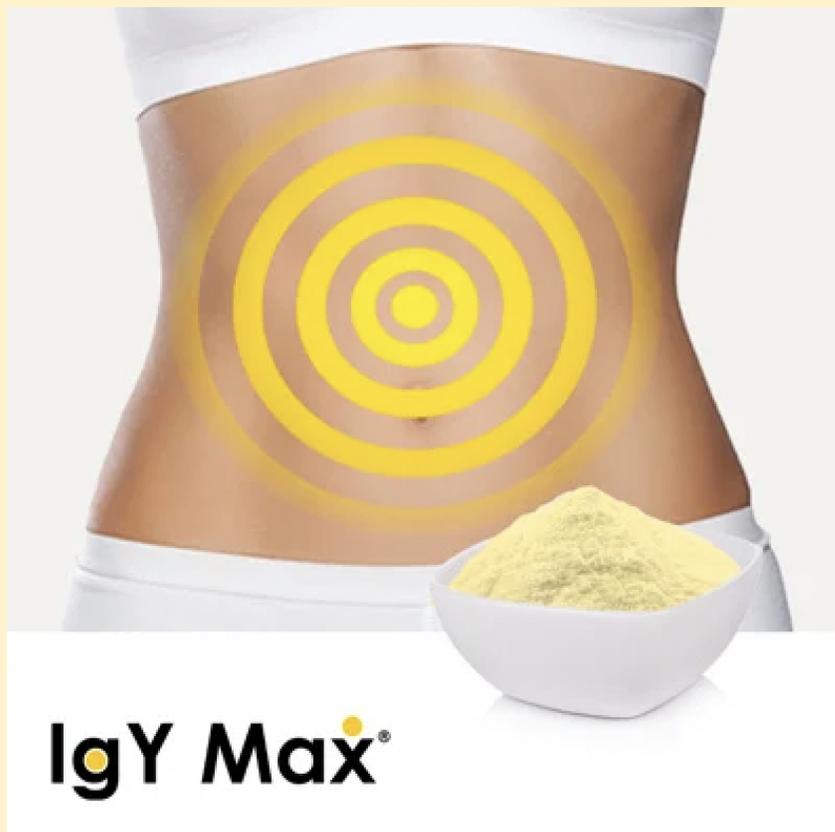




Antibodies: a Novel Solution to Dysbiosis

IgY Max® is an egg powder containing strain-specific antibodies that eliminate 29 dysbiotic pathogens from the microbiome



IgY Max® rebalances the microbiome, soothes symptoms like gas and bloating, supports the immune system, and fortifies the gut barrier

This white paper was written by IgY Nutrition's employee, Lana Schwartz

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Overview

IgY Max® is an antibody supplement that targets 29 dysbiotic pathogens inhabiting the gastrointestinal tract. IgY Max® rebalances dysbiotic microbiomes by **killing non-beneficial pathogens and eliminating them from the intestinal tract**. The product propels the growth of beneficial bacteria and restores microbial diversity, as corroborated by university-led trials. The result is **reduced dysbiosis-related symptoms** and improved **gut barrier integrity and inflammation biomarkers** such as zonulin, histamine, hs-CRP, and DAO. IgY Max®'s ability to remove dysbiotic pathogens from the gut while leaving beneficial microbes intact renders it a powerful tool for fighting dysbiosis and dysbiosis-related diseases. Since dysbiosis may cause or exacerbate a long list of conditions and illnesses, IgY Max® relates to **a wide variety of clinical applications**. Over the last 20 years, IgY Max® has been studied in well-renowned universities, hospitals, and research centers for application to the immune system, inflammation regulation, fibromyalgia, sports performance, muscle soreness and repair, cardiovascular disease, and more.

IgY Max® is a more effective means of addressing dysbiosis than the current standard of care: broad-spectrum antibiotics. Antibiotics are limited in efficacy because they do not target pathogens specifically. Instead, these antibiotics kill both beneficial and non-beneficial residents of the microbiome, rendering their efforts unsuccessful up to 50% of the time. IgY Max's ability to **neutralize non-beneficial pathogens while leaving beneficial microbes intact** makes it a superior tool for combating dysbiosis.

IgY Max® has the potential to revolutionize the modern approach to dysbiosis and dysbiosis-related conditions.

