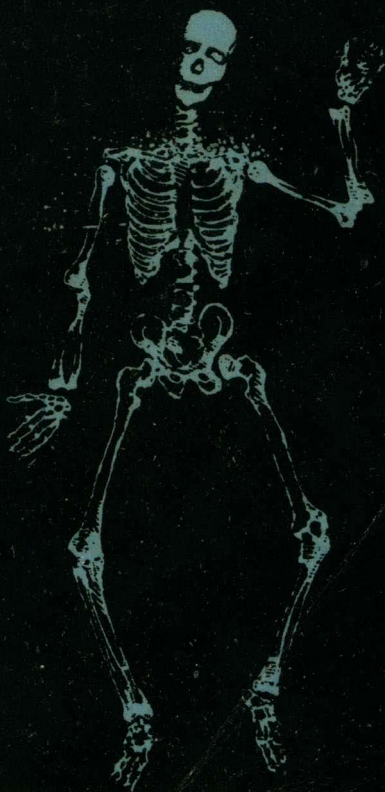


FACTS ABOUT THE HUMAN BODY

BY
MARIANNE
AND
MARY-ALICE
FULLY



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**BY MARIANNE
AND
MARY-ALICE
TULLY**

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← A FIRST BOOK →

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To Mom and Dad

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INTRODUCTION

This book is all about you. These are not questions that you have been afraid to ask. These are questions that you have asked, but probably have received vague answers to. These are actual questions from students. We have tried to give real answers, not watered-down versions. Enjoy reading them and we know this will lead you to a greater curiosity about the wonders of the human body.

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SAY AH!

THE INSIDE OF YOUR MOUTH

HOW ARE TEETH FORMED?

Teeth are formed from specialized skin cells found in the gums of the mouth. In the course of life history, teeth probably evolved from the hard scales of certain primitive fish. And scales, of course, are outgrowths of the skin of fish, much like fingernails on humans.

Before you were born, teeth began to develop within your jaws in little **sacs**. The sacs were filled with a jellylike substance composed of **dentine**-forming cells, **enamel**-forming cells, **blood vessels**, and nerves. Enamel and dentine were deposited in layers until the crown was completed and root formation began. As the crown of the tooth grew larger, the sac in which it all started shrank to form the pulp of the tooth.

When you were about six months of age, your first teeth began to erupt through your gums. They were pushed upward by the bone surrounding the tooth as it grew larger. The first set of twenty baby teeth, called milk teeth, is replaced by a set of permanent adult teeth between the ages of five and twelve years. By age twenty-five, the total number of adult teeth have appeared.

WHAT IS A CAVITY IN MY TOOTH?

The word *cavity* means "little cave." There is usually not an actual hole in the tooth, but there is some form of decay. What happens is the wearing away of the **calcium** content of the enamel and perhaps of the **dentine** portion of a tooth. The scientific name for this decayed area is **caries**. If the decay goes into the tooth to the pulp where the nerves are, the pain is a toothache.

There are two related ideas as to the cause of tooth decay. First, **lactic acid** is formed by the action of **bacteria** on the sugar that you take into your mouth. The acid wears away the protein network of the enamel and dentine. The second idea states that it is not the acid so much, but the **enzymes** made by the bacteria that dissolve the protein network.

Both these processes seem to play a part in tooth decay. The important thing to remember is that decay can be controlled by brushing your teeth properly after every meal and by diet.

WHAT IS THAT LITTLE DANGLING THING IN THE BACK OF MY MOUTH?

That dangling thing in the back of your mouth is the **uvula**. In Latin the word means "little grape." It is a part of the **soft palate**. Feel the roof of your mouth with your tongue. The hard part is called the **hard palate** and the soft part is called the **soft palate**.

When you breathe the soft palate and the uvula are at rest. Air travels freely from your nose to your lungs. When you are ready to swallow, however, it is necessary to block off the

air from going into your stomach and the food from going up into your nasal passages. The muscles of the soft palate and uvula spring into action. They are raised up and back and thus close off your nasal passages.

WHAT ARE TONSILS AND WHY DO SOME PEOPLE HAVE TO HAVE THEM OUT?

Tonsils are the armed guards of your throat. As spongy masses of **lymph tissue**, the tonsils form a ring of protection around your throat and nasal passages. Lymph is a watery fluid that circulates throughout the body. It contains cells that destroy **bacteria** and worn-out body cells. The lymph system collects fats, excess fluids, and lost proteins and carries these to your bloodstream.

