



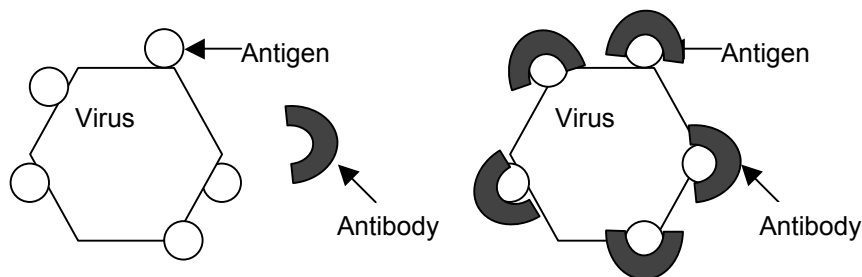
Reading

Tracking the Source of Disease:
Koch's Postulates, Causality, and Contemporary Epidemiology

Coxsackie Virus and Insulin Dependent Diabetes Mellitus (IDDM)

(Adapted from "The Enemy Within" by Shauna Roberts, *Diabetes Forecast*, 1991)

The human immune system protects our bodies from deadly invaders such as bacteria and viruses. One way in which the immune system protects the body against foreign invaders is by producing antibodies. Antibodies are proteins secreted by B cells and they work by attaching to antigens on the surface of invading bacteria and viruses. Antigens are molecules that the antibody can recognize and bind to. Antibodies are very specific. In most cases, they bind only to the antigen they are intended to recognize. When they bind with the antigen, the antibodies make it easier for the immune system's T cells to find and destroy the invaders.

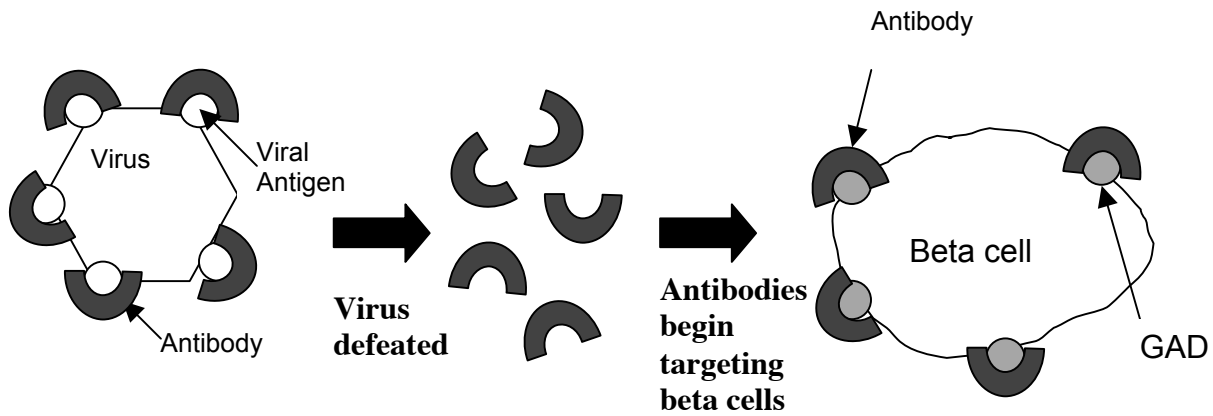


Unfortunately, sometimes the immune system makes mistakes. Sometimes antibodies are produced, which target and attach to antigens that don't belong to foreign invaders but to cells of the body itself. These antibodies that attack cells from the same body are called autoantibodies and are responsible for autoimmune diseases.

An example of an autoimmune disease is Insulin-Dependent Diabetes Mellitus (IDDM) or Type I Diabetes. The immune system of individuals with IDDM attacks the beta cells of the pancreas. The beta cells produce insulin. When the beta cells are destroyed, the body can no longer produce insulin, a hormone necessary for cells to absorb glucose, their primary energy source. This is why people with diabetes often feel tired.

Why does the body attack beta cells in people with IDDM? Some scientists think it may have to do with infectious disease. There is a protein in pancreatic beta cells called glutamic acid decarboxylase or GAD for short. Most people with IDDM have autoantibodies to GAD. When the immune system attacks the GAD protein targeted by these antibodies, it is thought to kill the beta cells in the process. Interestingly, GAD is similar in shape to part of a virus called Coxsackie B. Coxsackie B is a relatively common childhood virus. It is hypothesized that when certain people become ill with

Coxsackie B virus, their immune system produces large quantities of antibodies against the virus. After the virus has successfully been defeated, the antibodies begin targeting the GAD protein, because of its structural similarity to the virus.



This hypothesis is still controversial and has yet to be supported by enough evidence. Some scientists think that other viruses other than Coxsackie may be involved. Others believe that there is not enough similarity between the virus and GAD to cause the antibodies to attack GAD. Still others point to cases of people with IDDM who have no detectable antibodies to GAD. Further research will be needed to understand the relationship between Insulin Dependent Diabetes and Coxsackie virus.