The ABOs of blood types [1]

Dear Alice,

Can an A+ person receive any blood type other than their own? If so which ones? Which blood type is the universal receiver and which is the universal donor?

Answer

Dear Reader,

A person with an A+ (positive) blood type can receive blood types A and O (A+, A-, O+, and O). Moreover, type AB is considered the universal recipient blood type because type AB individuals can receive all blood types (and is the only blood type that can accept type AB blood). Type O blood is considered the universal donor blood type because type O blood is accepted by all blood types. Keep reading for more about these on the whys and hows of blood types and donation.

Blood types are determined by ABO blood grouping, which is based on two inherited antigens called A and B. An antigen is anything capable of inducing an immune reaction, and, in this case, A and B are proteins which are found in red blood cell membranes. The presence, or absence, of antigens and antibodies in your plasma will determine which blood type a person can receive. Here are the specific blood types, the antigens they have, and antibodies they produce:

- Type A blood has A antigens and produces B antibodies.
- Type B blood has B antigens and produces A antibodies.
- Type AB blood has A and B antigens and doesn’t produce antibodies.
- Type O blood has no antigens and produces both A and B antibodies.

So, what does this information mean? Your blood already contains antibodies against any antigens the body doesn’t manufacture itself. For example, if you’ve got type A blood, you can’t accept B and AB blood types because you will have a transfusion reaction, which is a special kind of tissue rejection. Basically, your anti-B serum antibodies will react with the B antigens in the donor blood and result in agglutinated blood (aggregation of red blood cells into clumps) that destroys the donor’s cells. This reaction, if severe enough, could cause fever, chills, and low blood pressure. It could also shut down vital organ function and can be fatal. If you are type AB, since you have no antibodies against either A or B antigens in your blood, you will not experience an immune response to any blood type you receive. On the other hand, if you are type O, you can receive only type O blood because you have antibodies
to both A and B antigens in your blood, which will cause an immune response to all other blood types.

Below is another list that will explain which types of donor blood someone could receive based on their blood type:

- If you have type A blood, you can receive type A and type O blood.
- If you have type B blood, you can receive type B and type O blood.
- If you have type AB blood, you can receive type A, type B, type AB, and type O blood.
- If you have type O blood, you only can receive type O blood.

That's not all there is to know about who can receive what type of blood though. While it's theoretically true that the universal recipient blood type is AB and the universal donor blood type is O, an emphasis is placed on theoretically because A and B are not the only antigens present on the surface of your blood cells. There's another antigen carried on a separate gene called the Rh antigen. If you have the A antigen and the Rh antigen, your blood type is A+ (or A positive). If you don't have the Rh antigen, you've got an A- (or A negative) blood type. The universal donor blood type is O- (or O negative) because it has no A, B, or Rh antigens, and, therefore, won't cause a transfusion reaction in anyone.

If you don't know your blood type, it could be good to find out in case you need a blood transfusion. At the same time, even if you already know your blood type, you may expect to be retested in order to prevent a reaction caused by minor antigens.
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