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Why This Book?

I wrote this book for several reasons. The first one is because I receive more and more questions about my work and particularly about beta-glucans. It seems that a lot of people have heard about them but are also confused about them. Despite the enormous scientific research that has gone on regarding individual glucans, very little accurate information is available on the internet. Information on the internet is often difficult for the general public to understand, or it is inaccurate (which is even more often) because it is commercially-driven. The internet is obviously the first port of call for anyone looking for information these days. Having researched beta-glucans extensively for 18 years, I am eager to provide scientific and reliable information about them to the general public, so that individuals can manage their health or illness more effectively.

During my 18 years of glucan studies, I have worked on federally-funded research on glucan activities and, together with Dr. Gordon Ross, one of the true glucan pioneers, elucidated the glucan-CR3 receptor interaction and the concept of synergy of glucan with specific antibodies.

Later, I cooperated with several companies around the world, including the Laboratoires Goémar in Saint-Malo where I studied the effects of marine glucans with Dr. Jean-Claude Yvin and Dr. Edouard Panak. Subsequently, I was also involved with the Groupe Roullier in Saint-Malo, doing additional research on using glucan in combination with other bioactive materials that might increase the already impressive actions of glucan. In addition, I am collaborating with the Brazilian glucan manufacturer Biorigin. Additional experiments evaluated the biological properties of glucan made and sold in the United States, Turkey, Taiwan, South Korea and the Czech Republic. Please know that I am not selling glucan. I wrote this book objectively and completely without any profit motive.

The book exists primarily to give the reader a complex overview of beta glucan, its activities, potentials and setbacks. Some authors tried to write an abbreviated, easy-to-read, "plain English" book. I chose the opposite direction, keeping the text simple, but giving full details. Where necessary, I used scientifically common terms, which are explained later in **Chapter 17: Glossary of Terms.** On the other hand, readers seeking even more details can take advantage of numerous important publications, summarized in **Chapter 18: Scientific References**.

Since I am not in the glucan-selling business, you will not find an endorsement of any company manufacturing or selling glucan. Any commercial name used in this book is mentioned only in case of my own extensive testing. Therefore, all information is for educational purposes only. It is my intention to give the reader enough tools to evaluate the sometimes rather bombastic statements and claims of commercial companies. After reading this book, one should have enough information (including references of the most relevant scientific studies) to clearly and safely distinguish between true data and smoke and mirrors and to pick the respectable, safe and, most of all, biologically active glucan.

I would also like to mention that there are other agents that stimulate the immune system. However, glucans are in a class apart, because those agents can push the immune system to over-stimulation. This means that they can make matters worse in the case of auto-immune illnesses such as lupus, multiple sclerosis, rheumatoid arthritis, allergies and yeast infections. Glucans, however, do stimulate the immune system, but never to the point where it becomes overactive. In addition, glucan is one of a few natural immunomodulators for which we know not only the composition, but also the mechanism of action.

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Differences Among Glucans

Though various models of the fungal cell wall differ somewhat, they concur in that β-glucan is not located on the surface of the wall but is more or less immersed in the wall material. With regard to both immunological research and pharmaceutical utilization of glucans, an important conclusion can be reached. In macroorganisms, glucans initially act as markers of fungal invasion, allowing the activity of β-glucan preparations to increase with the degree of removal of glucan fibrils.

There are various natural sources of β-glucans; however, they are most frequently prepared from fungal cell walls. Baker's yeast is the most common and likely the best raw material for glucan extraction. It is rather difficult to get the glucan molecule out from the yeast wall structure in a highly active form. The major challenge is to remove the impurities, such as manno-proteins and lipids (attached to the end points of the side branches in the intact cell wall), without the loss of any biological activity. On the other hand, whole yeasts alone are not the optimal source of active beta glucan. This is primarily due to their content of available glucan not being high enough, which may result in impurities acting against the biological effects of glucan molecules.

Until recently, biologically efficient β-glucans were supposed to have similar structures — a main chain of β(1→3) bound D-glucopyranose molecules to which some D-glucopyranoses are randomly connected by β(1→6) linkages causing a different degree of branching in different glucans. However, the detailed structure of β-glucans from dissimilar sources differs as well as their biological activity. In native β-glucans, their fibrils are composed from organized parts in which the main chain is coiled to a triple helix. These

The question of purification can be also confusing. In an ideal world, every glucan on the market would be 100% pure. In reality, it is commercially almost impossible to achieve this purity and still keep the price in the reasonable range. The level of purity is still important, but, as always, the devil is in the details. The definition of glucan content varies according to the manufacturers' methods. Some companies calculate glucan content by the percentage of carbohydrates, hexose, or glucose. That would work fine in the case of 100% glucan, but not if the sample contains glucan plus other carbohydrates such as mannoproteins or even glucose. Therefore, it is important to look for a product that guarantees the beta glucan content. We tried to compare the glucan content among different commercial glucans and the results were quite surprising (Figure 21). One cannot always get fair value for one's money, and when we compared the retail price of the same glucans, the results were mind boggling (Figure 22).

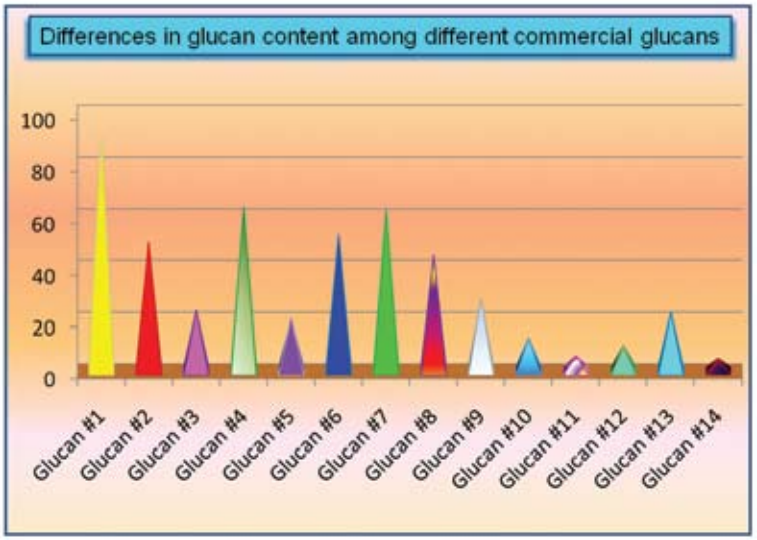

Figure 21

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Glossary of terms

Angiogenic factors — Factors that are critical to the initiation of angiogenesis and maintenance of the vascular network.

Angiogenesis — The growth of new blood vessels aiming to feed a tumor.

Antibodies — Immune system-related proteins called “immunoglobulins” Each antibody consists of four polypeptides: two heavy chains and two light chains joined to form a "Y" shaped molecule. Antibodies are divided into five major classes, IgM, IgG, IgA, IgD, and IgE, based on their structure and immune function.

Apoptotic cells — Cells undergoing the programmed cell death.

Aquaculture — Farming of freshwater and saltwater organisms including fish, mollusks and plants. Unlike fishing, aquaculture, also known as “aquafarming” implies the cultivation of aquatic populations under controlled conditions.