

Can Chronic Viral Infections be a Trigger for SLE?

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One of the most enduring theories concerning the cause of lupus is that an infection might act as a trigger. For decades, it was widely assumed that some sort of infectious agent, perhaps a chronic virus, must be the cause of lupus. However, despite intensive efforts by many researchers no unique lupus virus or other germ has been identified. It is safe to say that the vast majority of the medical community has accepted the conclusion that there is no such lupus virus.

However, an infection can still cause lupus even without a unique virus. For example, many scientists have hypothesized that perhaps a virus might trigger SLE only in individuals with certain genes. That is individuals with a particular susceptibility gene might have a higher risk of developing lupus after infection with certain viruses. No such susceptibility genes have been identified. It can be very difficult to prove that a virus triggers lupus, if most of the people infected with the virus did not develop disease! However, recent research has provided intriguing hints that a well-known virus may play a role in causing lupus. The suspect, Epstein Barr Virus (EBV) is commonly known as the agent that causes infectious mononucleosis, or mono.

There are some important differences between acute and chronic viral infections. Many viruses cause an acute infection: you get sick, but your body fights off the virus and you completely recover once the immune system eliminates all of the virus from your body. This is what happens when you catch the flu or a cold. Once you have recovered, you are immune to that virus and normally cannot become re-infected by the same strain of virus.

Chronic viruses have figured out ways to avoid the body's immune defenses so that they can persist in the body at a low level for the rest of your life. For example, the virus that causes chicken pox causes an acute infection that seems to go away once the immune system fights it off. However, the immune system cannot completely clear the infection from the body, even though it can keep the infection under control for many, many years. In fact, once you have been infected by chicken pox, the virus persists in your body in various hiding places for the rest of your life. Apparently the immune system keeps the virus under control so that it cannot come back. People who have had chicken pox normally are not infectious to other people, even though the virus is hidden inside their bodies. However, as people get older the immune control of the chicken pox virus often fades, and the virus can come back. When this happens, the result is clinically known as shingles. People with shingles are suffering from a reactivation of the infection that may have occurred many decades before! They are now infectious to other people and can spread the disease, until their immune systems once more get the infection under control and suppress the virus back into hiding.

Epstein Barr Virus (EBV) can also cause chronic infections. People typically become infected by EBV between the ages of 10 and 20, and eventually more than 95% of individuals become infected by the virus. In most cases, however, the infection is not recognized as mononucleosis, but rather as a non-specific infection that may be mistaken for the flu. Once someone has been infected by EBV, the virus generally persists in the body for the rest of the person's life and can be detected, but it is unknown whether this has any adverse effects in most people.

Some researchers have looked into whether EBV infection can trigger lupus. A team of scientists at the University of Oklahoma led by Drs. Judith James and John Harley investigated the question of whether certain chronic viruses might be detectable in young lupus patients more often than in the general population. Their results were dramatic. While there were no major differences in the frequency of chicken pox infection between young lupus patients and people in the general population, more than 99 percent of young lupus patients had been infected by EBV, compared to only two-thirds of the general population. Their results firmly establish the EBV infection occurs earlier and more frequently in people with lupus compared to healthy subjects.

Of course, there are several possible explanations for this finding. One possibility is that people who have lupus are more easily infected by EBV. At this time, we do not know whether the EBV infection occurred before or after the patient developed SLE, so it is not clear what triggered what. The other possibility is that infection by EBV may trigger lupus. There are several ways in which this could happen. EBV is known to infect immune cells, especially those known as B cells. In fact, B cells become activated in persons infected with EBV, and begin making increased levels of antibody. They may also begin making the autoantibodies that cause so much damage in lupus. Some scientists have suggested that one or more of the EBV proteins may have structures that are similar to proteins of the body. As a result, B cells and T cells that are attempting to attack the virus may accidentally become autoimmune and damage healthy tissue. Like all other viruses, EBV reproduces by infecting cells in the body and forcing those cells to make more copies of the virus. In order for the immune system to fight the virus, it has to destroy infected cells. Thus, fighting the virus requires something very similar to an autoimmune reaction.

More research will be required to determine whether EBV infection actually is an indirect cause of lupus. If true, it is not clear how this knowledge can help patients who already have lupus. If a viral infection triggers lupus, the horse may already be out of the barn. Once an autoimmune condition gets started by a viral infection, it could become self-sustaining, even if the virus has been eliminated from the body. In any case, today there is no proven treatment or vaccine against EBV. However, as we achieve a better and better understanding of the triggers for lupus, we inevitably gain knowledge that will ultimately help not only to prevent lupus, but also to treat it.

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