

## Immune System in Health and Disease

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### INTRODUCTION

The human body during its life span goes through numerous stresses including physical (trauma), chemical (metabolic and other toxic materials), biological (viruses, bacteria, fungi, parasites) and psychological (job, family and others) insults. In order to maintain homeostasis our immune system plays a vitally important role. With dedicated effort in improving our health, we are able to enhance our immune system's efficacy with little adjustment to our dietary choices and life style. If we could maintain the optimal immune system, we would not have to revert to centuries past when we used to place a blame on ambiguous "bad luck factors" for our health problems. Citizens all over the world stand in high respect and admiration for the discipline and sacrifice of their nation's soldiers.

### DISCUSSION

A soldier constitutes the ideals of machine-like work in harrowing circumstances, fiercely determined in the pursuit of defense. Similarly, the army in our body's immune system: an invisible and unrelenting system of cells and biochemical reactions. Much like an army, the immune system depends on its own attack mechanisms and defense strategies in order to be effective. An army depends on weapons to harm their enemies, fortified compounds for defense and for the soldiers' sanctuary, and secret communications that can be disclosed only within its ranks. Within our bodies, there are equally impressive mechanisms in place: Our inner army has several purposes: bring the body back to normal condition from any trauma (physical or psychological), eliminate any toxins including food metabolites (a type of chemical assault), and eliminates pathogens, an agent that causes disease, with minimal collateral damage to the host [1]. Furthermore, this army must be carefully calibrated for optimal efficacy: a deficiency in any aspect of the immune response leads to an immune deficient individual. On the other hand, an overactive immune system that indiscriminately launches attacks leads to autoimmune disorders such as multiple sclerosis or lupus, wherein the body's natural immune responses attacks its own tissues, mistaking the host body as the foreign invader. This balance between effective, intimidating wartime execution and ineffective, self-harming deployment is a tricky and constant compromise for our

immune system, much like two ballet dancers who must learn the proper give-and-take of each other's body in a difficult duet [2]. Let us start understanding and appreciating this challenge that silently occurs every millisecond in our private battle field. We begin with the most natural and instinctive habit of our body. With each breath in and out, our body encounters a host of pathogens ranging from environmental toxins to infectious agents. Indeed, the interface between the air and our body is the battlefield "most frequently targeted by pathogens." Just like an army advancing toward sits opponents and breaching the first wave of enemy soldiers, there will inevitably be casualties on both sides. Visualize this action inside the lungs: any damage incurred as the immune system attacks the lung [3].

pathogens also sheds away its own physical barrier, weakening its own defense structures one cell layer at a time, exposing its own soldiers to the volatile elements of the battle (Nature Immunology, December 2014). Think of how many times each year we cough, notice the green-yellow sputum in our tissues, and call our doctor: that number represents how many total battles were fought in our respiratory system and how our lungs suffered and were weakened a bit at a time during the attack. Now at this point consider an individual, who had an episode of the common cold in the winter and after he recovered, habitually reached for a pack of cigarettes. Each inhale of smoke is an advancing enemy, slowly breaching the mouth, the trachea, until it reaches the bronchioles of the lungs that house the alveoli, the basic lung units that exchange carbon dioxide for oxygen. Does this individual, chained to his habit of cigarette smoking, realize he has personally delivered 7,000 chemicals, 69 of which are directly known to cause cancer, to his lungs that now are becoming more burdened in their quest to deliver oxygen? These toxic chemicals specifically damage the cilia, the microscopic hair-like projections in the lungs that sweep away any mucus or unwelcome particle [4]. With each inhalation, more cilia are paralyzed and destroyed until there is no way for the lungs to protect themselves against basic invaders. This damage occurs with each cigarette until the individual, who now has emphysema, now depends on an oxygen tank to supply him what his lungs cannot do anymore. Even more frightening, the soldiers that protect those lungs from all that seek to injure them now lie defeated, the battle forever lost and the individual

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forever compromised [5]. Much like the lungs, another organ system that is constantly being inundated with pathogens as part of a vital life requirement is our gastrointestinal system in its quest to obtain nutrition [6].

## CONCLUSION

The gastrointestinal system's goal is to extract the nutrients from our diet, along with the corresponding pathogens like Salmonella and E. coli that make their home in our eggs and beef and cause the unwelcome symptoms of diarrhoea and dehydration. When the healthy nutrients and infectious invaders enter our digestive tract, our stomach, pancreas, and gallbladder are stimulated to secrete their potent digestive enzymes that break down the nutrients into the basic building blocks that provide energy, such as amino acids from protein, fatty acids from oils and fat, and simple sugar glucose from carbohydrates. While this occurs, our gut flora, the community of 100 trillion beneficial microorganisms in our intestines, utilizes the fatty acids and carbohydrates from our diet into a source of energy so that they may continue to enhance our overall immunity. In this way, our gut flora is like a miniature army under the umbrella of our body's armed services, providing another layer of defense and attack to its enemies

from the deepest bowels of warfare. Fortunately, there is a way to enhance our gastrointestinal army and gut flora through our diet. When you go into the supermarket, you may notice a shelf of yogurt boasting the term "probiotics," referring to live microorganisms that have a health benefit

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