- IgY Max® is pathogen-specific and highly effective
- IgY Max® has over 20 years of clinical history with **zero cases of adverse effects**
- The only ingredient in IgY Max® is specifically immunized egg
- Consuming IgY Max® is as safe as eating an egg from the grocery store
- IgY antibodies have a **long history of use** in humans, solidifying their safety profile
- IgY Max® is healthier than most medications
- IgY Max® is convenient to consume

- IgY antibodies are **superior to IgG antibodies**: they have a 3-5 times higher immunogenicity, have 20 times more immunoglobulins per unit, and do not carry the risk of triggering inflammation
- IgY antibodies do not stimulate the human complement system or inflammatory cytokines
- IgY antibodies are **more ethical to produce** than mammalian-derived antibodies

IgY Max® has a broad market potential for the following reasons:

- Its potential **customer base is enormous** if not unlimited:
 - 60-70 million Americans experience gastrointestinal issues
 - IgY Max® is shown to benefit a long list of dysbiosis-related conditions
 - Anyone can benefit from consuming IgY Max®, except those with an egg allergy
- IgY Max® satisfies the **rapidly expanding microbiome market's** demands for dysbiosis-alleviating products
- IgY Max®'s immune system support fulfills consumers' desire for immune system supplements, a sector that grew by 25% in North America after the pandemic
- IgY Max® is organic, non-GMO, all-natural, and additive-free, meeting consumers' preferences for clean-label products
- IgY Max® is affordable, allowing you to maintain high profit margins
- IgY Max® has **zero competition** - no other pathogen-specific antibody supplement for enteric application exists
- IgY Max®'s ability to target specific dysbiotic pathogens specifically renders it explicitly **more effective at rebalancing dysbiosis than any other microbiome product on the market**,
- It is the perfect complement to probiotics

What is IgY Max®?

IgY Max® is a specifically immunized egg-based supplement containing polyvalent, antigen-specific antibodies that target **29 dysbiotic pathogens commonly found in the**

human microbiome, including *Klebsiella pneumoniae*, *E. Coli*, *Salmonella*, *Shigella*, *Pseudomonas aeruginosa*, various strains of *Staphylococcus* and *Streptococcus*. IgY Max® antibodies are effective throughout the **entire length of the gastrointestinal tract**. They have a high pathogen-antibody affinity and inhibit bacterial adhesion, suppress colonization, and neutralize each targeted pathogen thoroughly (1, 2, 3). Neutralized pathogens are expelled from the gut through the stool. The product's elimination of pathogens allows beneficial microbes to flourish, supports **microbial diversity**, and helps to **rebalance the microbiome** (4).

This positive shift supports the microbiome by reducing dysbiotic pathogens' gastrointestinal damage and increases healthy flora's benefits. Studies of IgY Max® confirm that IgY Max® **supports beneficial flora, improves gut barrier integrity, and decreases inflammation** over eight weeks of use. In addition, studies showed improved markers for levels of inflammatory cytokines, high-sensitivity C-reactive protein, zonulin, histamine, and diamine oxidase [See the "Studies of IgY Max®" section for details].

Perhaps most important, participants' reported a **decrease in symptoms** of dysbiosis following consistent consumption, including improved stool regularity and composition, decreased bloating and gas, and higher energy levels. Though unofficial, the abundance of positive Amazon reviews corroborates the positive experiences of consumers.

About dysbiosis

Relatively recent scientific initiatives have investigated the microbiome's influential role in human health. For example, everything we know today about gut health can be traced back to the Human Genome Project's scientific findings. Scientists discovered that the microbiome has approximately 150 times more genes than the entire human body through this research. This finding sparked the Human Microbiome Project (HMP) launch in 2008, the first organized effort to research intestinal flora. As a result, scientists have discovered aspects of **the microbiome that directly affect human health** (5).

The project provided irrefutable evidence that the culprit of poor digestive health is often **dysbiosis, which is defined as a detrimental shift in human microbiome composition** (6). It can be caused by broad-spectrum antibiotics, over-the-counter NSAIDs, chemical consumption, alcohol, food additives, stress, and poor diet. Patients with dysbiosis have

decreased amounts of beneficial microbes and increased amounts of non-beneficial microbes inhabiting their intestinal tracts.

Beneficial microbes are essential to the body; they confer benefits such as metabolism regulation, vitamin production, and exclusion of harmful organisms. Harmful microbes, or **dysbiotic pathogens, actively damage the body** (7). They increase inflammation, injure the gut barrier, and cause digestive symptoms such as stool irregularity, flatulence, cramping, and bloating. Dysbiotic microbiomes lack adequate counts of beneficial bacteria, missing out on some of the benefits they confer. These microbiomes also have an excess of harmful bacteria, which increase gut damage

Since the digestive system is connected to nearly every other organ system in the body, dysbiosis is implicated in a long list of diseases and illnesses. The National Institute of Health includes **IBS, inflammatory bowel disease (IBD), mental health conditions, obesity, allergic disorders, Type 1 diabetes mellitus, thyroid and other hormone imbalances, autism, rheumatoid arthritis, and even cancer** on their list (8). Dysbiosis increases systemic levels of IL-6, IL-8, and TNF alpha. These mediators of inflammation are implicated in fatigue, weight gain, autoimmune conditions, depression, and others (9). The triggering of this inflammatory process may be part of the reason dysbiosis has such far-reaching consequences.

Interventions that can effectively address dysbiosis have significant implications for consumers struggling with various conditions. **IgY Max® relates to a variety of clinical applications.** Several studies of IgY antibodies for enteric use, and studies of IgY Max® itself, have pinpointed which conditions the antibodies help. In every study, **clinical outcomes have been positive** [See the "Studies of IgY Max®" section for details].