There are actually three types of tonsils. Some are on the back of your tongue. Others, called the **adenoids**, are on the upper rear wall of your throat. Others are attached to the back wall of your mouth, one on each side. These are the ones that people usually are speaking of when they say, "My tonsils have to be taken out."

Tonsils are believed to act as filters and fighters of bacteria. As such, they are subject to infection. They may become enlarged and sore. If this happens too often, a doctor might have to operate to remove them.

WHY DO I HAVE TROUBLE TELLING FOODS APART WHEN I HAVE A COLD?

Try this simple experiment: Hold your nose. Place a piece of raw carrot into your mouth and chew. Then, as you are still

chewing, let go of your nose. Do you taste the difference?

The sense of taste and the sense of smell work together as you eat. The taste buds on your tongue have nerve **receptors** in them. They can respond to only four different tastes—sweet, sour, salty, and bitter. All the other hundreds of tastes come from how foods smell to you.

Foods give off invisible fumes that you breathe into your nasal passages. The **olfactory**, or smelling, nerves react to these fumes and you become aware of the specific smell of these foods.

When you have a cold, however, your nasal passages are clogged with mucus. Your sense of smell is cut off, just as it is when you hold your nose. When you can't smell the foods you eat, it becomes hard to tell them apart.

WHY DOES THE DOCTOR TELL ME TO STICK OUT MY TONGUE AND SAY "AH"?

The doctor is usually looking for a whitish coating, or "furring," of the back of your tongue. It is a common sign of an upset stomach or constipation. The reverse rippling motion of the food tube causes the coating.

The doctor might also be checking for enlarged and red tonsils or signs of a cold or sore throat.

WHAT CAUSES GOOSE PIMPLES?

THE SKIN, HAIR, AND NAILS

WHAT CAUSES PEOPLE'S SKIN TO BE DIFFERENT COLORS?

You have heard that black, yellow, red, and white are the so-called colors of the races of man. But there are so many individual differences and such overlapping that there is no clear mark of skin color. For example, there are some people who are classified as "white" who are actually darker in skin tone than some people classified as "black."

The shade of people's skin may change in the summer. But a person's regular skin tone is based on certain **genes** that were inherited from his or her parents.

Just what is it, though, that colors the skin? There are three factors—the thickness of the skin, the blood supply, and especially the **pigments**, or coloring matter, found in the skin. The most important of the pigments is **melanin**, which ranges in color from yellow to black. The cells that produce melanin are between the outer and inner layers of the skin. Surprisingly, all humans have about the same number of these special cells.



Tommy Koolerich

But in darker-skinned people these cells are more active and produce more melanin. In some people, these cells are not able to produce any melanin at all. These people are **albinos**.

WHY CAN SOME PEOPLE WIGGLE THEIR EARS?

Some people are gifted with the fantastic ability to wiggle their ears. How do they do that?

Well, everyone has muscles attached to their outer ears. Human beings descended from mammals that had to use these ear muscles to catch the sound waves around them. Notice how your dog moves his ears when you call him. Gradually, over the course of life history, the human need for this function has disappeared. Simply, the muscles remain. Most people have lost control of these ear muscles, but some people haven't. When they contract these muscles, their ears wiggle.

WHY DO I GET GOOSE PIMPLES WHEN I AM COLD OR FRIGHTENED?

Goose pimples are little bumps that form around each strand of hair. They are caused by the **contraction**, or pulling in, of tiny muscles that cause the hair to stand up. This happens all by itself when you feel cold, or hear chalk screech on a blackboard—or when you are suddenly frightened.

What use is this to your body? Since you are a human being, with very little hair or body fur, goose pimples don't do much for you. But human beings are part of the animal kingdom. You are descended from hairier creatures. Goose pimples cause an animal's fur to puff out to form a thicker, warmer coat to keep it from getting cold. The puffed-out coat also gives an animal a larger appearance in the face of a fearful enemy.

So, even though goose pimples are no protection for humans, they are very useful for animals with a lot of hair. The fact that human beings still get them is a sign that people evolved from simpler animals over the course of life history.

WHY DOES MY SKIN GET TAN?

The **ultraviolet rays** of the sun cause the cells to produce more **melanin**. As melanin absorbs these burning rays, it becomes darker. How dark it gets determines how much of a tan you get. The ability of melanin to absorb ultraviolet rays protects the inner layers of skin from damage.

WHAT CAUSES SUNBURN?

