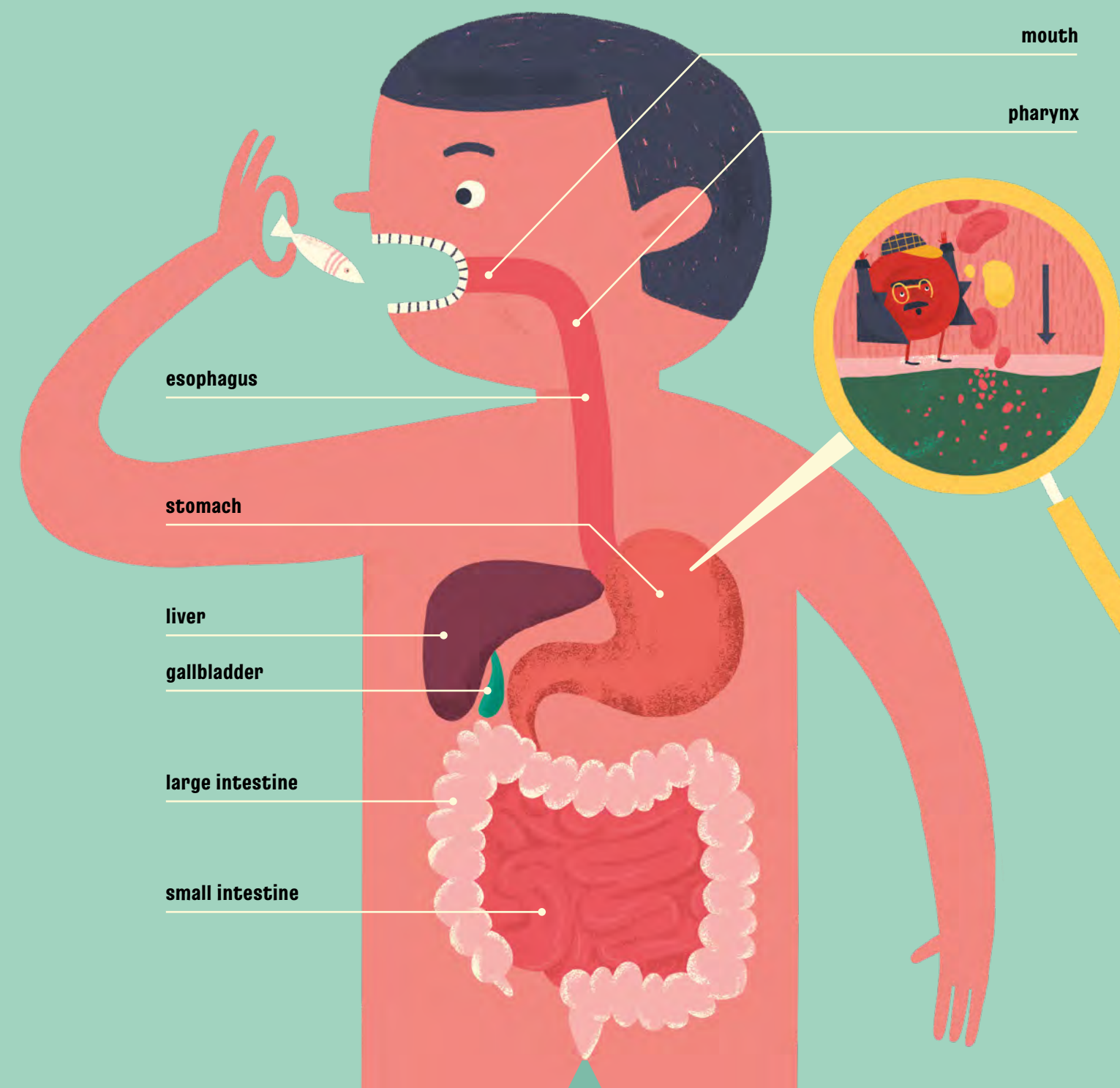


You're right, of course. The body gets energy from food. When it passes through the digestive system, a lot happens:

Food enters the body through the **mouth**. Then the body mixes and breaks it down in the **stomach** before it finally passes into the **intestines**, where the nutrients are absorbed. When the body doesn't need a substance, it excretes it as waste.

Did you know that the entire digestive tract can be up to 30 feet long? We're in for quite a ride! And maybe while we're at it, we'll solve our mystery.

Let's go to page 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.