Implications of poor digestive health

Gastrointestinal symptoms are burdensome to **the healthcare system, the economy, and millions of individuals' well-being**. Digestive complaints affect 60-70 million people in the United States. They account for an astronomical \$40 billion in primary care visits alone (10). Workers with digestive issues are reported to be 15% less productive than their healthy coworkers, a substantial cost to the economy (11). Even minor digestive complaints are associated with more time off work and a decreased quality of life. Digestive afflictions are undeniably taxing.

Because of the burdens that digestive afflictions pose, digestive health has become a hot topic in biopharma and medicine. In 2020, the **market for gastrointestinal therapies is valued at \$46 billion and is projected to grow** at a compound annual growth rate of 4.4% (12). Thus, gastrointestinal health is undoubtedly the new frontier in 21st-century medicine.

Pathogen-specificity: the missing component

IgY Max®'s neutralization of specific pathogens presents a far **superior solution to the current standard of care** for pathogen-induced dysbiosis: broad-spectrum antibiotics such as Rifaximin (13, 14). These antibiotics kill both 'bad' and 'good' residents of the microbiome, rendering their efforts unsuccessful up to 50% of the time (15). Furthermore, these antibiotics' inability to target specific pathogens often leaves individuals in states of chronic or prolonged dysbiosis. Pathogen-specificity, a characteristic of IgY Max®, is the modern treatment approach's missing component. As Dr. Alm et al explained in the Journal *Antibiotics*, "clinical use of a targeted spectrum agent, most likely in combination with a rapid and robust diagnostic test, is a commendable goal with significant healthcare benefits" (16).

IgY Max®'s ability to target dysbiotic pathogens while leaving beneficial microbes intact **likens it to a pathogen-specific antibiotic** for enteric application - one of the first of its kind. Moreover, its pathogen-specificity makes it a powerful tool for combating dysbiosis.

Use

Users should mix two to four grams of IgY Max® into a cool liquid or food like fruit juice, milk, water, or yogurt. Mixing it with orange juice is especially palatable. It should not be heated. Heat may cause partial denaturing of the antibodies. The recommended dosage is two to four grams of IgY Max® daily. IgY Nutrition recommends incorporating IgY Max® into a daily meal replacement shake or smoothie routine to encourage consistent use.

IgY Max® is marketed as a powder without any additives, in capsules, and flavored chewables and shakes.

How IgY Max® is made

IgY Nutrition harnesses natural passive immunity processes to develop its antibodies. Passive immunity is the **transfer of antibodies from one organism to another** (17). This transfer occurs naturally in mammals through breastfeeding. Avian organisms such as chickens transmit antibodies to their young through the yolks of their eggs. This transfer fortifies the offspring's immune systems with already responsive antibodies, which the mother has developed in response to her prior exposure to pathogens.

Chicken antibodies, called IgY, **work just as well in the human gut as in chickens** (18). IgY Nutrition can incorporate naturally-made antibodies of their choosing into medications or supplements by using their proprietary vaccines to inoculate mother hens with pathogens of choice, which is a patented process. After allowing the hens time to produce and transmit antibodies in their yolks, IgY Nutrition collects the eggs and spray dries the yolks. IgY Max® is whole egg powder. The only additive is the flow agent used in the drying process.

Using chickens as living antibody factories provides several advantages. The process is **economical, fast**, ethical, safe, and health-conscious. [See the "The Market" section for details].

Safety

Consuming yolk-derived antibodies is **as safe as eating an egg from the grocery store** (17, 18). All eggs contain antibodies to hundreds of pathogens relevant to chickens. IgY Max® egg powder contains targeted antibodies relevant to the human microbiome: 29 of the most common dysbiosis-causing pathogens. IgY Max® egg powder is pasteurized and subjected to extensive laboratory testing.

IgY Max® is a safe option for everyone except those with an egg allergy. IgY Max® is **sGRAS (self-affirmed), holds an FDA Food Additive Master File number**, has been NSF® Certified for Sport™, and is Kosher and Halal certified. It is natural, non-GMO, gluten-free, and does not contain additives. The only ingredient is egg, making it a preferable choice for health-conscious consumers.

About IgY Therapies

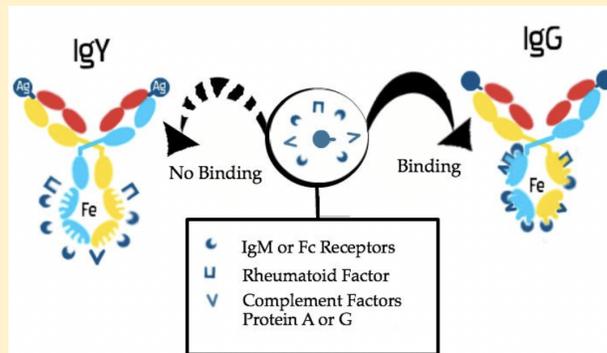
Advantages of IgY therapies

Other antibodies, including the popular IgG mammalian antibodies, are often used in passive immunity therapies. While there are similarities between IgY and IgG antibodies, it is widely understood that IgY antibodies offer several advantages over mammalian IgG antibodies. Most notably, IgY antibodies have higher immunogenicity, contain more antibodies per unit, and do not stimulate the human immune system. These benefits make IgY a safer, less-inflammatory, and more efficient and economical option than IgG antibodies.

