Platelet Disorder Support Association

20 Years

Empowering ITP Patients

The Science Behind the Causes of ITP

While no one knows the precise cause of ITP at this time, researchers continue to make progress in understanding the condition and its similarities to other autoimmune diseases. Just as the symptoms of ITP can vary greatly between individuals, causes of the disease may also vary.

Below are several theories as to the possible causes of ITP, however these may likely overlap. For example, someone may have a defect in immune regulation, which makes him or her more susceptible to developing ITP after an immunization or contracting a Helicobacter pylori (H. pylori) infection.

Bacteria and Virus Byproducts

Certain theories suggest that ITP (and other autoimmune diseases) may be caused by a person's immune response being confused between its own cells and invading virus and bacteria.

When a virus or bacteria invades our body, special cells chop it up into thousands of fragments and put some of these fragments in a type of pocket for the immune system to disable. T-cells (a type of white blood cell) latch onto the fragments in the pocket and send signals to destroy all of the tissues that have the same or similar makeup. A problem develops when the fragment to be destroyed looks like part of a platelet. In that case, antibodies attach to platelets as well as the fragments on other cells resulting in both the invaders and the platelets being destroyed.

In a similar theory, when our body is fighting a reaction, it produces a compound called interleukin-12 during its normal immune response. Interleukin-12 then creates many other immune compounds specific to a particular microbe. Researchers think this flurry of activity may activate any dormant self-reactive cells near the infection. According to this theory, if the self-reactive cell is for platelets, you can develop ITP.

8751 BRECKSVILLE RD | STE 150
CLEVELAND, OH 44141

1-877-528-3538 - TOLL FREE
440-746-9003

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Free Radical Damage (Oxidative Stress)

Theories regarding the role of free radical damage suggest reactive substances in our bodies can alter the DNA in our cells. When the changed DNA is a part of the immune control function, it can result in a specific autoimmune disease.

Free radicals are particles with an unstable molecular structure that act as scavengers in the body and rob electrons from other molecules. Factors that can instigate and hasten production of free radicals include stress, pollution, fertilizers, pesticides, prescription drugs, alcohol and electromagnetic radiation.

Our bodies have built-in methods to control free radicals and change them into neutral substances. These detoxification mechanisms require specific enzymes to make them function well. If our bodies do not have the vitamins and minerals to produce the enzymes, or if the detoxification mechanism is damaged, the result is a surplus of free radicals and other toxic substances.

The excess free radicals and other noxious byproducts of a failed detox process roam our bodies and attack our weakest links. Depending on the DNA attacked, the electron grabbing can cause an autoimmune disease, including ITP.

Immune System Defects

Both developing and mature T-cells and B-cells (types of white blood cells) have been implicated in the development of ITP.

The immune system has a way of determining the difference between foreign invaders and normal tissues. It is a complicated process with various checkpoints. When one or more of these checkpoints is faulty, antibodies can target important tissues like platelets.

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T-regulatory cells (a type of white blood cell) suppress the immune response of other cells. They keep the immune system in check by halting the immune reaction after clearing a virus or bacteria and by preventing the immune system from over-reacting and attacking normal cells, like platelets. Evidence of this theory was shown in a study of mice with ITP. Researchers found the T-regulatory cells were retained in the thymus of the mice instead of being released into the blood where they could do their job of balancing the immune system.

People with ITP also have fewer B-regulatory cells. These cells are important in regulating the T-regulatory cells and also play a role in deciding which cells are normal, and which are not and need to be eliminated.

Intestinal Changes

Our bodies contain about 100 trillion microbes, most of them bacteria, and most of them living in the digestive tract. These microbes play a role in our adaptive immune system, the part of the immune system that disables harmful viruses and bacteria. When beneficial bacteria living in the gut are modified by diet, antibiotics or invading pathogens, the immune system can shift allowing particles to escape from the digestive tract. These disturbances of the intestinal immune system can lead to various intestinal diseases and have been increasingly linked to immune-mediated diseases, including rheumatoid arthritis, multiple sclerosis (MS) and other autoimmune diseases.

It has also been shown that people with ITP have different volatile organic compounds in their urine than healthy controls; this finding could be due to differences in the number and kind of intestinal bacteria (microbiome).

Other Causes

People diagnosed with ITP sometimes have other diseases that contribute to their low platelets; other cases of ITP can be drug-induced or the result of eating particular foods. Learn more about other platelet disorders and their causes.

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