All shades of skin can be burned from too much exposure to the sun. When this happens a substance called **histamine** is released from the damaged cells. Histamine causes tiny **blood vessels** near the surface of the skin to expand. The resulting increased blood flow makes the skin look red. The skin is painful because it has been burned.

WHY DO MY FINGERS STICK TO THE ICE TRAY WHEN I TAKE IT OUT OF THE FREEZER?

This sticking is both a melting and a freezing action. First, your warm fingers quickly melt the frost on the ice tray when you hold it. Then the perspiration, or sweat, from your fingers mixes with the melted droplets. If the tray is very cold, this liquid will freeze up again. And you're stuck.

WHAT ARE THE LINES IN MY FINGERPRINTS?

To see the lines in your fingertips better, use an ink pad. Place one finger on the pad and press this finger to a piece of white paper. You have just made a fingerprint. And there is no other one in the world just like it.

The skin has an inner layer called the **dermis** and an outer layer called the **epidermis**. The dermis does not join with the epidermis as a flat, smooth sheet. Instead, little cone-like bumps called **papillae** go upward from the dermis and fit into the hollows of the epidermis. This locks the surfaces together so that the outer layer won't rub off easily. Because the skin on your fingers and toes gets a lot of wear and tear, it has many papillae. In these areas the papillae happen to be arranged in parallel rows that make a loop or swirl pattern. These are the lines that you see in a fingerprint.

WHY DO SOME PEOPLE HAVE STRAIGHT HAIR AND SOME PEOPLE HAVE CURLY HAIR?

Did you ever pull a paper ribbon between a scissors blade and your thumb? You probably ended up with a curly ribbon.

The same thing happens with a hair shaft as it grows through the hair **follicle**. The follicle is the deep pocket of skin cells in which each hair grows. If the shape of the follicle is round, the hair itself has a round shape and grows out straight. But if the shape of the follicle is oval or even slit-like, the hair will grow out in an oval or flat shape and be wavy or curly. Just as the ribbon was bent into a curl, so the hair is shaped into a curl as it grows through the follicle.

WHY DOESN'T THE HAIR ON MY EYEBROWS GROW AS LONG AS THAT ON MY HEAD?

The length and kind of hair are dependent on the size and shape of the hair **follicle** in which it grows. Hair growth follows a cycle. It grows to a certain age and length and after a while falls out. A new shaft grows in its place. The hair on different parts of the body grows to different lengths because the growth cycles of the different hair follicles are also different. Each type of follicle can support only hair of a certain length. When this length is reached, hair either stops growing or falls out.

HOW DO FINGERNAILS GROW?

Fingernails grow from a groove in the outer layer of the skin of the fingertips. This happens much in the same way that hair grows from a hair **follicle**. The nail is formed and pushes out from the white area at the base of the nail in the shape of a half-moon. The hard nail is made of dead cells, which are made of **keratin**, a protein substance.

You may observe the very slow growth of your fingernails. (It takes about three to six months for the whole nail to grow out.) Place a dot of ink or nail polish that won't wash off at the half-moon of one of your fingernails. Check its progress to see how long it takes to reach the end of your fingernail.

WHY DOESN'T IT HURT WHEN I GET A HAIRCUT OR CLIP MY FINGERNAILS?

The feeling of pain arises from harm to the nerve endings in

the body. There are no live cells or nerve endings in the hair shaft or fingernail plate. Hair and nails are made of a hard protein called **keratin**. And when they are cut, there is no pain.

WHY DO I SWEAT WHEN I AM HOT OR AFTER EXERCISE?

There are numerous tiny sweat glands found in the thick under-layer of your skin. Actually, there are two different kinds of sweat glands. One kind becomes active at puberty and produces a thicker, scented sweat. These glands may once have been intended to attract the opposite sex. The other kind of gland becomes active as a result of a rise in your body's temperature. This gland produces a more watery sweat, the kind that you feel on your body as a result of heat or exercise. Once the sweat reaches the surface of your skin, it starts to evaporate.

Evaporation is a process whereby a fluid becomes a gas, or vapor, in the air. It is a cooling process. As you are becoming cooler, the temperature balance in your body is returning to normal. In hot, humid weather evaporation goes on at such a slow rate that your body cannot cool itself enough for you to feel comfortable.

WHERE DOES THE OIL IN MY HAIR COME FROM?

The skin as well as the hair is kept moist by a fatty substance called **sebum**. It is made in the oil glands of the skin located near the root of every strand of hair. When the muscle of each hair pulls in, oil is pushed up from the gland to the surface of the skin or scalp.