IgY antibodies have three to five times **higher immunogenicity** than IgG antibodies (17). Higher immunogenicity makes it feasible to produce antibodies against highly conserved proteins and reduces the number of antibodies required to spark an efficient immune response, making IgY a more efficient option than IgG.

IgY confers the benefit of higher concentration per unit. Eggs contain 20 times **more immunoglobulins per unit** than serum-derived IgG, making chickens a more economical and sustainable source of large quantities of specific antibodies (19). In addition, extracting antibodies from egg yolk is a non-invasive collection procedure, while IgG must be extracted from animal plasma.

Because IgY antibodies do not bind with human Fc or IgM receptors, complement factors protein A or G, or with rheumatoid factors. They do not stimulate the human complement system or inflammatory cytokines. Thus, IgY **does not create non-specific inflammation**, which may occur with mammalian antibodies (20, 21).



History of IgY therapies

IgY antibodies' **long history of use in humans** further ensures their safety. Doctors have been enhancing immune responses through artificial passive immunity for decades, using either mammalian antibodies from milk (colostrum), blood serum (IgG), or avian antibodies from egg yolks (IgY) (17). IgY is used in antivenom medications, diagnostic procedures, and pediatric norovirus medication (22, 23, 24, 25). IgY antibodies have been studied for application to HIV-induced cachexia, cystic fibrosis, and fibromyalgia. Science's well-versed history with IgY solidifies IgY Nutrition's certainty of the safety of IgY antibodies. Below is a brief survey of studies of IgY therapies for enteric use:

Fibromyalgia

Adalsteinsson et al's "A Pilot Study of the Effects of Hyperimmune Egg in Treating Patients with Fibromyalgia Syndrome" examined IgY antibodies' effects on fibromyalgia patients (26). It found that "among 30 enrolled patients, **all clinical assessments showed some improvement** from baseline to end-of-study. Improvements in pain and the number of TePs (tender trigger points) were statistically significant." These results demonstrate that regulation of the microbiome through IgY antibodies can be applied to a wide variety of conditions."

Arthritis

Greenblatt et al's "Administration to Arthritis Patients of a Dietary Supplement Containing Immune Egg: An Open-Label Pilot Study" examined IgY antibodies' effects on arthritic patients (27). The study found that "daily administration of immune egg may provide a safe and effective complementary regimen for **amelioration of arthritic symptoms**." These results demonstrate that regulation of the microbiome through IgY antibodies can have far-reaching implications, such as the promotion of joint health.

Rotavirus

Published in Science Magazine, Rahman et al's "Randomized placebo-controlled clinical trial of immunoglobulin Y as adjunct to standard supportive therapy for rotavirus-associated diarrhea among pediatric patients" found that using rotavirus-targeted IgY in "rotavirus-infected children... appears to be a promising, safe and effective adjunct to **management of acute diarrhea in pediatric patients**" (28). A group who used IgY to end a

diarrhea epidemic in India won a Bill and Melinda Gates Foundation award for their successes (29).

HIV / Cachexia

Several studies of individuals in third world countries suffering from conditions commonly associated with **HIV-related opportunistic infections** such as cachexia, weakness, fever, and diarrhea showed significant improvement in gastrointestinal symptoms, weight, and quality of life upon using IgY antibodies.

The Aids Support Organization ran a study in Uganda titled "Improvement in Quality of Life for HIV/AIDS Patients Using Hyperimmune Egg - The TASO Study." It found that "the product demonstrated an impressive overall ability to improve signs and symptoms (i.e. quality of life) and with no apparent toxicity or undesirable side effects" (30). Additionally, Ambekar et al's "Hyperimmune Egg: Its Ability to Maintain Weight and Lean Muscle Mass in Patients with Aids" found that "after 30 days on the product, 71.4% of the patients either stopped losing weight (14.3%) or gained (53.5%) weight. After 60 days on the supplement, of the 9 patients still participating in the study, 81% of the patients either maintained their weight (22%) or gained weight (66.7%)... in many cases there was **a significant reduction of, or complete elimination of gastrointestinal symptoms.**" These results are promising for those dealing with HIV-induced cachexia (31).

Widespread examination and approval of IgY antibodies ensure its safety for use. These studies exhibit the product's long list of potential applications.

Studies of IgY Max®

Over the last **20 years**, IgY Max® has been studied in well-renowned universities, hospitals, and research centers for application to dysbiosis, gut barrier integrity, immunity, sports performance, muscle soreness and repair, cardiovascular health, and more. The following is **a survey of many of the IgY Max® studies'** outcomes. Results of the first study listed under "Studies of IgY Max® and Gut Health" are powerful.

