

Immunocal/HMS90 Questions and Answers

Q. What is Immunocal®? What is HMS-90®?

A. Immunocal® is known as HMS90® in Canada. This unique product is manufactured by Immunotec Research in Montreal, Canada. It is not a prescription drug, but a powerful and patented un-denatured and highly bioactive whey protein dietary supplement that is loaded with glutathione precursors. Immunocal® took \$10 million and 18 years of research to perfect. It is unique in the nutritional field as it is covered by 10 'Method of Use' patents worldwide: 5 in the US, 3 in Canada and 2 in Australia. Immunocal® is a highly concentrated milk serum isolate which is high in protein (90% protein by weight) and is lactose-free and fat-free. Immunocal® shares many of the same immune promoting and enhancing properties of Mother's milk. Immunocal® has been clinically proven to increase serum and tissue glutathione levels, and its efficacy is validated by extensive research, including over 450 that appear in the medical literature. These scientific papers can be examined through MEDLINE (the US National Library of Medicine). Immunocal® increases glutathione which is your cells' own natural antioxidant and most potent detoxifier. Immunocal® has been demonstrated to enhance both healthy and deficient immune systems, and is validated as an effective nutritional supplement by the medical community. Immunocal® has its own NDC (National Drug Control) number, and is reimbursable under Medicaid, Medicare, and by private insurance in many states.

Q. Can children take Immunocal?

A. Yes they certainly can. There is no problem with side effects or worry about conflicts with medication. Children should be given 1 1/4 teaspoon of Immunocal for every 3 lbs of body weight.

Q. What is the difference between Immunocal and other whey proteins?

A. Immunocal has been shown to differ from other whey proteins in its effect upon the immune system. Specifically, scientific studies on other whey proteins have not shown the same immune stimulating effects that are seen with Immunocal®. Immunocal has been extensively studied in the clinical literature. Comparing the bioactive ingredients in Immunocal to those in other whey proteins clearly shows the superiority of Immunocal®. Immunocal is a bioactive dietary supplement that is supported by eighteen years of research through rigorous clinical trials that have been published in peer review journals. These studies, performed in world-renowned medical and scientific institutions, attest to the efficacy of Immunocal. Immunocal studies have shown that Immunocal not only increases intracellular levels of GSH (glutathione or glutathione precursors) following ingestion, but also significantly builds up the stores of these substances inside the cells. This beneficial effect lasts for considerable periods of time after ingestion of Immunocal.

Q. What is the product's bioactivity dependent upon?

A. Concentrations of 3 bioactive and thermo labile (easily damaged by heat) proteins that are contained in the milk serum: serum albumin, alpha lactalbumin and lactoferrin. Because these compounds can be damaged by heat (in excess of 140 degrees F) or excessive mechanical agitation, Immunocal® must not be cooked, heated, or placed in a steel-bladed blender. For these reasons, and to preserve the bioactivity of its serum albumin, alpha lactalbumin and lactoferrin, Immunocal® has not been exposed to standard high-temperature Pasteurization. Rather, it has been bio-filtered to remove bacteria, and subjected to a patented process of low-temperature purification procedures to ensure its safety and purity.

Q. If a different manufacturer of whey protein supplements was able to duplicate our technology, could they make the same claims?

A. No. The power of our patents is not in manufacturing. Immunocal patents (presently there are ten patents on Immunocal®: 5 US patents, 3 Canadian and 2 Australian patents relate to the METHOD OF USE. That is, no other whey protein can state: "clinically PROVEN to stimulate the immune system", and "significantly raises glutathione levels". Additionally, although there are dozens of companies producing DENATURED (high-heat Pasteurized) whey proteins (primarily for use as a protein source in body-building), there currently is no company manufacturing an UNDENATURED

they protein product similar to Immunocal. Over 450 clinical studies and medical reviews appear in the clinical literature which specifically involved Immunocal®, and not other whey proteins. Accept no imitations.

