

# ***IMMUNOL™***

## ***HOW THE IMMUNE SYSTEM WORKS AND HOW TO IMPROVE IT IN 30 DAYS***

Inside your body there is an amazing protection mechanism called the immune system. The immune system was designed to defend you against millions of bacteria, viruses, toxins and parasites that are always trying to invade your body. To understand the power of the immune system, you have to look at what happens to anything once it dies. Now that sounds disgusting but it shows you something very important about your immune system. When something dies, its immune system along with all of the organ systems in the body shut down. In a matter of hours the body is invaded by all sorts of bacteria, parasites and other small living creatures. None of these microbes are able to get in when your immune system is working well, but once the immune system stops or is not functioning well the door is wide open. Once you die it only takes a few weeks for these organisms to completely dismantle your body and carry it away. Obviously your immune system is doing something amazing to keep all of that dismantling from happening when we are alive.

Your immune system works around the clock in thousands of different ways, but it does its work largely unnoticed. The one thing that causes us to really notice our immune system is when it fails for some reason. We also notice it when it does something that has a side effect we can see or feel. For example:

- When you get a cut, all sorts of bacteria and viruses enter your body through the break in the skin. When you get a splinter you also have a sliver of wood as a foreign object inside your body. Your immune system responds and eliminates the invaders while the skin heals itself and seals the puncture. In some cases when the immune system is depressed or not working well the cut gets infected. It gets inflamed and will often fill with puss. Inflammation and puss are side effects of the immune system trying to do its job.
- When you are bit by a mosquito, you get a red itchy bump. It too is a visible sign of your immune system at work.
- Each day you inhale millions of germs (bacteria and viruses) that are floating in the air. Your immune system generally deals with them without a problem. If our immune system is not working at peak performance you will develop an infection like a cold or flu. A cold or flu is a visible sign that your immune system has failed to protect you. Because your immune system is still working at a low level it will take longer to recover from these infections. If they are particularly bad infections, you may die. Remember, infections are the number **one** cause of illness and the number **four** cause of death after cancer, heart disease

and stroke. It is interesting to note that both cancer and heart disease can be the result of a poor immune system.

- Each day you eat millions of germs, most of which die in the saliva or the acid of the stomach. If some organisms get through, you could end up with food poisoning. This is a breach of the immune system resulting in diarrhea or vomiting. The Centers For Disease Control And Prevention predict that each year over 2 million Americans will develop some form of food poisoning with over 70,000 deaths. Most of these deaths are the result of a poor immune system.
- There are also all kinds of human ailments that are caused by the immune system working in unexpected or incorrect ways that cause problems. For example, some people have allergies. Allergies are really just the immune system overreacting to certain stimuli that other people don't react to at all. Some people have type 1 diabetes, which is caused by the immune system inappropriately attacking cells in the pancreas and destroying them. Some people have rheumatoid arthritis, which is caused by the immune system acting adversely in the joints. Certain cancers are thought to be prevented by your immune system reacting to the production of rogue cells that are the precursor to cancer. Your body is constantly producing these "error" cells and a strong immune system will remove the cancer precursor cells from your body.
- People with weakened or compromised immune systems such as cancer patients that have had chemotherapy and radiation for cancer, the elderly and the very young, AIDS patients and those with autoimmune diseases are more susceptible to infections that may become life threatening.

### **Your Wonderful Immune System . . . . .**

One of the funny things about the immune system is that it has been working inside your body for your entire life but you probably don't know much about it.

The most obvious part of the immune system is what you can see. For example, skin is an important part of the immune system. It acts as a primary boundary between germs and your body. Part of your skin's job is to act as a barrier in much the same way we use plastic wrap to protect food. Skin is tough and is generally impermeable to bacteria and viruses. The epidermis (top layer) contains special cells called Langerhans cells that are an important early warning component of the immune system. The skin also secretes antibacterial substances. These substances explain why you don't wake up in the morning with a layer of mold growing on your skin.

Your nose, mouth and eyes are also obvious entry points for germs. Tears and mucus contain an enzyme (lysozyme) that breaks down the cell wall of many bacteria. Saliva is also anti-bacterial. Since the nasal passage and lungs are coated with mucus, many germs are not killed immediately but rather trapped in the mucus and eliminated. These are the first line defenses against the invasion of bacteria and bacteria.

