

- MS. SCHLAU:** Dear students, the lecture we will hold today is especially important.
- PROFESSOR EINSTEIN:** That's right. We're going to show you how you can become heroes. Heroes who save lives!
- MS. SCHLAU:** How that works? It's quite simple. By donating blood.
- PROFESSOR EINSTEIN:** Yes, exactly. Blood is the red liquid that flows through your body.
- MS. SCHLAU:** It's very valuable because it can really help sick or injured people.
- PROFESSOR EINSTEIN:** By the way, my blood is particularly valuable because I have the rarest blood type in the world. AB negative. The blood group of geniuses! Hahahaha.
- MS. SCHLAU:** Oh, really? Then you should begin with your donation right away, because rare blood types are especially valuable.
- PROFESSOR EINSTEIN:** Mhm. Can't that wait a little longer? Hm hm...
- MS. SCHLAU:** OK, Professor, then we'll go ahead and start with the film. We're going to learn a lot about blood and all the good things you can do with it.
- PROFESSOR EINSTEIN:** Is that the film in which field researcher Christoph...ummm donates... uh...
- MS. SCHLAU:** Donates blood. Exactly.
- PROFESSOR EINSTEIN:** Hahahaha. Hm. Mhm. Yes. I already know this film. You do it, please, Ms. Schlau. I need to... uh... urgently... call someone. Yes!
- MS. SCHLAU:** Whatever you say. Start the film. This is Lydia. Every four weeks, Lydia receives new **blood (BLUT)** in the hospital. This is because her body isn't able to bind blood correctly. She's familiar with this. It isn't anything special for her. But where does the blood come from? Christoph wants to learn more. "Blood Drive Today" it reads. This could be correct. First show your ID, fill out a questionnaire, then a little prick in the ear. This is to measure if Christoph even has enough blood.
- OK, yes, he can donate. **Band-aid (PFLASTER)** on... and another talk with the doctor. Now finally he can begin with his blood donation. They put a **cuff (MANSCHETTE)** on his arm. Then they clean the crook of his arm. Disinfect is what it's also called. This is the best place to take blood from most people. Pump up the cuff. And then comes...the prick. Already done. Christoph, that wasn't so bad. Then when Ms. Schmidt opens the tube, the blood can flow. And where does it go to? First into this little bag, and when it's full, into a big one.
- The little container is used to fill samples of blood into little test tubes. Different little test tubes for different kinds of tests.

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What kind of tests these are, we'll take a look at a little bit later.

Now Christoph can make himself comfortable, along with all the other blood donors. In order to help the blood flow better, he's told to move his fingers a little bit. In this swing, his blood is mixed with a liquid. So that it doesn't clump together - "coagulate" it's called. After 5-10 minutes, the bag is full.

A half-liter of blood. Now the needle can be removed. There, all over already. Gauze on top and Ms. Schmidt wraps a bandage around it so that the blood vessel can close again.

And now something very important. Christoph's bag and his test tubes have a number. A **bar code (STRICHCODE)** - it is scanned in like at the supermarket counter.

A few empty bags hang on the full bag - it's a complete set. All of this will now be cooled with a metal plate. While his blood samples are sorted in with the rest Christoph gets a bite to eat. This is so that his body can quickly replace the blood. Normally that happens fairly quickly. Ummm, yummy sausages - for all donors with band-aids on their lobes.

All the blood donations are collected in the late afternoon and taken to a central laboratory. It really added up. Today alone there were more than 4,000 donations. The test tubes now need to be prepared for certain tests.

First they go into a **centrifuge (ZENTRIFUGE)**. This inner part can spin very fast. So, the test tubes are spun around. At a rate of 100, 1,000, 2,000, 3,490 rotations per minute.

So, what just happened? Something has separated. In all of them? Yes, there are three layers. In the middle, between the yellow and red layers, there's a lighter layer. Starting now, everything else happens automatically. First, the bar codes.

Each test tube belongs to a blood donation from a particular person. Of course you can't mix these up. Which is why the code is scanned in right here. Then the lid comes off so you can get to the blood. Now one drop is sucked away from each yellow layer. Like with a straw. These little green tubes are what we call **pipettes (PIPETTEN)**. In one such drop is where you can identify hidden diseases when it is placed on a very special observational slide.