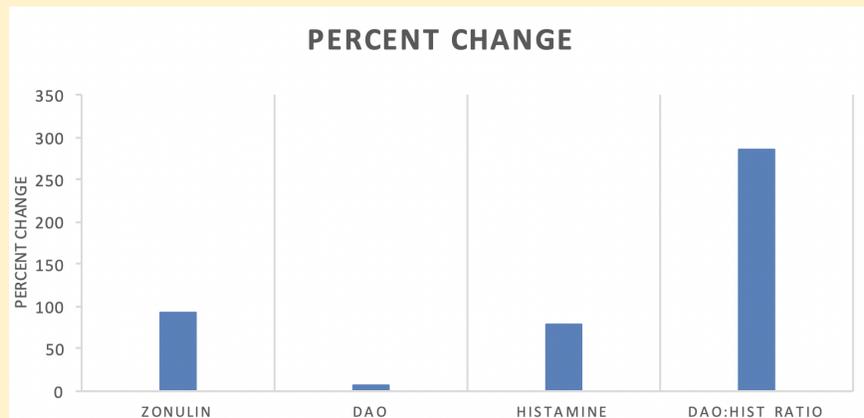
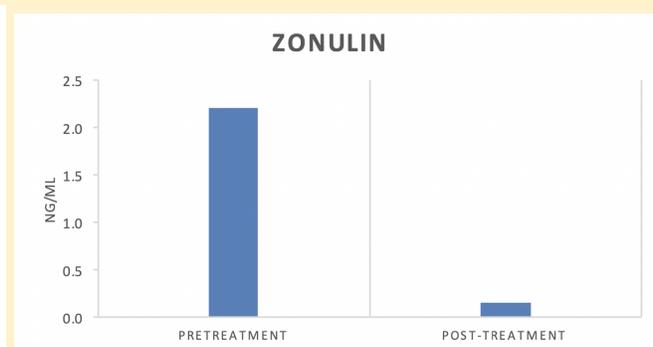
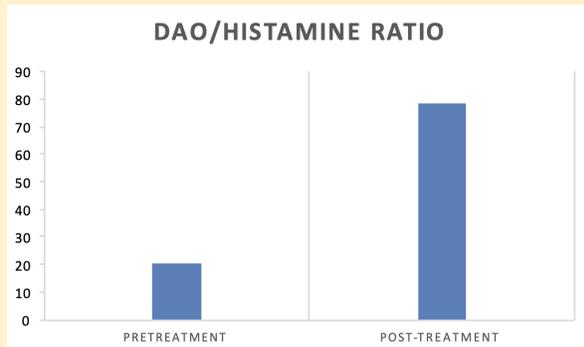
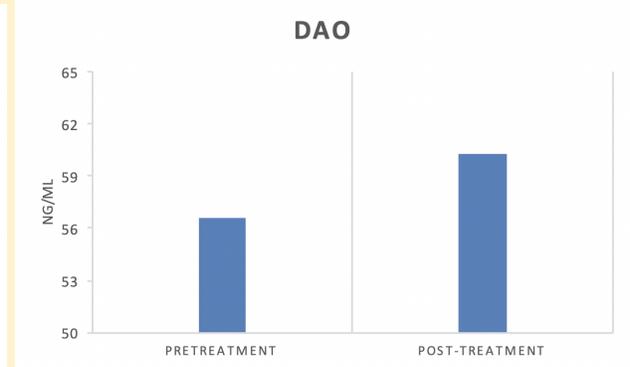
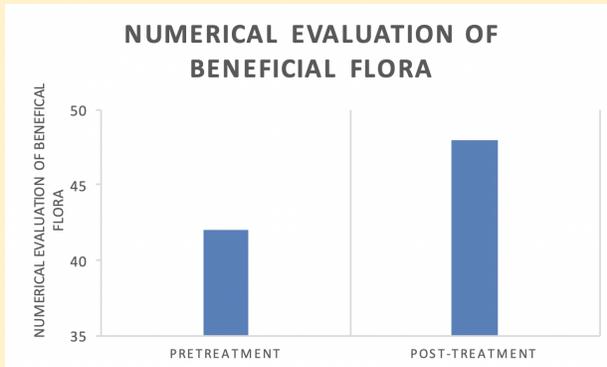
IgY Max® and Gut Health

As part of IgY Nutrition's ongoing commitment to research, an open-label pilot study was conducted to explore the effects of eight weeks of IgY Max® supplementation on

microbial diversity and on biomarkers of gut wall integrity in subjects reporting mild to moderate GI complaints.

The study, titled "IgY 26; A Powerful Tool in Gut Based Inflammatory Conditions," measured subjects' counts of beneficial flora and markers of gut permeability, such as zonulin, DAO, and histamine, before and after the eight-week consumption period (32). **Zonulin** is a regulator of intestinal permeability and can therefore be a biomarker of impaired gut barrier function. **Histamine**, produced by mucosal mast cells, acts as a proinflammatory mediator in the intestine and modulates intestinal permeability. **DAO**, diamine oxidase, is the enzyme made by the microvilli that degrades histamine (33). Low levels of DAO and elevated levels of histamine have been implicated in chronic inflammatory and autoimmune disorders. Improvement of these markers is associated with improved GI function, intestinal wall integrity, and levels of inflammation (33).