Once inside the body, germs deal with the immune system at a different level which involve the thymus, spleen, lymph system, bone marrow, white blood cells, antibodies,

the complement system and certain hormones. Cells from these organs all have a special job to do, but it is beyond the scope of this booklet to explain all of their functions.

### **When The Immune System Makes A Mistake...**

Sometimes the immune system makes a mistake. One type of mistake is called autoimmunity: the immune system for some reason attacks your own body in the same way it would normally attack a germ. Many diseases are caused by immune system mistakes. Juvenile-onset diabetes is caused by the immune system attacking and eliminating the cells in the pancreas that produce insulin. Some forms of rheumatoid arthritis is caused by the immune system attacking tissues inside the joints. Other forms are caused by bacterial infections in the joints caused by a poorly responsive immune system.

Allergies are another form of immune system error. For some reason, in people with allergies, the immune system strongly reacts to an allergen that should be ignored. The allergen might be a certain food, or a certain type of pollen, or a certain type of animal fur. For example, a person allergic to a certain pollen will get a runny nose, watery eyes, sneezing, etc. These symptoms are the result of the release of histamine from the mast cells in the nasal tissues. Of course, we take **anti**-histamines to reverse the action of the histamine and the allergy symptoms.

Balancing the immune system so that it is neither over or under active usually relieves allergies altogether.

### **A Healthy Immune System.....**

- As you can see from our discussion, it is extremely important for you to have a good immune system. A response mediated immune system will help protect you from a long list of infectious and non-infectious diseases. Global Biotechnologies, Inc. has spent several years developing and testing Immunol™, a revolutionary multi-component immune enhancing formulation that will give your immune system a new and powerful response mechanism to help you fight infections and other immune mediated disorders. The active ingredients in Immunol™ have been the subject of over **50** clinical trials and have been the subject of over **500** peer reviewed scientific papers. The findings suggest that there is not a better combination of ingredients for immune system enhancement either over-the-counter or by prescription.

Lets look at the ingredients in Immunol™ and explore how they work, and the clinical evidence to support its effectiveness.

**Bovine Colostrum** - Bovine Colostrum is the immune rich portion of cows milk that is present only in the first few hours after the cow calves. The colostrum collected for Immunol™ is from the first 6 hours of lactation after the calf is born. This colostrum is essentially the same as human colostrum which is important to newborn humans. With colostrum growing in popularity, it is important that we understand how it works and the differences between colostrums. Colostrum supports the human organism in two main ways. First, it's multiple immune factors and natural antimicrobial factors provide strong support for the immune system. Second, its many growth factors offer a broad spectrum boost to the body to encourage optimum health and healing. Studies show that colostrum contains powerful immune factors (Immunoglobulins, Lactoferrin, Cytokines and Interferon) that work to restore potent immune function.

Immunoglobulins are large proteins soluble in saline but not water. Immunoglobulins represent more than 40% of the proteins found in our blood serum. There are five classes of immunoglobulins; IgA, IgD, IgE, IgG and IgM. Colostrum is rich in all five of these Immunoglobulins. IgA is found in blood serum, tears, saliva and mucous membranes. IgG (the most abundant immunoglobulin found in all mammalian colostrum) is carried in the circulatory and lymphatic systems, where it helps neutralize toxins and other unwanted invaders. IgD and IgE are highly antiviral, antibacterial and are active during allergies and allergic reactions. IgM is a powerful antibacterial agent and acts as a natural antibiotic. Colostrum also contains PRP (polyproline-Rich-Polypeptides) shown in medical studies to boost an under active immune system. PRP helps restore the thymus gland to optimal functioning capability. The thymus produces vital T-cells which fight viruses and unwanted antigenic substances. PRP found in colostrum also helps balance an overactive immune system present in autoimmune diseases - conditions where the body actually attacks itself. This has tremendous implications in illnesses such as Chronic Fatigue Syndrome, Fibromyalgia, Multiple Sclerosis, Rheumatoid Arthritis, Lupus, Scleroderma as well as allergies.

