



## Beta-Glucan (1-3), (1-6)

Humans evolved in a dirty environment over a very long period of time but soap, disinfectants, canned and frozen foods have only been with us for a few generations, and antibiotics are even more recent.

During most of our time on this planet, therefore, our environment has been replete with bacterial hazards, and our immune systems (the bodies natural defences against infection) constantly challenged. As we developed strong immune systems so we thrived and multiplied.

Recent studies have shown that the human immune system has adapted as a result of facing constant challenges, responding to attack by up-regulating its state of readiness and effectiveness on a continuous basis. In particular, the first line of immune defence (known as the innate immune system) has learned to recognise molecules called 1-3, 1-6 beta glucans, which are present in the cell walls of many microbes, automatically responding to their presence by mounting a very strong defensive response.

This is why when we still lived in caves and hovels we were happily able to eat foods that, far from being kept in sanitised conditions, were literally crawling with bacteria.

In today's sanitised environment, however, our immune systems have relatively little to contend with. This makes them less active and less able to neutralise new and unexpected threats. This is why, when we travel to parts of the world where sanitation standards are lower than ours, we routinely fall victim to pathogens that locals have no problems with. Montezuma's revenge, Delhi belly and all the other travellers' ills are largely due to our under-strength immune systems.

The problems in the developed world are compounded by widespread Type B malnutrition (lack of a balanced diet), chronic stress and immuno-suppressant drugs, all of which suppress the immune system.

Surveys show that in the general public, especially the middle-aged and elderly, reduced immune system effectiveness is very common. This is why 'super-bugs' have come to haunt us; with immuno-suppressed patients flooding into the hospitals where antibiotic-resistant bacteria are bred, it is no wonder that casualties from MRSA, Clostridium Difficile and other such bugs continue to rise.

The advent of drug resistance in both bacteria and viruses (most particularly new strains of influenza) presents a real threat to humanity. Add to this the wide-spread findings of reduced immune effectiveness and the picture is grim indeed.

Like any other biological system your immune system needs to be challenged and used if it is to operate effectively. It is less likely to become exhausted or overwhelmed if it is kept active – like an athlete needs to keep to a strict training regime.

### **How can this be done?**

There are a number of ways of stimulating your immune system. Babies do it instinctively by eating all forms of dirt (or anything they can get their hands on) to marshal their formative immune system.

Not many adults would care to do this – and nor would we recommend it. Fortunately there is a safe and effective alternative; a natural product containing 1-3, 1-6 beta glucans, compounds that wake up the innate immune system and put it on full alert by harmlessly mimicking potential threats.

### **Beta glucan 1-3, 1-6**

1-3, 1-6 beta glucans and related molecules are found in many natural sources known to have immuno-stimulant properties. Shiitake and Maitake mushrooms, Echinacea and *Saccharomyces cerevisiae* (Brewer's yeast) have all been traditionally used as immuno-stimulants, but recent research by the Pentagon [\[1\]](#) put *Saccharomyces* at the top of the list.

As a result, some supplement companies have developed beta glucan products derived from *Saccharomyces*. But these are not all equally effective. The amount of beta glucans per capsule is sometimes cited as the key criterion of quality, or the percentage, or the particle size; but the truth is that none of these is completely accurate.

The only way to be sure of the efficacy of a beta glucan formulation is to test it in biological systems, and measure how effective it is in stimulating an immune response. When you do this, some products that claim very high beta glucan content actually do very badly.

When choosing a beta glucan product, therefore, you should look for a company with a substantial track record of product testing. Glucasan®+ has been developed in Germany in conjunction with the University of Berlin and has been shown in independent tests to outscore all other beta glucan products, including the US-marketed 90% beta glucan extract. This is why, when new laws forced farmers in the EU to remove growth-promoting antibiotics from animal feedstock, similar products were chosen to replace them and to protect the animals from infection.

### **What is the proof?**

For a list of research papers that demonstrate the effectiveness of beta glucans, go to the Research Info section on this web site. This site also shows the results of the comparative test on various available products - [click here for details](#).