Q. What exactly is glutathione (GSH) and how is it important?

A. Glutathione is the master antioxidant of the body. Without glutathione, we would die. The replenishment of the glutathione levels within the lymphocytes (also called leukocytes or white blood cells) increases the intensity of the immune response. The increase in glutathione levels also results in the proliferation of lymphocytes that act as scavengers, and helps to combat infections. Selenium is a structural component of, and a co-factor for the antioxidant enzyme glutathione peroxidase. For this reason, supplementation with selenium can modestly increase glutathione levels in persons who are selenium deficient. Glutathione is a tri-peptide of the amino acids *cysteine*, *glycine*, and *glutamic acid*. Tissue glutathione levels increase when cystine levels increase within the cell. This is why cystine is critical in the production of glutathione. Prior to the development of Immunocal, no effective way was known to safely and significantly increase cystine levels in the cell over long periods of time. A deficiency of glutathione can cause haemolysis (the destruction of red blood cells resulting in severe anaemia) and numerous diseases of oxidative stress. Glutathione is essential in intermediary metabolism as a donor of sulfhydryl groups that are essential for the detoxification of the liver. The antioxidant enzyme glutathione peroxidase functions in the process of elimination of wastes from the body. Glutathione works within the liver, lungs, colon, kidneys, and skin in the process of removing toxic cellular metabolic wastes.

Q. What is the difference between products or pills that people use as supplements that are labelled as "glutathione" or "cystine"?

A. Glutathione must be produced within the cells (intra-cellularly). Clinical and laboratory studies demonstrate that oral glutathione is NOT absorbed but will be eliminated by the liver through the bile before ever reaching the systemic circulation (blood stream). Several studies have suggested that supplementing with oral glutathione may actually do the reverse and depress cellular and blood levels of glutathione. Injectable glutathione also has limited benefits. It is unstable in the blood stream. By the time it reaches the cell, much of it has been degraded, and much of the remaining glutathione cannot effectively pass through the cell membrane. Cystine is not well absorbed when taken by mouth. Clinical studies have demonstrated that oral cystine supplementation (NAC or N Acetyl L-Cysteine) is not effective in increasing cystine levels within the cell, and also has not been associated with significant increases in glutathione levels within the cell. The three bioactive proteins supplied by Immunocal constitute a "natural delivery system" from these cystine precursors to the cell (in order to facilitate *clinically and statistically significant increases* in glutathione levels in BOTH the extracellular serum and intracellular tissues). Because Immunocal® provides the building blocks for cystine, and these building blocks for cystine are easily transported inside the cell where they can be quickly synthesized into glutathione, Immunocal® is therefore ideally suited to increase glutathione levels within the cell.

Q. What is the difference between NAC (N Acetyl L-Cysteine) and Immunocal/HMS90®?

A. N Acetyl L-Cysteine (NAC) is sulphur containing (sulfhydryl) amino acid, which is present in many proteins, and is in the same class as the amino acid methionine. NAC is a naturally occurring amino sugar and is a form of cysteine which has been demonstrated to facilitate the SHORT TERM cellular detoxification of alcohol, tobacco smoke, acetaminophen [Tylenol®] poisoning and environmental pollutants in several in-vitro (in a test-tube) studies. When Cystine is heated, molecular bonds are cleaved and it becomes *Cysteine*. Cysteine is beneficial if it is produced INSIDE the cell, but is mildly toxic if it is produced outside the cell. NAC does not travel well in the blood stream, and doesn't reach the cells (to be used to synthesize glutathione and Glutamic acid). NAC supplementation over long periods has been associated with *modest* increases in serum glutathione, but has not proven particularly useful in the treatment of chronic, long-term intracellular glutathione deficiencies. Furthermore, therapeutic levels of NAC are relatively toxic and have been associated with significant side effects. At therapeutic doses, oral NAC supplementation has been associated with cerebral symptoms: nausea, blurred vision, and vomiting. Immunocal provides the precursors for the manufacture of intra-cellular cystine, and effectively delivers these to the cell. For this reason, Immunocal supplementation has been associated with *sustained and significant* increases of cellular

glutathione, and is virtually devoid of troublesome side effects. Immunocal® has the same side-effect profile as mothers' milk.