Finally, Colostrum contains Lactoferrin, which has been shown in numerous clinical studies to be a potent, broad spectrum natural antibiotic and anti-viral agent. Lactoferrin is also a powerful antioxidant which inhibits the harmful effects of free radicals. Since almost all infectious and degenerative diseases are immune system mediated, a poor immune system is a problem. People who are in risk groups (the elderly, the very young, cancer patients who have undergone chemotherapy or radiation and those with autoimmune diseases) generally have poorly functioning immune systems and are susceptible to many health problems. Colostrum also has a myriad of other growth factors. These seemingly miraculous substances have been shown to benefit tissue repair, boost the bodies ability to metabolize fat and build lean muscle tissue, balance blood sugar and brain chemical levels and even repair damaged DNA and RNA.

In order for colostrum to be effective, it must be collected from a multigenerational herd with a wide catalog of different immunoglobulins, cytokines and growth factors. The colostrum used in Immunol™ is standardized for immunoglobulin concentration, screened for 36 antibiotics and 24 pesticides and dioxin. The organochlorines screened for include Lindane, BHC, Heptachlor and metabolites, DDT and metabolites, Mirex,

Methoxychlor, toxaphene, chlordane and PCB's.

### **What Doctors And Journals Have To Say About Colostrum:**

"Colostrum has a virus antibody that acts against viral invaders. A wide range of antiviral factors were found to be present in colostrum." National Institutes of Health and Prevention Research.

**Dr. E.L. Palmer, ET. al.: Journal of Medical Virology.**

**Human Clinical Study:** "Immune factors in bovine colostrum, when taken orally, are effective against disease causing organisms in the intestinal tract. Ingestion of bovine colostrum's immunoglobulins may be a new method of providing passive immunoprotection against a host of disease causing bacterial and viral organisms.

**Dr. R. McClead, et. al., Pediatrics Research.**

"Immunoglobulins from bovine colostrum effectively reduces and prevents infections from immune deficient subject: bone marrow recipients, premature babies, AIDS and patients under going chemotherapy and radiation for cancer".

**New England Journal of Medicine.** Short Abstract

"Immunoglobulins in colostrum have been used to successfully to treat: Thrombocytopenia, Anemia, Neutopenia, Myasthenia Gravis, Guillian Barre Syndrome, Multiple Sclerosis, Systemic Lupis, Rheumatoid Arthritis, Kawasaki's Syndrome, Chronic Fatigue Syndrome and Crohns Disease among others".

**Dr J. Dwyer; New England Journal of Medicine.**

"PRP was found not to be species specific and bovine PRP from colostrum turns white blood cells into functionally active T-cells. Results were shown in the treatment of autoimmune disorders disorders and cancer. An important immune modulator that stimulates an under active immune system and tones down an over active one."

**Drs. Janusz & Lisowski; Archives of Immunology**

**BETA 1, 3 GLUCAN** - Beta 1,3 Glucan has a long scientific history and reference list including literally hundreds of peer reviewed scientific papers. Research originated in the 1940's with the preparation of a crude yeast preparation called Zymosan. It was reported that this preparation would stimulate non-specific immunity. At that time, it was unknown which element of this crude preparation was able to stimulate non-specific immunity. In the 1980's, a Harvard University study described the mode of action of this material in stimulating the immune system: there is a specific receptor for yeast Beta 1,3 Glucan on the surface of certain cells called macrophages. When activated, macrophages stimulates the cascade of events that turns the body into "an explosive arsenal of defense." Macrophages play an essential role in the initiation and maintenance of the immune response. From an evolutionary point of view, the macrophage is the oldest and most consistently preserved immunologically competent cell known; not only in humans and higher animals but lower forms which have no other immunological effector cells,

have macrophages. In order to function defensively, the macrophages must pass through a state of activation which involves certain morphological changes. Also, most importantly, a whole sequence of metabolic changes occur which results in the production of a series of cytokines. They act as internal regulators of the immune system. Activation can be initiated by a variety of different stimuli such as endotoxin, bacteria, viruses or chemicals. However, these activators can be too toxic or pathogenic to be useful. Beta 1,3 Glucan, on the other hand, is orally effective, complete safe and non-toxic, and may be one of the most powerful stimulators of the immune response.