The other tubes are placed into a machine that can identify specific **blood types (BLUTGRUPPE)**. For that, one needs a drop from the red layer. People have many different blood types. Blood may look the same for everyone: red.

But the individual blood types can still be different. And some of them don't get along with each other. When you put two drops of thinned blood on a glass slide

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and they touch one another and mix, something happens. We looked at this under a **microscope (MIKROSKOP)**. The red discs are the red blood cells. Here, they're still flowing around freely. But after a bit, the two groups of blood cells clump together because they can't tolerate one another. Clumps everywhere. Now, the blood can no longer flow freely.

If you imagine this happening in your body – now that would be a catastrophe. That's why the donor's blood type needs to be determined in the lab. So that each person gets the right blood. While all these tests are going on, Christoph's big bag also continues on its way. But why are there so many other bags attached to it? The big bags go into the centrifuge as well. That blood also needs to get separated. When the bags come out again, they look like the tubes do. Three layers. Each individual layer is a very specific part of the blood. When someone needs blood, he often needs just one of these parts. Because one can't artificially produce blood and it's therefore very valuable, the three parts will now be separated, which is what these other three bags are for.

Now the bar codes are also scanned in, also the one from Ms. Bluch. When the bag is now pressed together, a metal tongue shoves itself into the middle and divides the upper from the lower parts. This is how it looks when there is no bag hanging in front. Everything that's above the metal tongue flows up. And that's how only the yellow flows into the upper bag. This part of the blood is the so-called **blood plasma (BLUTPLASMA)**. That's what is used when, for example, someone has had an accident and has lost a lot of blood. And only the red liquid is pressed down. Those are the red blood cells.

The bag with Christoph's blood plasma is now full. When it's frozen, it can be stored for up to two years. But there's more left to do with the red blood cells. First, they have to go through a filter. Like through a sieve. This makes sure that only the red blood cells remain. They are needed, for example, when someone is operated on, or when somebody's body doesn't produce them. Like with Lydia. Once they are filtered, they can last for 5-6 weeks. Red blood cells. This is how they look. Magnified quite a bit. The blood donation bags are almost empty now. But the middle layer is still inside. That gets washed out here. Because there's so little of it, four bags of the same blood type always need to hang together and each one must be shaken well. Because what remains is so valuable and precious, a lot of effort is used to retrieve it. These are the platelets that make sure wounds stop bleeding. This is how the platelets look. The light knots beside the red blood cells attach to the wounds and stick blood compounds together. Coagulation strings. The blood solidifies and the surface dries. It coagulates.

- MS. SCHLAU:** And because the platelets are always so eager to attach somewhere, they have to be agitated while they're being stored and despite this, they last only 5 days. It's a lot of work. So this is what has come of Christoph's blood donation. His blood type is now identified and he has no diseases. His blood seems to be just fine. Lydia and Christoph's blood tolerate one another. The bag on the left with the red blood cells is the one for Lydia next time. Today's bag is now empty. Unwinding the bandage is something Lydia can already do herself. She'll need new blood again in four weeks. But for now the small tube can be taken out. All done. And now it's off to kindergarten. Bye, Lydia! Fascinating, this blood. Don't you think so?
- PROFESSOR EINSTEIN:** Is the film um... already over?
- MS. SCHLAU:** Yes.
- PROFESSOR EINSTEIN:** Yes. Haha, then all is well. Wonderful, this blood. Simply...uh...fantastic!
- MS. SCHLAU:** Oh. You think so?
- PROFESSOR EINSTEIN:** Of course.
- MS. SCHLAU:** Really? Well, I have a suspicion that you just can't look at blood.
- PROFESSOR EINSTEIN:** What? That is unheard of. I'm a fearless scientist. Not able to look at blood...
- MS. SCHLAU:** JOWO, why don't you show us the picture of the bleeding fingers.
- PROFESSOR EINSTEIN:** Is that real...Bl..Bloo...Bloood...?
- MS. SCHLAU:** Professor, you just have to use your imagination and pretend that it's just ketchup. Like on French fries. JOWO?
- PROFESSOR EINSTEIN:** Tomato ketch...? Uuuuh...
- MS. SCHLAU:** Professor, for goodness' sake. There's no way I could've known that you not only can't stand blood, but you also can't look at tomato ketchup.