Q. What is the difference between bovine colostrum and Immunocal®?

A. The proteins in colostrum have almost no cystine content. Cystine is critically essential to the immune system. Although growth factors present in colostrum (including IGF-1, or Insulin-like growth Factor-1 which is effective in promoting muscle growth) are not affected by stomach acid, research published by one manufacturer of Colostrum (*Vital Health News*, Winter 1998, page 7) demonstrated that "the effectiveness of the immune factors present in colostrum is lowered by stomach acid." Although the immune enhancing factors found in colostrum are often "preferable to single isolated immune components" (such as interferon, which is more likely to cause troublesome side effects), colostrum has NOT been demonstrated to be superior to isolated undenatured whey proteins such as Immunocal®.

Colostrum (which is produced by the mammary glands during the first 26 hours following birth) is primarily composed of immunoglobulin and some lactoferrin. According to both laboratory experiments and clinical trials conducted in Germany, although colostrum supplementation was associated with *mild increases* in immune function in some patients, these increases were not statistically significant. A postulated mechanism of the action of colostrum is the inter-species transfer of immune factors, however this has NOT been clinically proven. Most of the data supporting the effectiveness of colostrum is anecdotal (consisting mostly of personal testimonies rather than clinical studies). Since the primary mechanism of action on the immune system is via stimulation of the synthesis (production) of glutathione, the near absence of glutathione precursors in the immunoglobulin fraction (from the colostrum) may explain its relative lack of effect. Conversely, Immunocal contains substantial amounts of thermolabile (heat-sensitive) proteins which are rich in cystine and glutamylcystine (known precursors of glutathione), and the effectiveness of Immunocal has been demonstrated in numerous human clinical trials which found statistically significant increases in glutathione and indices of immune function (such as CD4:CD8 ratios). Colostrum might be beneficial as an adjunctive (add-on) therapy to Immunocal®, but the clinical data is significantly more convincing for Immunocal/HMS90®.

Q. What are some additional benefits of un-denatured whey proteins?

A. Immunocal® has been clinically demonstrated to increase exercise capacity by 13 percent (*Lands et al., 1999*), and may be useful as a supplement for competitive athletes. *Wattanabe et al.* (Japan) conducted a clinical study with Immunocal to evaluate increases in GSH among patients with Hepatitis B and C, and found that these viruses are vulnerable to glutathione. In-vitro studies in Japan also showed that whey could stimulate the bone cell (osteoblasts) to produce more bone, hence increasing bone density and reducing the risk of osteoporosis. Lactalbumin from whey protein has been demonstrated to kill breast cancer cells in-vitro. Glutathione (from whey protein) lowers serum cholesterol by stimulating bile synthesis in the liver. In addition, glutathione is a powerful antioxidant that will prevent lipid peroxidation (a sign of free radical activity). Lipid peroxidation is implicated in arteriosclerosis (hardening of the arteries), stroke and coronary artery disease.

Q. How does the manufacturing of our product differ from other whey proteins?

A. In the manufacturing of other whey proteins several things occur: in the process of heating and Pasteurization, critical bonds holding the cystine together get broken down ("denatured", meaning they lose their original nature--similar to the denaturing and irreversible changing of liquid egg white by the heating process involved in frying an egg). The exact type of proteins that serve to increase tissue and serum glutathione most effectively are lost or diminished. The researchers at Immunotec (the manufacturers of Immunocal®) have developed a process by which these delicate proteins remain intact in their natural form to serve us most effectively.

Q. What is the theoretical mechanism of action of GLUTATHIONE (GSH) in Cancer and Immune dysfunction?

A. Natural killer (Immune) cells may become glutathione-depleted over time, and their immune response weakens. Immunocal raises glutathione levels and strengthens the immune system to fight cancer, viruses, bacteria, etc. For those patients receiving traditional medical therapy for their cancers, Immunocal supplies lactalbumin and has been clinically proven to raise glutathione levels.

