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Editorial

The Montezuma Defence (Or, How to Protect Yourself against Infection, Including Food Poisoning)

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Received: November 16, 2020; **Published:** January 28, 2021

The adaptive immune system gets a good deal of attention because it can be manipulated via immunisation, which at $40 billion per year is very big business indeed [1]. So big, in fact, that the pharma companies involved can afford to spend many millions of dollars to subvert organisations such as the CDC, to push mandatory immunisation programs [2].

Another reason for focusing on the adaptive immune system is that it can go wrong in many interesting ways. It is deeply involved in allergy, critically involved in autoimmune disease, and is an essential component in graft rejection and graft-versus-host disease.

It is the innate immune system, however, that keeps most of us healthy, most of the time.

The innate immune system may not have long-term memory but it is a highly sophisticated system, with many components. During the last few decades a growing science has shown that some of these can be manipulated too, in order to gain therapeutic advantages. And this can be done at home; no doctors, drugs or vaccines are needed.

The innate immune system includes physical barriers to infection, the best known of which are the skin cells we shed daily, the mucociliary escalator and the acid bath of the stomach. It also includes chemical compounds such as the antimicrobial peptides and the enzymes lysozyme, lactoperoxidase and myeloperoxidase; humoral elements such as complement and the opsonins and cellular components such as macrophages and neutrophils.

Many of these elements are compromised by poor nutrition, which is now commonplace. Inversely, they can be enhanced using pharmaconutritional tools.

It is well known, for example, that the functionality of innate immune cells can be enhanced using natural CR3 and Dectin-1 agonists, the most effective of which are the 1-3, 1-6 beta glucans from baker's yeast and other fungi [3]. It is accepted that the LPO system can be mimicked and enhanced using exogenous lactoperoxidase, an approach originally developed to sterilise bulk milk [4] but which is now being used by increasing numbers of health care professionals to treat clinical infections [5,6].

If the innate immune system is the redheaded stepchild of the overall immune system, however, the redheaded stepchild of the innate immune system is the microbiome. If correctly configured, the microbiome presents a huge challenge to potential pathogens. If. And here, I believe, is another opportunity for innate immune enhancement.

Industrial foods are routinely low in prebiotic fibers. This dietary defect starves gram-positive anaerobes such as *Lactobacilli* and *Bifidobacteria*, which decline in number and are replaced by generally gram-negative species. The impact of this shift is highly pro-inflammatory.

When gram-positive bacteria ferment prebiotic fibers they produce butyric acid, which is a powerfully anti-inflammatory compound. As the gram-positive bacteria decline in numbers, levels of butyric acid fall. Conversely, gram-negative bacteria are coated in highly pro-inflammatory lipopolysaccharides, and come into close contact with the gut walls; so as they multiply pro-inflammatory signalling in the gut increases.

I now believe, however, that the modern, excessively gram-negative microbiome may harm us in other ways also. Specifically, I think it leaves us more vulnerable to food poisoning.

It takes time to obtain ethics committee approval for clinical investigation, and I have never been very bureaucratically inclined when it comes to the study and use of natural dietary compounds, which carry little risk. So, I decided to self-experiment at my own convenience (with apologies for the cheap wordplay).

I prepared food in such a way as to guarantee a degree of food poisoning, froze it and consumed similar portions on 4 separate occasions. On the first and third occasion I did so with a microbiome that had been damaged by eating industrial foods. On the second and fourth occasion I had a very different microbiome, enhanced by using a time-release blend of several prebiotic fibers.

The results were quite convincing. Doses 1 and 3 produced very obvious gastrointestinal symptoms, which lasted for 24 - 36 hours. After doses 2 and 4, the symptoms were very much milder and lasted for no more than 6 hours.

This is in line with animal studies. Veterinary scientists have found that modifying the microbiome with prebiotic fibers reduces GI infections in chickens, which are not very like humans, and in pigs, which are [7-13]. There are several mechanisms involved. As the probiotic species grow, they occupy ecological niches in the large bowel and reduce colonisation opportunities for potential pathogens. Perhaps more importantly, they secrete anti-microbial peptides and proteins that kill off many types of pathogens, from gram-negative bacteria to viruses to yeasts [14-18].

Over the last ten years or so I have consistently experienced that the combination of innate cell activation (using 1-3, 1-6 beta glucans) and lactoperoxidase enhancement (using Fe and thiocyanate) provides excellent cover against infection. I occasionally experience a tickle at the back of the throat, but this has not once progressed to overt infection since I started the program.

I now think that it is a good idea to add blended prebiotic fibers to the mix, especially if you are going to travel to places where food poisoning is common. This combination does not make you immune to all microbial slings and arrows, but I am certain that it will improve your odds of staying healthy.

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Volume 16 Issue 2 February 2021