A natural immune-modulating ingredient
Nutramunity™ Beta-Glucan (NBG®) is a beta-1,3/1,6-glucan, a natural bioactive component isolated from the inner cell walls of baker’s yeast (Saccharomyces cerevisiae).

In its purified form, this beta-1,3/1,6-glucan functions as a signal that alerts the innate immune system and prepares it to respond quickly to infections, alleviate symptoms of allergy, promote wound healing and to counteract inflammatory reactions.

NBG® – The Natural Immune Stimulant
Beta-1,3/1,6-glucans are naturally occurring polysaccharides found in the cell walls of fungi and yeast. Through evolution, the innate immune system has learned to recognise and respond to structures common for pathogenic micro-organisms, but distinguishable from those found in animals. The beta-1,3/1,6-glucan molecule of baker’s yeast is such a structure, which in its purified form serves as a safe and powerful immune-enhancing agent.

Mode of Action
The gastrointestinal tract is a major immune organ in the body, rich in dendritic cells and macrophages – innate immune cells which continuously monitor the components that pass through it. Evolution has taught these cells to recognise and respond to structures typical for potentially harmful micro-organisms, so-called PAMPs (pathogen associated molecular patterns) and equipped them with specialised pattern recognition receptors (PRRs). NBG® Particulate is such a PAMP and when ingested, it binds to the PRRs on the surface of the immune cells. This interaction signals to the immune cells and triggers the onset of a series of biochemical events which eventually leaves the immune system more potent to eradicate invading micro-organisms and counteract harmful inflammatory reactions.

Nutramunity™ Beta-Glucan (NBG®) has a strong foundation in research and a significant portion of today’s knowledge about the safety of yeast beta-1,3/1,6-glucan and its mode of action on the immune system have been obtained through studies of NBG®.

Immunity for life
The immune system protects the body against infections by pathogenic viruses, bacteria, fungi and parasites. It also plays a key role in removing dead body cells and repairing tissue damage caused by UV light, irradiation and environmental toxins. A strong and properly functioning immune system is the key to good health.
Comparison of scientific research on beta-glucans from different sources

Beta-1,3/1,6-glucan from baker’s yeast has proven superior to beta-glucans from other sources, in terms of immune stimulatory efficacy.

<table>
<thead>
<tr>
<th>Beta-glucan source</th>
<th>Dietary fibres</th>
<th>Pathogen-associated molecular patterns</th>
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<tbody>
<tr>
<td>Beta-glucan structure</td>
<td>Dal</td>
<td>Barley</td>
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<tr>
<td>Lowers cholesterol levels</td>
<td></td>
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<tr>
<td>Reduces blood glucose levels</td>
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<td>Enhances probiotic function</td>
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<td>Increases infection resistance</td>
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<td>Counteracts inflammatory reactions</td>
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<tr>
<td>Alleviates symptoms of asthma and allergy</td>
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<tr>
<td>Weight enhancement</td>
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<tr>
<td>Other applications</td>
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</tbody>
</table>

• = Partially substantiated by third party and manufacturer public information

= Significantly substantiated by third party and manufacturer public information

☆ = Supported also by manufacturer-owned studies

Scientific background

A number of studies have demonstrated that oral intake of beta-glucan from baker’s yeast (Saccharomyces cerevisiae) enhances resistance to infections in farmed animals such as fish and swine [1, 2], and also in animals used as models in experimental infection studies (rats and mice) [3]. Clinical studies have shown that this beta-glucan enhances resistance to infections also in humans [4, 5, 6, 7, 8]. In addition to its prophylactic effect on the occurrence of common colds, when episodes of common cold occur, they are less pronounced and subside faster [8]. A one-year study of healthy individuals taking NBG® as a dietary supplement compared to healthy individuals not taking the supplement, demonstrated a 44 % reduction in the number of sick-leave days related to symptoms like cold, flu and fever [8]. Yeast beta-glucan has been demonstrated to counteract inflammatory reactions in animal models, and to effectively protect against septic shock induced by injected bacterial endotoxin (lipopolysaccharide; LPS) [10, 11]. Clinical studies have shown that yeast beta-glucan counteracts inflammatory reactions also in humans [12, 13], and alleviates symptoms of allergy (allergen-induced inflammatory reactions in the nasal/eye/lung mucosal tissues) in humans [14, 15, 16, 17]. Beta-glucan from baker’s yeast has positive effects on skin tissue when applied topically and has potential in treatment of different skin conditions, like eczema and acne [18], skin lesions and sun burns [18, 19], and skin wounds [18, 20, 21, 22] and ulcers [23, 24]. NBG® has also been shown to reduce the appearance of wrinkles and fine lines [25].

Passionate about beta-glucans
The Nutramunity™ Beta-Glucan (NBG®) from NutraQ has a strong foundation in research and is the result of the discovery by Norwegian scientists, that yeast beta-1,3/1,6-glucan significantly enhanced disease resistance of Atlantic salmon when added to the fish feed. This remarkable finding initiated a comprehensive research and development programme on the extraction, purification, chemistry, mode of action, efficacy and safety of yeast beta-1,3/1,6-glucan, which eventually revealed that this molecule serves as a beneficial input to the immune system of humans as well.

**NBG® – Its structure is the key to its function**
Scientific and technical expertise ensures that the native beta-1,3/1,6-glucan structure of NBG® is kept intact during the isolation process. Well-established production routines ensure a high degree of batch-to-batch consistency. NBG® Particulate is non-allergenic and those components in yeast which may cause allergy are completely removed during the production process.

**NBG® – The yeast beta-glucan with the longest history of use**
NBG® has been used as a health promoting dietary supplement for almost 20 years in Norway and for more than 10 years in the USA and in Japan. NBG® has also been in use in skincare formulations for more than 10 years in Norway and the USA.

**Versatility**
NBG® is available in different grades for use in daily supplements, food, beverages, foods for particular nutritional uses (PARNUTS) and personal care formulations.

**Quality**
- Natural
- No GMO
- Allergen-free
- Pharma GMP
- Kosher certified
- Halal certified
- GRAS
- EU Novel Food approved
- Stable under all physical and chemical conditions relevant for use in supplements, food & beverages

**About NutraQ**
NutraQ is the exclusive worldwide distributor of Nutramunity™ Beta-Glucan. We also formulate and produce a market-leading range of dietary supplements and skincare products containing Nutramunity™.

The ingredients in all our products are sourced by our in-house experts, to our own exacting formulations designed for today’s health-conscious customer. NutraQ’s specialists in research and development, regulatory matters, product design, manufacturing, distribution and marketing complete a dynamic proposition for our business partners.

From our headquarters in Norway we operate around the world. Our customers trust us to deliver high-quality products on time, every time. We approach our business relationships as a partnership and build them to last. Healthy partnerships deliver healthy results.