The Biotoxin Pathway

In genetically susceptible people, biotoxins bind to pattern receptors, causing continuing, unregulated production of cytokines.

High cytokine levels in the capillaries attract white blood cells, leading to restricted blood flow, and lower oxygen levels. HIF stimulates VEGF and TGF B-1. Reduced VEGF leads to fatigue, muscle cramps, and shortness of breath (may be over-ridden by replacement with erythropoietin). TGF B-1 changes cell type and interacts with Treg cells.

Surface Receptors (Toll; C-type lectin; mannose & others)

Increased Cytokines

Fat cells then produce more leptin, leading to obesity (which doesn’t respond to exercise and diet).

Hypothalamus

Leptin receptor

Damaged leptin receptors lead to reduced production by the hypothalamus of MSH, a hormone with many functions.

Reduced MSH

White blood cells lose regulation of cytokine response, so that recovery from other illnesses, including infections diseases, may be slowed.

Increased cytokines

Endorphin production is suppressed. This can lead to chronic, sometimes unusual, pain.

Inflammation-related symptoms

High levels of cytokines produce flu-like symptoms: Headaches, muscle aches, fatigue, unstable temperature, difficulty concentrating and more. High levels of cytokines also result in increased levels of several other immune-response related substances, including TGF B-1, MMP-9, IL-1B, and PAI-1. MMP-9 delivers inflammatory elements from blood to brain, nerve, muscle, lungs, and joints. It combines with PAI-1 in increasing clot formation and arterial blockage.

Sleep Disturbance

Production of melatonin is reduced, leading to chronic, non-restorative sleep.

Vitamin (VIP)

MSH

AVP

Leptin

Reduced MSH can cause the pituitary to lower its production of sex hormones.

Resistant Coag-negative Staph Bacteria

Colonies of MARCoNS with resistance to multiple antibiotics may develop in biofilm or mucus membranes. The bacteria produce substances that aggravate both the high cytokine levels and low MSH levels.

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Increased Leptin

Gastrointestinal Problems

Lack of MSH can cause malabsorption in the gut, resulting in diarrhea. This is sometimes called “leaky gut” and resembles (but is not) celiac disease. IBS is often present.

Chronic Pain

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Split Products of Complement Activation

C4a: capillary hypoperfusion
C3a: bacterial membranes

In most people, biotoxins are either removed from the blood by the liver or attached by the immune system, broken down, and excreted harmlessly. In people who don’t have the right immune response genes, however, biotoxins can remain in the body indefinitely.

Body acquires biotoxins or toxin-producing organisms from food, water, air, or bug bites

Biotoxins have direct effects, including impairment of nerve cell function.

Biotoxins (HLA susceptible)

Nerve cell/axon

Biotoxin (HLA susceptible)

Nerve cell/axon

Biotoxins (HLA susceptible)

Removal from the body

Inflammation-related symptoms

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Reduced Androgens

Reduced MSH can cause the pituitary to lower its production of anti-diuretic hormone (ADH), leading to thirst, frequent urination, and susceptibility to shocks from static electricity.

Reduced ADH

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Reduced MSH

Changes in Cortisol and ACTH levels

The pituitary may produce elevated levels of cortisol and ACTH in early stages of illness, then drop to excessively low levels later. (Patients should avoid steroids such as prednisone, which can lower levels of ACTH)

Prolonged Illness

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Immune System Symptoms

Patients with certain HLA genotypes (immune response genes) may develop inappropriate immunity. Most common are antibodies to:
- Gliadin (affects digestion)
- Cardiolipins (affects blood clotting)

Treg cells: Pathogenic T cells

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