TEEN TALK

-Blood 101-

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Blood 101

Understanding the role blood has in our bodies helps us understand a bleeding disorder. This knowledge can lead you to a better understanding of what exactly occurs in the body when someone without a bleeding disorder is bleeding, and how this is different for a person with a bleeding disorder.

Blood is made up of several different parts. These parts include a liquid or fluid portion and cells. The liquid portion is called plasma. Cells in the blood include red blood cells, white blood cells, and platelets. Together, these parts perform many different functions. For blood to work correctly, all the parts must be present in the right amount and in the right shape so that they can perform their different functions. Each individual part that makes up blood is vital to one or more of blood's functions.

Red blood cells deliver oxygen to and remove carbon dioxide from body cells. Red blood cells are also known as erythrocytes or RBCs and contain a protein called hemoglobin. This hemoglobin is what enables the RBCs to carry oxygen. Although red blood cells only live for about 120 days, they are constantly being replaced in your body, and at any one time there are millions of RBCs in your body. When the correct number of RBCs is not present in the body, people become anemic.

White blood cells fight disease and infection. They can also be called leukocytes or WBCs. There are not as many of these in your body; only 7 to 9 thousand per cubic mm. However, there are many different types of white blood cells, each with a different purpose. Basophil, monocyte, lymphocyte, neutrophil and eosinophil are the five types. They help with allergic reactions, destroy bacteria, stop infections, and attack foreign matter (antigens) that enters the body.

Platelets help stop bleeding by plugging the holes in blood vessels. They are formed from red bone marrow.

Blood also contains plasma. This is the watery component of blood where von Willebrand's protein is found. Plasma contains water, dissolved proteins, and sugar, along with many other substances.

Blood is found in blood vessels. When somebody is bruised or cut, blood escapes from the damaged blood vessel, leaking out. If the damaged blood vessel isn't repaired, a person could have a

bleed. That's why blood contains clotting factors, which stop bleeding at the site of injuries.

Normally, platelets arrive at the site of the injury and slow the bleeding. They are held together by von Willebrand's protein, which acts as a kind of glue. This structure, however, is not sufficient to entirely stop bleeding. A substance called fibrin forms a net around the platelets and von Willebrand's protein. Together, the platelets, von Willebrand's protein, and fibrin stop bleeding, and together they are known as a clot.

People with von Willebrand's disease have a smaller amount of von Willebrand's protein in the blood than there should be. This is why it takes longer to stop bleeding for people with von Willebrand's disease.

Another blood disorder is hemophilia. People with hemophilia lack factor eight (VIII) or factor nine (IX) in their blood, which also helps blood clot. Prolonged bleeding can result.

There are other things, though, besides bleeding, that can affect the flow of blood. Perhaps the most obvious of these is a heart attack. These take place when fatty buildup in the arteries blocks the flow of blood. Another serious injury can occur when the blood freezes. This is known as frostbite. Obviously, blood that can't get to the heart or is frozen can't deliver nutrients to your cells, nor can they take waste from the cells. Consequentially, body parts affected by a heart attack or frostbite can "die."

Knowing how blood is supposed to work, and understanding why it sometimes doesn't work is very important. It allows us to understand bleeding disorders, and how they can be controlled.

Blood Science

When we were researching blood, for the issue of Teen Talk, we used experiments from "*Kids Talking About von Willebrand's Disease*" which is information you can use to give a talk about von Willebrand's disease. You can get a copy or more information by calling Great Lake Hemophilia Foundation at 888-797-4543. These experiments show how von Willebrand's Disease prevents good clotting.

First, before explaining the experiments, we must understand what a blood clot is. Here's a quick review. In order to form a clot, you have to have an injured blood vessel which blood is leaking from. In other words, you have to be bleeding. When you start to bleed, von Willebrand protein and platelets fill the hole where you were bleeding and they form a platelet plug. Then fibrin comes and creates a net over the platelet plug to hold it together. With all of these components, working correctly you will stop bleeding. This is called a blood clot.

If you are missing just one component, the clot will not hold together. If you have a bleeding disorder, the clot takes longer to form because you are missing a component of the plug. Do you need to see it to believe it! Let's create a blood clot we can see and eat!

Graham Cracker Experiment

The first experiment has three ingredients. *You will need some frosting, coconut, and graham crackers.* Now, before we go any further, we must know what each of these ingredients represents. Frosting symbolizes the von Willebrand protein and the graham crackers represent platelets. The coconut

symbolizes the fibrin. Together these three ingredients will form a blood clot. Here are the steps to make a delicious blood clot:

1. Get a paper plate, one tablespoon of frosting, one tablespoon of coconut, and one fourth of a graham cracker. The graham cracker represents the platelets coming together.
2. Now spread the frosting on both sides of the graham cracker. The frosting represents the von Willebrand protein. Von Willebrand protein acts like glue to hold the platelet plug together and help it stick to the injured blood vessel wall.
3. Roll the frosted graham cracker in the coconut. The coconut represents fibrin, a net-like covering that weaves over the plug to form a strong clot.
4. If any one of these ingredients were missing, the clot would not form properly and the bleeding would continue.

Kitchen Supplies Experiment

For the next experiment you will need two coffee filters which represent platelets, waxed paper which symbolizes von Willebrand protein, one sieve which represents fibrin, and water with red food coloring which symbolizes blood. Here are instructions for the second experiment.