Glutathione and lactalbumin (a component of Immunocal®) have been associated with the strengthening of healthy cells and (paradoxically) the *weakening* of cancerous cells. In research conducted by C. Svanborg *et al*, lactalbumin was associated with apoptosis (or the programmed death) of breast cancer cells. Glutathione has been scientifically demonstrated to decrease cancerous cells' resistance to chemotherapeutic drugs, while protecting healthy cells. This should allow a patient to respond better to chemotherapy with fewer side effects.

Q. What are the diseases or conditions that have been associated with low glutathione levels?

A. There are over 100 diseases and conditions associated with low glutathione levels. Most of the degenerative diseases of aging and the autoimmune diseases have been studied and linked to low GSH levels including: Acetaminophen poisoning, ADD, Addison's disease, aging, AIDS, alopecia areata, ALS, Alzheimer's disease, anaemia (haemolytic), ankylosing spondylitis, arteriosclerosis (hardening of the arteries), arthritis (rheumatoid), asthma, autism, autoimmune disease, burns, cacexia, cancer, candida infection, cardiomyopathy (idiopathic), Chronic Fatigue Syndrome, colitis, coronary artery disease, cystic fibrosis, diabetes, Crohn's disease, eczema, emphysema, Epstein Barr Viral (EBV) syndrome, fibromyalgia, free radical overload, Graves' disease, hepatic dysfunction (liver disease), hepatitis B, hepatitis C, hypercholesterolemia (high blood cholesterol), herpes, infections (viral, bacterial and fungal), inflammatory bowel diseases (IBD), lupus, macular degeneration (diabetic and age-related macular degeneration), malnutrition, Meniere's disease, multiple sclerosis, Myasthenia Gravis, neurodegenerative diseases, nutritional disorders, Parkinson's disease, primary biliary cirrhosis, progeria, psoriasis, rheumatic fever, sarcoidosis, scleroderma, shingles, stroke, surgery, toxic poisoning, trauma, vasculitis, vitiligo, Wegener's Granulomatosis, to name a few.

Q. Has therapy to increase glutathione levels been effective in treating the diseases or conditions that have been associated with low glutathione levels?

A. Yes. There have been many thousands of research studies proving that raising glutathione levels is an effective treatment in dozens of diseases and conditions. Of course, prevention is always a more desirable path. Immunocal/HMS90 has been proven to raise and maintain healthy levels of glutathione.

Q. Can a person who is lactose intolerant take Immunocal/HMS90®?

A. Yes, Immunocal® has less than 1% lactose which should not cause any ill effect even in the most severe case of lactose intolerance.

Q. Are there any interactions known between supplements such as coenzyme Q-10, antioxidant vitamins, or herbs and Immunocal/HMS90®?

A. No, there are no known potential or reported interactions between Immunocal and nutritional supplements. In fact, Immunocal increases glutathione levels that help to *improve* the action of antioxidant vitamins (which are less effective if your glutathione levels are impaired). For this reason, mega-doses of antioxidant vitamins (i.e. doses in excess of 10 times the RDA of these vitamins) are not required if you are supplementing with Immunocal®. As we age, our glutathione levels fall precipitously like a downhill ski-slope. Low levels of glutathione are associated with a host of degenerative diseases, and critically low levels of serum and tissue glutathione often predict that death is imminent. Supplementation with Immunocal/HMS90® helps restore these precious glutathione levels, and assists the supplemental vitamins you may be taking to work more effectively.

Q. Are there any interactions known between prescription medications and Immunocal/HMS90®?

A. No, there are no known interactions between Immunocal and prescription drugs. Immunocal is composed of the same basic proteins that are found in human breast milk, and should be considered to be as safe to take as mothers' breast milk. Furthermore, Immunocal® is 90% protein, and is one of the best sources of highly absorbable protein on the planet. Patients taking immunosuppressant drugs such as Cyclosporin® after such treatments as organ transplants should consult their physician before taking Immunocal®.

