Health and Wellness: The Hygiene Hypothesis: Allergies and other Auto-immune Diseases.

We are living through a pandemic of auto-immune diseases. In the developed world, some form of allergy now afflicts almost half of those living in industrialized societies. Serious immune-mediated diseases occur in 3 to 5% of the US population. Lastly allergic and autoimmune diseases have increased strikingly in the last 50 years. Civilization has apparently flipped a switch in our immune systems. Why is this?

Most are aware that Florence Nightingale saved many lives by cleaning up British field hospitals during the Crimean War. Likewise Ignaz Semmelweis did much good by promoting antiseptic practices in the maternity hospitals of 19th century Vienna. Their message, that hygiene saves lives, may have had an unintended consequence when generalized outside the hospital to entire lifestyles -- i.e. it may have resulted in a pandemic of auto-immune diseases. It has taken 150 years for us to realize that while a lot of dirt is bad for us, a little bit of the right kind might be most helpful. There is a saying in Afrikaans which supports this argument: “Wat nie doodmaak nie maak vet” (What doesn’t kill fattens). For example:

- Ethiopian, Brazilian, Venezuelan, and Gambian adults have less asthma when infected with nematodes
- Gabonese schoolchildren with schistosomiasis have fewer allergic reactions to dust mites than do those who are not so infected
- Children living on farms in Germany have fewer allergies than children living in cities.
- One of the most debilitating autoimmune diseases, multiple sclerosis, is virtually absent in Roma, Inuit, and Bantu, is rare in the indigenous peoples of the Americas and Asia, and is rare in the tropics

The “Hygiene Hypothesis” maintains that this pandemic is an unintended consequence of the cleanliness of modern civilizations caused by the elimination of parasitic worm infections. Pig whipworms are the worm of therapeutic choice because they elicit reactions in the human immune system without establishing debilitating infections. Sterilized whipworm eggs administered in doses of
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- 2500 eggs twice a week for 12 weeks led to improvement in 43% of patients with ulcerative colitis
- 2500 eggs once every three weeks for 24 weeks led to improvement in 72% of patients with Crohn’s Disease

Now, a study of patients with multiple sclerosis indicates that infection with intestinal worms protects against the advancement of that scourge as well. MS patients with worm infections developed symptoms very, very slowly, whereas MS patients without worm infections progressed much more rapidly to serious disease. Convinced, the National Multiple Sclerosis Society has funded a study for MS using pig whipworm eggs. One of the nastiest of the autoimmune diseases may be coming within the reach of a most surprising therapy.

Why might parasitic worms (helminths) want to manipulate the human immune system? They face daunting transmission problems and must survive for long periods in their vertebrate hosts to achieve reproductive success. They evolved methods of reducing the inflammatory response of their host’s immune system, in part mediated by regulatory T cells. Regulatory T cells are conspicuous by their absence in auto-immune patients; worm infections appear to restore them to normal levels. Once worms had evolved the ability to persist in their hosts and produce chronic infections, their hosts co-evolved to further reduce the debilitating inflammatory responses elicited by the worms, which could no longer be avoided. As a result, the host-parasite interaction changed and the relationship became symbiotic. Then, when modern hygiene eliminated the worms, our immune system was left with inappropriate reactions to the sudden lack of a chronic stimulus. Those inappropriate responses include a decline in the production of regulatory T cells and associated attacks on our own tissues, be they the myelin sheaths of nerve axons (in MS), the Islets of Langerhans in the pancreas (in insulin-dependent diabetes) or the lining of our gut (Crohn’s and other types of inflammatory bowel diseases).

Stephen Stearns  evmedreview.com  If you cannot find it, search Google using the keywords "stephen stearns hygiene hypothesis"
There is also an excellent video on the subject by Professor Graham Rook  www.hstalks.com

In summary what this all means is the following: Human evolution took place in the presence of all
manner of parasites, including intestinal worms, exposure to domestic animals like cattle, dogs, cats etc. As a result, our immune system developed ways to either (a) identify the intruders and eliminate them, or (b) find ways of living with the problem. It is the latter that is the cause of many auto-immune diseases (asthma, hayfever, multiple sclerosis, diabetes, etc) because our immune system continues to function in the way it had evolved even though the environment has changed. More specifically, it now reacts inappropriately (i.e. it over-reacts) in some instances. One solution would be to return to the unhygienic conditions that prevailed earlier -- something I am sure few are, understandably, willing to contemplate. Alternatively one might consider re-introducing into our environment relatively benign parasites, thus fooling our immune systems into behaving in an appropriate manner. NFHyg