The study found that "IgY 26, given to subjects, resulted in **improvement of markers of gut distress** such as Zonulin, DAO and Histamine... beneficial flora including *Bacteroides fragilis*, *Bifidobacterium* species, *E. coli*, *Lactobacillus*, *Enterococcus*, *Clostridium* were tracked. When the **quantitative value of the flora was summed, there was an increase overall.**" Besides the objective results, subjects also had **improved quality of life** measures and reported noticing a decrease in gas and bloating and feeling more energy.



Seeing as IgY Max® drastically improved these markers - the near 100% decrease in zonulin and near 300% increase in DAO-Histamine ratio being notable - these results suggest that the product is valuable for improving GI function, gut barrier integrity, and inflammation levels.

IgY Max® and Cardiovascular Health

IgY Max® has also been shown to improve consumers' cardiovascular health. Dr. Karge et al published a trial in the Journal of Medicinal Food titled "Pilot Study on the Effect

of Hyperimmune Egg Protein on Elevated Cholesterol Levels and Cardiovascular Risk Factors." Participants were U.S. Army soldiers. Soldiers consuming IgY Max® showed stabilized cholesterol compared to a placebo group (34). The study concluded "that hyperimmune egg may beneficially modify the regulation of serum lipoprotein levels and thereby **reduce the possibility of cardiovascular disease.**" This study strongly suggests that IgY Max® benefits cardiovascular health.

IgY Max® and Inflammation

A private clinical trial run by Lauren Miles MD titled "Effects of Hyperimmune Egg on Hs-CRP Levels" examined IgY Max®'s effects on consumers' inflammation (35). Dr. Miles specifically looked at high-sensitivity C-reactive protein, a measure of general levels of inflammation in the body. The trial found that "a statistically significant **reduction in hs-CRP in all cases** was noted at six weeks. The average decrease in hs-CRP at three weeks was 1.66 and the average drop at six weeks was 2.52." This study suggests that IgY Max® may beneficially regulate inflammation levels in the body. Other studies listed below corroborate this finding.

IgY Max® and Exercise

Doctors and scientists at the College of Charleston ran several trials of IgY Max®, examining the product's effects on participants' exercise-related markers, including **muscle repair, soreness, and strength, endurance, stimulation of the GH → IGF-I axis, submaximal heart rate, and peak power.**

The study "Effect of the Hyperimmune Egg Supplement on Anabolic Mediators of Muscle Repair" found "oral supplementation of hyperimmune egg protein for 10 days resulted in **significant changes in hGH** (human growth hormone) **and FAI** (free androgen index) and non-significant, yet promising alterations in IGF-I (insulin-like growth factor) (36). Supplementation with HIE (hyperimmune egg) protein appears to **stimulate beneficial hormonal responses necessary for muscle repair** during recovery after exercise." This study strongly suggests that IgY Max® may beneficially regulate muscle repair and reduce inflammation.

The study "Hyperimmune Egg Protein Supplementation Stimulates the GH → IGF-I Axis," found that "oral supplementation with hyperimmune egg for 10 days produced significant **variations in GH** (growth hormone) **and IGFBP-3** (insulin-like growth factor binding protein 3) and non-significant but potentially meaningful alterations in IGF-I (insulin-like growth factor)" (37). They concluded "hyperimmune egg protein represents an effective protein-based supplement that **enhances recovery** through altering the GH → IGF-I axis." This study strongly suggests that IgY Max® may beneficially regulate muscle repair in the body.

The group also examined IgY Max®'s effects on strength and endurance in "Increased Muscular Strength and Enhanced Muscle Repair with Hyperimmune Egg Protein Supplementation." The trial found that "oral supplementation of HIE for 10 days resulted in a significant **increase in bench press strength and endurance**, decreased muscle soreness, and enhanced muscle repair during recovery." Increased strength and endurance make IgY Max® an attractive product for athletes (39).

Next up, the group looked at submaximal heart rate and peak power in "Hyperimmune Egg Protein Decreases Submaximal Heart Rate and Increases Peak Power." The study found "that oral supplementation of hyperimmune egg for 10 days resulted in a significantly **lower submaximal HR and higher peak power**," another benefit for athletes (38).

Oklahoma State University studied inflammatory markers that affect muscle soreness in "Effect of Oral Immunoglobulin and Cytokines on Serum Creatine Kinase and Delayed Onset Muscular Soreness." The study found that "IgY supplementation **lessens muscle creatine kinase levels and perceived muscle soreness** following exercise, possibly due to an **anti-inflammatory** effect (40). Such an effect may facilitate the continuation of training intensity, reinforcing the product's value to athletes.

