Natural Plant Molecules ©

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Glycobiology is a relatively new field of study in the world of science. Recently discoveries in the field of Glycobiology reveal the critical role of mannans in the mechanisms of immunity. This paper defines a fundamental pathway of innate immunity and describes the strategic role of mannans at each stage of this pathway. [1,3,4,5]

By studying current research, we can distinguish three steps of a basic, acute pathway of immunity. We can demonstrate the event of the critical role of mannans through the functions of mannan/mannose binding protein (MBP) in the work of acute phase reactors, and then through the functions of the macrophage mannose receptors (MMR) in the dominant responses of the macrophage. Each of these critical pathways will show through the healthy working of the immune system. Each step of this process could be dangerously threatened by a lack of sufficient mannan molecules. This study points to the significance of this research showing that natural plant molecules can supply functional mannans. Mannan saccharides are abundant in high levels in certain plant species, such as Aloe Vera. The implications are clear. Natural plant molecules found in Aloe Vera offer answers to improving our immune system and our overall health. [2,6]

The powers of the immune system were demonstrated, in the 19th century, by Dr Cooley, cured sarcomas in animals by injecting them with extracts of E-Coli. Later, a complex of lipomannan saccharides (LPS) were identified as the source of signals activating this intense immune inflammatory response. Today, LPS signals are also known as Cooley's endotoxin. [7,8]

In the 20th century, a source of immune signals and activation are revealed in extracts of natural plant molecules. The source of this immune stimulus was identified as a complex sugar molecular known as glucomannan saccharides. High concentrations of mannan saccharides are available in the gel of Aloe plants. Laboratory studies show the effects of glucomannan saccharides signals as they activate the immune response through increased expressions of interleukin-1, interleuken-6, and tumor necrosis factor. Research confirms that mannan saccharides serve as "actogens signal" which alert acute responses of the immune system. [14,]

Next, mannans play a critical role in the acute response phase of innate immunity. A surge of blood chemistries called acute phase reactors initiate the first wave of defense against foreign or non-self molecules that threaten the body. In the first hours of immune defense, mannan binding proteins (MBP) are released by the liver in high concentrations. This stimulates a chain of chemicals that directly kill microbes or coat their membranes with opsin to enhance later phagocytosis. MBP in the presence of compliments constitutes a primal route of a basic immune defense. Crystallography and new techniques of analysis describe the geometric configuration of the MBP structure. Its chromosomal source, its genetic region of organization, its architecture, and the routes of its interactions are clearly defined and documented. [5,11,12,13,]

The two processes of acute signal and acute response activate the innate immune system whenever a palatable threat to the body is recognized. However, the pathway of immunity includes a further ongoing response of a defensive nature. Research in the latter half of the 20th century has focused on the role of the macrophage acting both as a primary killer of pathogens, itself, and as commander in chief of the cellular and humoral immune army. [13,14,15,16,]

Using its remarkable diversity, expertise, and skills, the activated macrophage patrols and orchestrates the ongoing defense of all tissues. The macrophage includes three distinct types of mannan/mannose binding-

receptors known as LPS, mannose binding-receptors (MMR) and a class of seven transmembrane receptors. Combinations of macrophage membrane receptors dock with a broad array of initial mannan receptors found on B cells, immununglobulins, and complements.

As alarm signals accumulate in intensity, the levels of acute immune responses increase in intensity. The macrophage, itself, is especially sensitive to the level of danger signals. A progressive increase of alarm signals activates the macrophage. Distinct functional states of alert are primed macrophages, antigen presentation, and cytokine expression. Considerable research demonstrates that a high level of mannan signals activate a high state of macrophage function, which presents antigens to incite T lymphocytes and the releases intense defensive cytokines, especially IL-1, IL-6, and tumor necrosis factor (TNF). [9,17,18,19,]

The evidence that mannan molecules are essential in the function of the immune system becomes ever clearer when mannans fail to present in their natural physiology. For example, injections of high levels of LPS endo-toxin can induce extreme inflammatory host reactions of lethal septic shock. [7,8,9]

Too few functional signals lead to a variety of pathological conditions resulting from genetic disorders. Inheritable mannan related carbohydrate-deficient glycoprotein syndromes tend to cause multi system diseases, typically with major nervous system disabilities. One type of mannan genetic defects is deficient glycoprotein syndromes tend to cause multi system diseases, typically with major nervous system disabilities. One type of mannan genetic defects is described as a flawed, lectin-recognition and defective opsins in the alternative-complement pathways. These genetic dysfunctions markedly impair defenses of newborns who suffer a high mortality rate during their first 2 years. Low serum levels of mannan binding protein are found in other familial diseases of vulnerability to infections. [32-34]

In general, however, dietary mannan supplements from plant molecules appear to be handled in our bodies, in a controlled fashion at a natural level of signals and functions.

A number of recent studies demonstrate enhanced benefits of mannan saccharides. Research studies, presented in a series of legal patents, offer evidence of possible benefits of mannan associated in the defense against a broad array of illnesses including bacteria, viral, fungal, parasitic, auto immune and many other chronic type health disorders. Mannan saccharides augmentation has successfully passed, Phase I and II of FDA testing. In fact, the clinical benefits of aloe mannan saccharides have proved so significant that the USDA in the management of oral lesions now accepts aloe mannan saccharides. [38]

Tracing mannans through a primal, fundamental pathway of immunity is the beginning of the first chapter of a script about their potential benefits in the future of our health care.

Mannans operate at the ground level of our own well-being. Glycoproteins of stem cell fibroblasts direct the synthesis of complex mannans to build connective tissue of the matrix, covering virtually every tissue of the body. With mannans molecules synthesized with specific proteins and lipids to build glycoprotein and lipoprotein used in intracellular organelles of every cell of our body. Mannans are uniquely absorbed into our digestive tract through efficient energy driven pinocytosis. In contrast to the majority of carbohydrates that are easily absorbed, the chains of mannan saccharides are ingested intact by distinctive membrane endocytosis. Compared to monomer hexose sugars such as glucose or xylose, mannose is absorbed preferentially, faster. Compared to other sugars, mannans are contained in our tissues far, far longer. With mannans uniquely conserved by our genes assign, one gene dedicated to the mannan monomer structure, one gene dedicated to the dimmer structure, and so on. By specific enzymes mannans are transported, sorted, and recycled for metabolic renewal. Combined with phosphate, intercellular mannans are selectively switched; mutations and defective mannan enzymes drive dysfunctions of recognition, absorption, transference, traffic sorting mechanisms, and more. [34-39]

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