Q. Are there any side effects associated with Immunocal/HMS90®?

A. Immunocal® increases serum and tissue glutathione levels. When liver tissue glutathione levels rise, the liver is able to more effectively detoxify the body (which is a beneficial function of Immunocal®). Some patients (especially those who have been exposed to high levels of environmental toxins) may have a mild temporary reaction to these mobilized toxins as the liver is removing them from storage in body fat. Typically, reducing the dose of Immunocal® will allow these temporary side effects quickly disappear. Immunocal is composed of the same basic proteins that are found in human breast milk, and has the same side effect profile as mothers' breast milk. Because Immunocal® is a milk protein, persons who are mildly allergic to milk proteins may experience minor gastric distress from Immunocal®. This gastric distress usually disappears if you reduce the dose of Immunocal®. Persons with serious milk-protein allergies should not take Immunocal®.

Q. Can you overdose Immunocal/HMS90®? Is there any potential for toxicity if you take too much?

A. Your greatest risk is wasting your money if you take "too much" Immunocal®. Clinical data seems to indicate there is limited benefit from exceeding 30 grams (3 packets) per day of Immunocal®. Because our cells have an innate mechanism of "feed-back inhibition" with respect to the glutathione synthesis precursors (building blocks) provided by Immunocal®, there is no potential for making "too much glutathione" within the cell if large quantities of Immunocal® are consumed. Immunocal® supplementation will result in establishment of *normal* glutathione levels, (NOT excessive glutathione levels) within the cell. Excess Immunocal/HMS90® would be metabolized as protein (Immunocal® is an excellent source of protein, containing 90% protein by dry weight).

Q. Because Immunocal/HMS90® is 90% protein, is it contraindicated in patients on renal dialysis who must limit protein intake?

A. No, Immunocal/HMS90® is not contraindicated in these patients. Although we suggest that you consult your personal physician with individual medical questions such as these, there is no reason to believe that Immunocal/HMS90® would be anything but helpful for these patients. Immunocal® is one of the most easily digested and most easily absorbed forms of protein in the diet. Its Protein Efficiency Ratio (PER: a mark of the quality of a protein) is extremely high, and in conditions such as renal failure where protein intake must be limited, it is most prudent to consume the highest quality proteins such as whey proteins and egg white proteins, versus lower quality proteins that produce more problematic metabolic waste by-products and residues.

Q. Is Immunocal/HMS90® contraindicated in Celiac Sprue disease?

A. These patients are usually instructed not to ingest wheat or gluten. There is no wheat, or gluten in Immunocal. Furthermore, Immunocal® is lactose-free. There is no reason to believe that Immunocal® would be detrimental in patients with Celiac Sprue Disease.

Q. Who should not take the product?

A. People with an allergy specifically to milk protein, (which is very rare). NOTE: Please understand that lactose intolerance is NOT a milk allergy. Also, anyone who has had an organ transplant and is receiving immunosuppressant therapy should not take Immunocal. The immune system needs to be suppressed in order to prevent organ rejection.

Q. What are some of the critical ingredients in a daily amount of Immunocal/HMS90® (1 pouch)?

A. 9 grams or 90% Protein, 0 mg Fat, less than 1% Lactose, 60 mg of Calcium, 4 micrograms of Selenium, 30 Mg of Potassium, 4 mg of Iron, and approximately 40 Calories.

Q. What is the recommended dose for taking Immunocal/HMS90®?

A. Check with your physician or health care professional. If you do not have a documented glutathione deficiency and are taking Immunocal for good health, one pack per day is the usual maintenance dose. Generally, most studies conducted using Immunocal in patients with glutathione deficiencies used at least 20 grams per day (2 pouches), and some studies showed increased effectiveness using up to 30 grams (3 pouches) per day.

Q. What is the difference in taking Immunocal/HMS90® as opposed to taking other antioxidants?

A. Vitamin E and C are important antioxidants, and you should consider these important supplements in your diet. Immunocal® is not an antioxidant per se, but provides the building blocks for the synthesis of the principle intra-cellular antioxidant, glutathione. Glutathione is the most potent cellular antioxidant known to man, and is hundreds of times more potent than vitamin C or vitamin E. For this reason, glutathione has been called the "Super Antioxidant". By raising the glutathione level within our bodies we provide for the optimum functioning of other lesser antioxidants such as vitamins C and E. More importantly, glutathione serves as a detoxifying agent for multiple toxins that we encounter on a daily basis through the environment and the medications we take. Glutathione has been demonstrated to act as an effective protectant against ultraviolet radiation, which is important in view of the continued loss of the ozone layer.