### **How does my immune system work?**

The immune system can be divided into two separate but integrated sub-systems; the innate and acquired immune systems.

The innate immune system is our first line of defence. Micro-organisms are in the air we breathe and the food we eat, so our epithelial surfaces (skin, respiratory tract, gastro-intestinal and genitourinary tracts) are continuously exposed. Disease occurs when micro-organisms invade epithelial surfaces and penetrate deeper into the body. The innate immune system is so effective that despite our constant exposure to bacteria and viruses, clinical infections are the exception rather than the rule. This resistance of epithelial surfaces to invasion is called innate (natural) immunity. It prevents entry of microorganisms into tissues or, once they have gained entry, eliminates them prior to the occurrence of disease. It is non-specific, and acts on many organisms.

Apart from the physical defences (such as the skin), there are two main cell types: Macrophages and Natural Killer Cells. There are different types of Macrophages in different tissues; the Macrophages that lie deep in the skin, for example, are called Langerhans cells. The main body of innate immune cells lie alongside the gut, and are called GALT (Gut-Associated Lymphoid Tissue). Taking beta glucan supplements stimulates the GALT and this in turn wakes up all the rest of the innate immune system. Applying beta glucans to the Langerhans cells in the skin<sup>[2]</sup> does not do this however; instead it leads to accelerated skin growth and skin regeneration.

The acquired immune system is our second line of defence, and only comes into play when the first line has been breached. This part of the immune system has a 'memory'; that is, after one infection it 'learns' the pathogen and deals very effectively the next time it encounters it. So you only get measles, for example, once. This is the basis of immunisation. The acquired system is much more complex than the innate system, and can more readily make mistakes; when it confuses part of the body with a previously encountered pathogen, this leads to allergy and auto-immune disease.

Short of immunisation therefore the one sure way of ensuring that your bodies innate defences are trained to remain in tip top condition is to stimulate your GALT using Glucasan®+ regularly – this in turn will improve the condition and readiness of your entire innate immune system.

### **Will my immune system get tired of all this training?**

No. Our immune system was designed to cope with constant and recurring threats, and works best when stimulated. The old idea that immuno-stimulants should only be used intermittently was based on a fundamental misunderstanding of how the immune system actually works and what it is designed to do.

### **Prevention is better than cure..**

You could wait to fall ill, and then rely on your doctor's choice of antibiotic to solve the problem. If it is a virus, you may be able to get Tamiflu in time – although ominous reports of Tamiflu-resistant strains of flu virus are emerging. You might just want to sweat it out – and if you do, good luck to you. But as prevention is generally better than cure, the best alternative we know of is to increase your resistance to disease, and thus reduce your odds of getting ill. And one of the best the best ways of increasing your resistance is to take quality Beta-Glucan (1-3),(1-6). Frequent hand washing is important too, and you may want to consider using face masks (providing they are technically good enough).

### **What else can I do?**

In order to work most effectively the immune system requires a good many co-factors including nearly all the vitamins and minerals, and many phytonutrients also. As so many people today are depleted in most of these dietary elements, it makes sense to combine a beta glucan immuno-stimulant with a wide-ranging pharmaco-nutritional support program - or of course a well balanced diet. [Click here for diet ideas](#).

[\[1\]](#) If you're wondering why the Pentagon carried out this research, they were looking for ways to protect their GI's against biological warfare. As it may not be possible to know what bacterial or viral agent an enemy might use, immunisation doesn't make much sense. Ensuring that your men's defences to all pathogens are in good shape is a better strategy.

[\[2\]](#) Beta glucans alone cannot penetrate the skin. They can only do so when complexed with hyaluronic acid (the skin's natural hydrating agent). The resulting complex – called HyaFerm® – penetrates deep into the skin and stimulates the Langerhans cells, leading to regeneration of the skin's matrix. The results include increased skin thickness, strength, elasticity and hydration; and as the local immune system has been stimulated, increased protection against skin infection and cancer.