Patents

In scientific literature, broad applications of IgY antibodies supported IgY Nutrition's patent of IgY Max® for a wide variety of uses. Below is a partial list of IgY Max®'s patents.

IgY Max® is patented when combined with glucosamine for its ability to **regulate joint inflammation**. It is effective for osteoporosis and rheumatoid arthritis.

IgY Max® is patented for its ability to prevent, counter, or **reduce NSAID-induced gastrointestinal damage** indicated by zonulin levels.

Contact IgY Nutrition for a full list of patents.

IgY Max® Applications and Concepts

In light of IgY Max®'s long list of patents and potential clinical benefits, IgY Max® is clearly **a versatile ingredient**. IgY Max® is a valuable addition to any supplement intended to mitigate the effects of dysbiosis or a dysbiosis-induced illness or disease.

Combining IgY Max® with pre and probiotics is synergistic. By creating a hostile environment for transient pathogens, IgY Max® makes room for probiotics to colonize the gut, enhancing their effectiveness. Studies suggest that IgY Max® may also offer synergistic benefits when **combined with glucosamine for joint health**.

IgY Nutrition suggests incorporating IgY Max® into supplements targeting the following:

- Dysbiosis
- Irritable bowel syndrome (IBS)
- Intestinal bowel diseases (IBD) like ulcerative colitis
- Small intestinal bacterial overgrowth (SIBO)
- Intestinal permeability
- Allergies / histamine levels
- Immune system
- Inflammation
- Fibromyalgia
- Cystic fibrosis
- Autoimmune diseases of any kind
- Metabolic diseases of any kind
- Obesity

- Cardiovascular disease or those with elevated serum lipoproteins
- Nutrient deficiencies
- Cachexia
- Norovirus
- Mental health conditions of any kind
- Arthritis of any kind
- Hormone conditions of any kind
- Muscle repair and recovery
- Strength and endurance

IgY Max® can be consumed alone or formulated in powdered drinks, capsules, or chewable tablets. It tastes best when mixed with something sweet, such as orange juice.

The Market

IgY Max® is a perfect-suited product for today's microbiome-oriented market. Several of the product's characteristics make potential for profitability astronomical:

- **Microbiome manipulation:** IgY Max®'s effective manipulation of the microbiome satisfies the ballooning microbiome market's demands for dysbiosis-alleviating products.
- **Immune support:** IgY Max®'s immune system support fulfills consumers' desire for immunity supplements, a sector that grew by 25% in North America after the pandemic (41).
- **Natural ingredients:** IgY Max®'s organic, non-GMO, all-natural, additive-free ingredient profile matches consumers' preferences for clean-label products.
- **Pathogen-specific targets:** IgY Max®'s ability to target specific dysbiotic pathogens specifically renders it more effective at rebalancing dysbiosis than any other microbiome product on the market, including broad-spectrum antibiotics and probiotics.
- **Cost effective:** IgY Max® has an affordable price point, allowing you to maintain profit margins.
- **Zero competition:** There is no other OTC, enteric-use, pathogen-specific antibody product on the market.

- **Compliments but does not compete with pre and probiotics:** IgY Max® makes pre and probiotics most effective at rebalancing the microbiome because it addresses the pathogens that cause dysbiosis.

Equipped with the characteristics needed to make it the most effective microbiome product on the market, IgY Max® will add value to any gastrointestinal supplement you produce.

The microbiome market

IgY Max®'s focus on the microbiome echoes desires. The 2020 pandemic triggered consumers to make more health-conscious purchasing decisions. As consumers have learned more about digestive health's influence on immunity, cardiovascular function, brain health, stress, and other organ systems, they have learned of the value of supplements targeting the microbiome. Market trends demonstrate consumers' increased interest and understanding of gut health's relevance:

- Between 2014 and 2019, **Google searches for microbiome** rose by over 250% (42).
- Linkage Research & Consulting Inc. reported that **87% of Americans understand** that digestion and health are connected (42).
- A May 2021 review by Lumina Intelligence showed that internet searches regarding probiotics and the gut-brain axis **grew by 50% over the last year** (42).

Surging health awareness among consumers is propelling the microbiome market through a substantial expansion:

- Mintel found that new product launches with positioning or **marketing using the word microbiome grew by 267%** from 2019 to 2020 (42).
- ReportLinker data shows the microbiome market is estimated to grow with a compound annual growth rate (CAGR) of 23.6% from 2020 to 2027, potentially **reaching \$1.873 billion by 2027, up from \$356 million in 2019** (42).
- Mintel found that **40% of consumers will try food and drinks** that support their digestive health (42).

- Demand for supplements that support the immune system exploded across all channels, with an **almost 100% increase in sales over 2019** (43).

The skyrocketing gut health market offers microbiome supplement companies an immense opportunity. As an effective microbiome supplement, IgY Max® echoes the recent shift in consumer preferences precisely, upping its value significantly.

