

Autoimmunity and Nutrition

A central function of the immune system is to distinguish foreign molecules, such as infectious agents, from the molecules that belong to the body tissues. The immune system attacks foreign particles by creating an army of specialized white blood cells (lymphocytes) and by producing antibodies.

Sometimes there is a failure to discriminate between self and non-self (foreign), and an inappropriate immune response will arise, an *autoimmune* response. In an autoimmune response, the specialized lymphocytes and the antibodies attack normal body tissues and organs.

More than 78 clinically distinct autoimmune diseases are identified and the list continues to grow. Some of the autoimmune diseases are well known, including; Diabetes type 1, Irritable Bowel syndrome, Lupus, Multiple Sclerosis, Rheumatoid Arthritis, and Juvenile Arthritis. Others are less familiar, including Crohn's disease, Graves' disease, Hashimoto's thyroiditis, Mixed Connective Tissue Disease, Pemphigus, Progressive Systemic Sclerosis, Sarcoidosis, Sjogren's Syndrome, Temporal Arteritis, and various skin conditions. Collectively these diseases afflict more than 15 million Americans, with women being affected disproportionately.

Autoimmune conditions represent a significant physical, emotional, and financial burden for society.

Many separate mechanisms have been described that may contribute to the failure of the immune system leading to autoimmunity. Among them, drugs and hormone interaction, genetic configuration, cross reactivity of some bacterial and virus immune factors, and the scarcity or the excess of some specific food ingredients in the diet form a puzzling assortment of triggers.

Links between food ingredients and immunity have become a hot topics of research. Recent publications demonstrate a remarkable and close concordance between the host overall nutritional status and immunity.

An example is:

Deficiencies of minerals, including iron and zinc, are well documented to impair immune function in experimental animals, and to the extent studied, in humans as well. One postulated mechanism is that both of these metals are essential for the function of a number of metalloenzymes required for nucleic acid synthesis and cell replication. (Gerald T. Keusch, 2003)

Other links have been delineated between specific food ingredients in the diet and autoimmunity. Examples are the link between a scarcity of some carbohydrates and errors in cell identification, and the links between an elevated omega-6 to omega-3 essential fatty acid (EFA) ratio in the diet or an elevated blood sugar level and an exaggerated immune response.

Here is how the links work: Target recognition directs the immune response, while the prostaglandins hormones we make from EFAs modulate its intensity.

A - Target Recognition.

Cells wear identification molecules protruding from their membranes. The cell's identification molecules are made of various carbohydrates and carbohydrate derivatives. Without the supply of a variety of carbohydrates, cells have problems making their identification molecules. Errors in these molecules confuse the immune system recognition system. Think of the identification molecules as bar codes and the immune system recognition system as a bar code reader. Think of the mess caused by errors in a bar code

A cell's bar code contains the carbohydrates glucose, galactose, mannose, xylose, fucose, and derivatives. One of these carbohydrates— glucose, is in excess in our diet, while the other carbohydrates are scarce or missing in our refined food. The missing carbohydrates exist in fruit and vegetables.

2 - Intensity Modulation

The intensity of an immune response is modulated by prostaglandins hormones. We make two types of prostaglandins hormones. Type 1 increases immune response, type 2 reduces it. A useful immune response depends on the balance between the two types. We make prostaglandins from Essential Fatty Acids (EFAs) exclusively. There are two types of EFAs, the Omega-6 and the Omega-3 EFAs. We use the omega-6 EFAs to make the prostaglandins that increase immune response, and the omega-3 EFAs to make the prostaglandins that reduce the immune response. The omega-6 EFAs are abundant in our diet, while the omega-3 EFAs are very scarce. The omega-6 to omega-3 ratio in the American diet is about 12 to 1, in the Australian diet the omega-6 to omega-3 ratio is around 18 to 1, instead of an ideal 2 to 1. With ratios higher than 2 to 1, the immune system is overactive. With ratios around or higher than 10 to 1 the immune system runs with no brakes. *Hence, the proliferation of autoimmune conditions with our omega-3 EFA deprived diet.*

To correct the ratio we should avoid omega-6 EFAs rich fats and oils and supplement the diet with omega-3 EFAs rich fats and oils. Omega-3 EFAs are available in flax seeds, in cold ocean fish (sardine, salmon, mackerel, and herring), and in fish oil supplements like Ultimate E.F.A. and Ultimate E.F.A. Plus. Here we have to make a distinction between Alpha Linolenic Acid (ALA), and other more active omega-3 EFAs. ALA is the sole omega-3 EFA found in plants and in the supplement Ultimate E.F.A. Cold ocean fish and the product Ultimate E.F.A. Plus contains ALA and other omega-3 EFAs, among them the active omega-3 fatty acids Eicosapentaenoic acid (EPA) and Docosahexaenoic acid (DHA). We make the prostaglandins that reduce immune response from EPA. Although we are capable of making EPA and DHA from ALA, many people have lost that capacity. ALA has little biochemical function except to contribute to cell membrane fluidity, and to be the raw material for making more active omega-3 EFAs. People that can not make EPA and DHA from ALA *can not make enough prostaglandins to down regulate an overactive immune system.* They need food and supplements containing EPA and DHA. They need it at least to start with. Indeed some EPA and DHA intake is for our biochemistry like seed money for a business.

When correcting the diet to reduce autoimmunity, we have to take into account the life span of the lymphocytes the immune system has multiplied, the lymphocytes that attack the tissue and organs and the lymphocytes that produce antibodies. Once the storage of EPA and DHA is replenished—it takes about 6 weeks, the omega-3 derived prostaglandins production halts the lymphocyte multiplication. However the lymphocytes produced previously are still available. The lifespan of lymphocytes is from six months to two years. Therefore six months is the period of time one has to consider for some improvement to become noticeable and two years for remission to occur. Some food (offending food) contains molecules that stimulate the production of omega-6 derived prostaglandins. A high blood sugar level (hyperglycemia) also stimulates the production of omega-6 derived prostaglandins. People with an autoimmune disease should avoid eating offending food and food that increase the blood sugar level, like refined sugar, and food with a high glycemic index.

A list of immune system offending food, an informative text about hyperglycemia with food listed by its glycemic index, a list of food with its essential fatty acid content, and the text above are available in the website of the Longevity Institute at <<http://www.longevinst.org>> (Click on “downloads” in the left navigation strip)