1. Get one-fourth cup of water to which you have added a few drops of red food coloring and waxed paper, cut to the same size as the coffee filters. The coffee filters represent the platelets. The waxed paper represents the von Willebrand protein that holds the platelets together.
2. Place the waxed paper between the two coffee filters. Place the filters, with the waxed paper in between, into the sieve. The coffee filters and the waxed paper together represent the platelet plug. The sieve represents the fibrin.
3. Place the sieve over a large bowl. Pour a small amount of red water into the sieve. The red water represents blood. All the necessary ingredients for a clot formation are present. The red water is held in the sieve.
4. For some more fun, you may want to show that if any of the ingredients were missing, bleeding would occur. For example, remove the sieve and water will pour over the sides of the filter.

All in all, the blood clot is simply many different components coming together to help stop the bleeding. We hope you enjoyed the experiments and had fun too!

Links

For this issue of *Teen Talk*, the American Red Cross web site was reviewed. The web site is "www.americanredcross.org" This site had lots of good information on how you can help in your community and volunteer your services.

The best thing about this site is

there is a huge section for youth. There are sections about how teens can get involved in activities they like to do. For example, one of the activities was talking to other teens that are hospitalized. I don't know about you, but I love to talk to anyone! There are also sections describing how we can get involved in our schools and start new clubs. One of the clubs was a blood donation and awareness organization. You are able to host a blood drive at your school and tell you friends why it is important to donate blood.

This site is great because there is not a lot of reading and the information is the right level for most teens. If you want to know a little more information, the site has a science youth section. This section is mainly on blood. It describes why you should donate blood and how it helps the community. They also describe what blood is and how it works.

If you aren't into science, there are plenty of sections on daily news. There are updates on disasters that have occurred, world news, and even some news from the medical world.

This web site is well organized and has something for everyone. It has lots of information on blood, volunteer services, new clubs, science information, blood donation, and a great search engine to help you find what you want fast.

	Excellent	Very Good	Good	Poor
Amount of Info	*			
Info for Teens	*			
Easy to Use	*			
Searchable	*			

Overall Rating: Excellent

Election

On November 2nd, President George Bush and Senator John Kerry faced off as the respective Republican and Democratic nominees for President. This election and its results will affect our nation, and everyone in it, for at least four years, influencing everything from foreign policy, to taxes, to health care, and any number of other issues. All of these concepts will affect your lifestyle for years to come. However, the idea of health care is one particularly important to those with bleeding disorders.

There is a great deal of medicine that can keep bleeding disorders under control, but they can be expensive. Appropriate health care is a necessity for those with bleeding disorders, because of how quickly costs can add up. Politicians and lawmakers make the decisions about health care, which is why it's so important to vote and make your voice heard.

Despite all of this, only a fraction of our country's citizens will exercise the hard-earned right to vote. Choosing a leader is one of the most important decisions that any society can make, and one of the most influential. This is why it's so important that those who can participate in the election process should vote. Although you may not be allowed to vote yet due to your age, you should still stay informed of the issues and people that affect you. As teenagers, it is only a matter of time before we will be in that voting booth.

In the mean time, it's important that you stay informed by watching the news, reading newspapers, or utilizing other resources related to medical and other issues important to you. By talking about the issues and listening to other opinions, you can obtain a variety of perspectives. One great way to stay

informed regarding legislature affecting bleeding disorders is to visit the NHF's website at "www.hemophilia.org/home.htm." You can also sign up for their e-newsletter. To become active in your local chapter, you can go to "http://www.hemophilia.org/about/chapters.htm". Finally, go to www.glhf.org for information about the Great Lakes Hemophilia Foundation.

Sports Skinny

This summer, on Monday, August 30, the 2004 Summer Olympics came to an end. The athletes, coaches, and fans, gathered at the heart of Athens for the closing ceremony. This was the conclusion of over two weeks of competition in 28 events, ranging from swimming, to track and field, and fencing. This time, the games returned to their original Greek roots. Long before the modern Olympics, ancient Greeks gathered and competed in a variety of sporting events. Obviously, the games have changed a great deal since then.

However, one event was incorporated into the modern Olympics as homage to its Greek roots. This event is the marathon, a 26.2 mile race, recalling the journey of a Greek soldier when he ran from the town of Marathon to Athens to announce a Greek victory over the Persians.

This event caused a stir at the Athens games when, during the final stages of the race, a protesting priest pushed the leader off of the track. The runner's lead was taken away before he could get back on the track, and his rhythm was interrupted. This could have taken the athlete out of the running entirely. However, he persevered and finished the race in third place, receiving a bronze medal.

This is impressive. The third place finisher could have given up entirely after that interruption, even though it was no fault of his own. It was the athlete's perseverance and determination not to give up that got him a bronze medal, even in the face of unfair, uncontrollable circumstances. It is this kind of determination that those with bleeding disorders must employ in order to keep their circumstances from getting in their way. Regardless, of our obstacles we can never stop in the middle of the race.

Guest Corner

Teen Talk is still looking for a guest columnist for the next issue! If you write and send us a publishable article concerning Blood 101, you could receive ten dollars! The article can be a story, idea, opinion, or tip! Be creative, it's up to you! The article needs to be well written and polished so we can easily put it in our newsletter. Also, limit your article to 500 words, please. So get those pens out and start writing! You can send those publishable articles to Ali and Derick Stace-Naughton at <pjstacen@wisc.edu> with the subject line "Teen Talk"!

Don't Forget to Look For Our Next Issue on Genetics!