Quality of ingredients

As consumers investigate the quality of and science behind their products, companies that provide consumers effective supplements made with high-quality ingredients, like IgY Max®, will have an advantage. In addition, consumer preferences have shifted towards organic and non-GMO products that do not contain additives and are research-backed. According to research by Lonza, **at least 50% of consumers look for naturally-sourced products** that do not contain preservatives, artificial colors/flavors, allergens, are non-GMO, and are organic (44). IgY Max® is an all-natural supplement whose only ingredient is egg, satisfying the consumer demand for naturally-sourced products..

Pathogen specificity

IgY Max®'s ability to target specific pathogens also ups its value. According to a study published in *Frontiers in Microbiology*, current research and development efforts are focused on **antimicrobial agents that can selectively interact with a target site or a specific pathogen**, the front-running candidates being complex and expensive technologies like antimicrobial peptides and nanoparticles (45). IgY Max® possesses the ability to target a specific pathogen the authors describe - yet, unlike the contenders mentioned in the study, IgY Nutrition completed R&D long ago, and **its chicken inoculation production platform evades the enormous production costs** that other technologies require.

IgY Max® has a head start over the biopharma companies spending millions on R&D, regulatory approval, and expensive production processes for compounds as intricate as nanoparticles. IgY Max® offers an affordable price point, increasing access for customers of various backgrounds. Adequate promotion of **IgY Max® could beat out expensive endeavors** and provide customers with an affordable treatment option.

Notably, IgY Max® is the only product on the market that contains IgY antibodies targeting numerous enteric pathogens. There is no other product on the market with IgY Max®'s characteristics; there is no other multivalent hyperimmune egg in production.

Pre and probiotics fall short

Pre and probiotics have shown modest promise for improving gastrointestinal symptoms and overall health - enough promise to fuel domination of the microbiome market. However, their **effectiveness is limited**; pre and probiotic needs vary with the composition of microbiomes (46). Pre and probiotics' limited effectiveness is apparent in patients whose microbiomes are dominated by persistent dysbiotic pathogens.

Though a pre or probiotic may help these patients somewhat, they almost always require more than temporary support of beneficial members of the microbiome alone. Diminishing these individuals' dysbiosis symptoms would likely require **significantly eliminating non-beneficial pathogens, which pre and probiotics are not designed to accomplish**. Unlike pre and probiotics, IgY Max® combats non-beneficial pathogens, making it a perfect complement to pre and probiotics.

IgY Max® is often imprecisely compared to a prebiotic, a compound that promotes beneficial bacteria growth by feeding them. IgY Max® supports the growth of beneficial microbes by eliminating competition from non-beneficial bacteria. IgY antibodies make space for good bacteria to grow by eliminating non-beneficial dysbiotic pathogens that compete with beneficial bacteria for space and nutrients in the microbiome.

Simply supporting good bacteria with a prebiotic can help but does not address the root cause of their dysbiosis: non-beneficial pathogens. Eliminating dysbiotic pathogens, IgY Max®'s primary function, is crucial for long-term microbiome balance. IgY Max® is **much more valuable to a consumer's microbiome than a prebiotic** because it rids the microbiome of dysbiotic pathogens. IgY Max® operates on the other side of the equation from a pre or probiotic - IgY Max® is the perfect complement.

Conclusion

IgY Max® has the potential to dramatically **advance modern medicine's** approach to dysbiosis and dysbiosis-related conditions. Several of its characteristics make it particularly

advantageous. Its pathogen-specific strategy is more effective than every other product on the market, including those produced by big pharma, which cannot to specify their neutralization targets. Backed by 20 years of clinical history, zero cases of adverse effects, FDA approval, and an all-natural production platform, IgY Max®'s safety profile is rock solid. Plus, IgY antibodies' higher immunogenicity and level of immunoglobulins ensures they have a leg up over IgG antibodies. There is a reduced risk of inflammation because IgY antibodies do not stimulate inflammation as IgG can. Its long list of valuable characteristics fuels its potential to revolutionize modern medicine's approach to pathogen-induced dysbiosis and dysbiosis-related conditions by making treatment safer, more effective, cheaper, more accessible, and healthier than broad-spectrum antibiotics.

IgY Nutrition **is eager to influence today's microbiome-oriented market.** Several of the product's characteristics make the potential for profitability enormous. First off is the product's **colossal target market.** 60-70 million Americans experience gastrointestinal issues. Millions of consumers look for products that mitigate symptoms of dysbiosis-related conditions, like IBS, IBD, SIBO, allergies, fibromyalgia, cystic fibrosis, autoimmune diseases, metabolic diseases, obesity, CVD, cachexia, norovirus, mental health conditions, arthritis, and hormone conditions. IgY Nutrition looks forward to alleviating these consumers' symptoms.

IgY Max® fits in with current market trends. IgY Max® **satisfies consumers' demands** for dysbiosis-alleviating products, immunity supplements, and "clean-label" products. It meets your requirement for an affordable price point that maintains your profit margin. IgY Max®'s ability to target non-beneficial dysbiotic pathogens makes it unique in its approach to supporting the microbiome and dysbiosis. It is the perfect complement to pre and probiotics.

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