

Thomas G. Williams Ph.D.
Joel J. Pins Ph.D, MPH, LN.

MANAGING CHRONIC INFLAMMATION: NATURAL SOLUTIONS

The human immune system is a complex and multi-layered array designed to limit tissue damage from harmful agents and cells. The inflammatory process is a vital and necessary component of our immune defense system, and when these immune responses are temporary and local, the inflammatory process is beneficial. However, a breakdown in the regulation of the inflammatory response can result in processes that, instead, lead to the damage of tissues and organs; and are a hallmark of most chronic diseases. Therefore, understanding the various aspects of the inflammatory process allows for a more comprehensive approach to treating patients with most chronic conditions. Likewise, an immense amount of research is now being directed at finding agents that affect the inflammatory process at various levels. This review will focus primarily on the role of inflammation in chronic disease conditions and the role of diet, lifestyle and nutraceutical agents in the management of both acute and chronic inflammation.

Introduction

Formal descriptions of inflammation are very ancient, being described by the four hallmarks of redness, swelling, pain and heat as early as the first century. These hallmark signs were long associated with acute injury or infections and are considered vital to the repair of damaged tissues. Over the past decades, we have linked inflammatory processes to many more diseases without these overt outward signs. They include inflammatory disease of the skin (psoriasis, eczema), bowels (Crohn's disease, colitis), central nervous system (Alzheimer's, multiple sclerosis), rheumatoid arthritis, allergies, asthma, atherosclerosis, cancer and diabetes to name just a few. While the tissues affected by these conditions may be different; the cells, cytokines and pathways of inflammation are very similar in each. Likewise, some of the lifestyle, diet and treatment protocols for these conditions may have a common thread- the overall reduction of the inflammatory burden.¹

The basic process of inflammation begins with some sort of tissue injury- whether physical, chemical or biological. This injury results in the release of cytokines and chemoattractants from the damaged tissue that function to recruit immune cells (lymphocytes) from the bloodstream into the damaged tissue. These recruitment signals may come from the distressed cells directly or from mast cells and macrophages, immune cells

embedded within the tissues. Next, up-regulation of adhesion molecules (e.g. selectins, ICAM, VCAM) on the damaged tissues allows for the docking of the recruited lymphocytes, permitting these immune cells to begin the process of diapedesis, where they alter their cellular structure and move from the arterial lumen to the tissue space through the endothelial junctions. Once these immune cells are in the extravascular space, they begin the process of "fighting" the cause of the tissue damage, sending more signals to recruit more cells and secreting compounds that alter vasodilation, platelet activity and fibrinolytic activity- resulting in the hallmark signs of inflammation. These processes are designed to eliminate the cause of injury and help repair the damaged tissue. Unfortunately, many of the signals which drive the inflammatory process are not transient and, instead of resolving the underlying damage, the inflammatory process results in a chronic cycle of tissue damage.²

Mediators of Inflammation

In the past several decades, many of the cells, cytokines and genes that regulate the inflammatory process have been described. While only a few of these have resulted in measurable clinical markers, many of the mediator pathways have become the target of anti-inflammatory therapies. Perhaps the most