There are several different types of Beta 1,3 Glucan with different levels of activity. The most active type, however, is Beta 1,3 Glucan from the yeast cell wall.

The activated macrophage is a veritable powerhouse. A macrophage can recognize and kill tumor cells nonspecifically as well as remove foreign debris. It also produces a number of essential cytokines that are able to stimulate the immune system in general and boost bone marrow production.

Some individuals, because of age, chronic infection or poor nutrition, have a compromised immune defense system. They are susceptible to all of the following problems: arthritis, reduced wound healing capacity, reduced bone marrow proliferation with resulting lowered white cell counts and anemia; increased incidence of cancers; and increased incidence of viral, fungal and bacterial infections.

It is well understood that one of the main elements of the aging process is a lowering of the effectiveness of the immune function. All of the problems mentioned above occur with aging. In addition, the immune system is impaired by numerous environmental factors such as UV radiation, food preservatives, dioxin and antibiotics. It is well documented that generally healthy athletes frequently suffer from influenza or pneumonia following heavy periods of intense exercise. The same immune suppression is observed in people with stress related diseases. Under these influences, the number of macrophages available are reduced and are unable to participate in the immune cascade, which causes even deeper immunosuppression. Beta 1,3 Glucan has been shown to both stimulate and activate macrophage cells which will counter these negative effects.

The first human study on Beta 1,3 Glucan's systemic effect was in the 1980's on advanced HIV infection. Even in these deeply immunodeficient individuals, an increase in serum cytokines, IL-1, IL-2 and interferon was measured.

Results of another clinical trial showed a significant mortality decrease from infectious complications in severe trauma patients. Beta 1,3 Glucan is also a free radical scavenger. It is able to protect blood macrophages from free radical attack during and after radiation, allowing these cells to continue their important functions in the irradiated body and release factors important to the restoration of normal bone marrow production. These important free radical scavenger assays were repeated in different models which confirmed the antioxidant effect. In light of what is known about the potential of free

radicals to accelerate aging, cause cancer and other diseases, this particular effect of Beta 1,3 Glucan is especially important.

An independent study at Baylor College of Medicine in the laboratory of Dr. Phil Wyde also indicates the oral effectiveness of Beta-1,3 Glucan in stimulating non-specific immunity. Peritoneal macrophages doubled their phagocyte activity in mice fed with Beta-1,3-Glucan. The systemic effect of its oral application is comparable to that achieved by injection, which makes the material a unique and very valuable oral immuno-stimulant. When Beta-1,3 Glucan was added to the antibiotic regimen in animals challenged with different bacterial pathogens (*S. aureus*, *Klebsiella*, *E. coli* and others) and viral pathogens (Herpes Virus), a reduced amount of antibiotics and antivirals was needed to cope with the infection. Beta-1,3-Glucan also has an anti fungal effect, shown in studies with *Canadian albicans*. Such a broad anti-infective spectrum can be explained only by the fact that the immuno-stimulation produced by this unique material is nonspecific.

Continuing research in the application of Beta 1, 3 Glucan revealed that it also increases the effectiveness of other oral cholesterol-reducing agents, such as niacin and Lipid. Research has also demonstrated the anti-diabetic effect of IL-1 cytokines which increases insulin production causing the lowering of blood glucose levels. Activated macrophages are the main source of IL-1 in the body and its production can be boosted by yeast Beta 1,3 Glucan supplementation. Keeping in mind the extremely high rate of atherosclerotic complications and the extraordinary requirement for antioxidants in diabetic patients, yeast Beta 1,3 Glucan is an obvious adjuvant for an improved lifestyle in these conditions.

Multitudes of studies repeatedly show that yeast Beta 1,3 Glucan is a powerful immune stimulator, a “Biological Defense Modifier” and the benefits of Beta 1,3 Glucan as a nutritional supplement are huge.

