

Welcome to this lesson on blood types. Today we are going to be identifying and describing the four main blood types. So blood type is determined by the antigens that are present on the plasma membrane of red blood cells. So your red blood cells are actually the cells that determine what blood type you have.

So there are four main blood types. We have type A, type B, type AB, and type O. So we refer to this as ABO blood typing. So we're going to go through and talk about each of these blood types and the characteristics of each.

So the first column here is going to identify the blood type that we're talking about. The second column here is going to discuss antigens that are on the red blood cell. And an antigen will basically mark that cell as self. And the antigens that can be on a blood cell, you could have an A antigen, a B antigen, or both A and B antigens.

So the antigens that are on that red blood cell determine the blood type. Then we're going to talk about antibodies that are in the blood associated with that blood type. And antibodies will basically identify and attach to antigens. So when we discuss our first one, we'll get a little bit more in depth with that.

We're going to talk about what blood type if you have this blood type, who can you donate to. And if you have this blood type, who can you receive blood from. So let's start by talking about type A. So type A blood would have A antigens on the red blood cell.

So let's label our A antigens like this. And we're going to say that these are A antigens. OK, so they have these A antigens on their red blood cells, which identifies the blood type as type A. Antibodies that it has in the blood then would be anti-B. So we're going to draw our anti-B antibodies like this.

So these antibodies are in the blood. And basically if somebody with type A blood was transfused with type B blood, these anti-B antibodies would identify those blood cells and attach to them, basically rendering them ineffective. So what would happen would be something called agglutination.

So agglutination occurs when incompatible blood types mix. So basically those red blood cells will clump because they're incompatible. So these antibodies-- let's see. If we have let's say these B blood cells were transfused into somebody with type A blood, what would happen is that these antibodies would attach to them, and it would cause them all to clump together in this manner.

And if they're all clumping together like this, it leads to agglutination, and then the cells can also burst at the same time too. So they're clumping together or they're bursting because antibodies in the blood are attacking them because they are foreign. They're not compatible with that person's blood type.

OK, so somebody with type A blood can donate to somebody else who has type A blood, or they can also donate to somebody who has type AB blood. So this person who has AB blood has these A antigens on their red blood cell as well. So it will match up with these A antigens and will be compatible.

Somebody with type A blood can receive from somebody else with type A blood because it's going to be just the same. Or they can receive from somebody who has type O blood, because type O blood doesn't have any antigens on it.

All right, somebody who has type B blood, the antigens on their blood cells are going to look let's just say something like this. OK, so these antigens are B antigens. So they mark the blood type as type B blood. So the antibodies that would be in this person's system then would be anti-A antibodies.

So if this person were transfused with type A blood, these anti-A antibodies would cause agglutination of those A blood cells. So somebody with type B blood can donate to somebody else who has type B. So type B blood is compatible with type B blood. And they can also donate to somebody who has type AB blood.

Again, because AB blood still has those B antigens that are compatible with B blood. And somebody who has type B blood can receive blood from somebody who has type B, again because the antigens are going to be the same. Or they can receive from type O. And again, that's because type O blood doesn't have any antigens on it.

All right, AB blood is our next example. So somebody who has type AB blood is going to have both A and B antigens. So here's our A antigens. So we have our A antigens on AB blood, and we would also have our B antigens.

So this is somebody who has type AB blood. They have the antigens for both A and B. So somebody who has type AB blood actually doesn't have any antibodies in the blood. So they don't have any antibodies against type A or type B because they possess the antigens for type A and type B.

So somebody with type AB blood can only donate to somebody else who has type AB blood. And the reason for this is if, let's say somebody has type A blood, and they were transfused with AB blood. Those anti-B antibodies would attack the B antigens on this blood cell.

Or if somebody has type B blood and was transfused with AB blood, then those anti-A antibodies would attack the A antigens on those blood cells. So therefore they can only donate to somebody else who has type AB blood.

But they can actually receive blood from type A, Type B, type AB, and type O. Because remember, there's no antibodies in that blood, so they can actually receive blood from any of the blood types because they're lacking

those antibodies.

And then our last example is type O blood. So type O blood doesn't have any antigens on the red blood cell. Let me actually go back one more second here. Type AB blood is referred to as the universal recipient. And again, that's because they can receive from any of the blood types.

OK, so back to type O blood. Type O blood doesn't have any antigens on the red blood cells. But they do have antibodies then for type A and type B. So their antibodies are against type A and type B. So if a person with type O blood was transfused with either type A, Type B, or type AB blood, these antibodies would cause, again, agglutination. It would attack those blood cells.

So type O blood can donate to all blood types. It can donate to A, B, AB, and O, again because it doesn't have any antigens on its red blood cells. So the antibodies in these other types of red blood cells have nothing to attack. So type O is referred to as the universal donor.

The universal donor because they can donate to anyone. But they can only receive blood from type O blood, again because they possess these antibodies against type A and type B. So this lesson has been an overview on the four main blood types and their characteristics.