The aging process has been defined as “the sum total of life’s physical embarrassment due to adverse conditions”. Yeast Beta 1,3 Glucan may well be the first and only true anti-aging supplement. It is a defense against events such as infection, tumors and radiation damage, an adjunctive to the positive effects of antioxidants, lipid balance enhancers, antibiotics and other therapeutics. The result is improved general health which means greater enjoyment of life, fewer infirmities, less time and money required for medical needs and dramatic savings in health related expenditures over time. The FDA classifies Beta 1,3 Glucan as safe and nontoxic and it has no known side effects.

In summary, some of the biological events illustrating the stimulation by Beta 1,3 Glucan are:

- Activation of macrophages, expressing increased nonspecific phagocytic activity allowing macrophages to destroy pathogens more efficiently, preventing disease.
- Release of important cytokines like IL-1, IL-2, among others, which initiates an

immune cascade and triggers other cell lines, such as T-cells and the release of Colony Stimulating Factor which boosts bone marrow production.

- Cholesterol reduction through cell activation and anti-oxidant activity.

### **What The Scientific Community Says About Glucan**

“Glucan (Beta 1,3) has been shown to enhance macrophage function dramatically, and to increase nonspecific host resistance to a variety of bacterial, viral, fungal, and parasitic infections.” **M.L. Patchen, Ph D., Dept. of Experimental Hematology and Radiation Sciences, Armed Forces Radiobiology Research Institute**

“Beta 1,3 Glucan, is a potent macrophage stimulant and is beneficial in the therapy of experimental bacterial, viral, and fungal diseases.” **William Browder, M.D., Dept. of Surgery and Physiology, Tulane University School of Medicine**

“These studies show, unequivocally, that Glucan (Beta 1,3) has an effect not only on macrophages, as was originally thought, but also on B lymphocytes and on suppressor t cells.” **P. Mansell, M.D., McGill University Cancer Research Unit, Victoria Hospital, Montreal, Canada**

“A cascade of interactions and reactions initiated by macrophage regulatory factors can be envisioned to occur and to eventuate in conversion of the Glucan treated host to an arsenal of defense.” **Joyce K. Czop, Ph.D., Dept. of Rheumatology and Immunology, Harvard Medical School**

“Beta 1,3 Glucan is at least 100 times more active than mannan.”  
**Joyce K. Czop, Ph.D., Dept. of Rheumatology and Immunology, Harvard Medical School**

**ARABINO GALACTAN** - Arabinogalactan (AG) is a naturally occurring botanical extract from the larch tree. Arabinogalactan is the active ingredient in Echinacea and other medicinal herbs. Its properties have been extensively studied by scientists around the world. Two basic mechanisms have been proposed to explain why AG enhances immune system performance. First, scientists have found that AG blocks bacteria and viruses from attaching and binding to cell membranes of the liver and other organs, thus preventing infection from starting. Second, AG has been shown in both human and animal studies to enhance the number of immune cells present in the blood. This is especially true for macrophages, and immune cell known for its capability to remove foreign material from the blood stream. In tests on human blood, at the University of Minnesota, the specific arabinogalactan used in Immunol™ was shown to be more effective than Echinacea at stimulating macrophages and other components of

the immune system. Further more, while the effectiveness of Echinacea decreases as the dosage increased, no decline is seen with AG. The receptor specificity of arabinogalactan is not well characterized. Cultures of blood mononuclear cells treated with AG showed enhanced natural killer activity against tumor cells. The Natural Killer (NK) activity was not a direct response to the AG exposure but rather the AG stimulated a cascade to cytokines in this immune stimulation network. The effect of AG in conjunction with the other immune stimulating factors in Immunol™ make it very efficacious product.

**LACTOFERRIN** - Lactoferrin is an immune chemical found in the human body usually in secretions like tears, perspiration, the lining of the intestinal tract, and the mucous membranes that line the nose, ears, throat and urinary tract; any place that is vulnerable to infection. Lactoferrin is part of your bodies shield against infection. The highest concentrations are found in colostrum, secreted in the first six hours after birth in mother's milk. The purpose of adding lactoferrin is to boost the overall immune stimulating capacity as well as hinder tumor growth and metastasis, enhance natural killer cell activity, activate neutrophils, prevent bacterial overgrowth, help prevent viruses from penetrating healthy cells, reduce inflammation and inhibit free radical production.

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