Q. What is the best way to mix Immunocal/HMS90®?

A. Because Immunocal is a very fine and delicate powder, we recommend mixing it with any juice or liquid that is not above lukewarm (110 degrees F), and NEVER above 120 degrees F. First, mix the packet with approx. 1 tablespoon of the liquid you have chosen, to form a paste. Then pour the liquid to fill your glass. Allow it to sit for a few minutes, stir, and enjoy. Immunocal can also be mixed in applesauce, yoghurt, or sprinkled over cereal without any particular mixing procedure. The product should not be mixed at high speed in a blender (mechanical mixing damages the milk proteins). If you are making a breakfast "smoothie", put all the ingredients except the Immunocal/HMS90® into the blender, mix at high speed, then reduce the blender speed to 'Fold' or 'Low' before adding the Immunocal/HMS90®.

You can mix Immunocal by hand, whisk, covered shaker cup or inexpensive "vortex-mixer". We will ship you a portable, battery-operated vortex-mixer FREE with your first shipment of Immunocal® on the Immunocare (Autoship) program (when you sign up using your credit card to receive monthly shipments of 1 box of Immunocal® or more), or when you purchase a business-builder "Action Pack".

Q. When is the best time of day to take Immunocal/HMS90®?

A. There is no 'best time' to take this product. Because foods such as yoghurt and orange juice are generally morning foods, most people take Immunocal/HMS90® with breakfast. There is nothing wrong with taking it with lunch or dinner or as a midday snack. It will be better absorbed if taken on a relatively empty stomach, i.e. not with or after a heavy meal.

Glutathione (GSH) Enhancer

“Glutathione” the body’s most powerful healing agent. (Dr. Jim Gutman, MD)

“The human immune system is **extremely dependent** on adequate glutathione levels to perform properly, in the words of Dr. Wulf Droge former head immunology at the Heidelberg Cancer research institute. "Thiols And The Immune System: Effect of N-Acetyl cysteine on T Cell System in Human Subjects. Even a partial depletion of the intracellular glutathione pool has a dramatic consequence for the process of blast transformation and proliferation, and for the generation of cytotoxic T cells." (T-cells help the body defend against diseases.) Research has shown that we cannot stay healthy with low levels of ‘glutathione.

Scientists at McGill University in Canada, discovered a safe, natural way of raising our glutathione levels. The product is “Immunocal”.

Facts about this GSH enhancer, cysteine delivery system

21 Years of research at McGill University Medical Research Center and the Montreal General Hospital

23 Published clinical studies proving its effectiveness

All natural –with no side effects, no conflicts with existing meds

Medicaid/Medicare reimbursement in U.S. in selected states

8 Pharmaceutical type patents in the treatment of numerous very deadly and serious disease states. Proven to raise glutathione levels in your cells.

Listed in the main ‘drug’ edition of the U.S. Physician’s Desk Reference 2004

Exceptional health product for all levels of athletes! Double blind study in Muscle Performance from Montreal Children’s’ Hospital

Main Functions of Glutathione (A I D E)

Anti-oxidant: Glutathione is the body’s own natural anti-oxidant, destroying bad free radicals, while helping anti-oxidants like C & E do more work

Immune Booster: Glutathione raises levels of disease fighting T&B cells

Detoxifier: Glutathione removes heavy metals, toxins & pesticides from the liver. Reduces the negative effects of pharmaceutical drugs on the liver

Energy: Glutathione eliminates bad free radicals, cells produce more energy

Immunocal is not a drug, herb, vitamin or anti-oxidant!! It is a highly bioactive (protein) cysteine delivery system, safe & effective

www.immunocal.com doctors’ section: username: doctors / password: gsh

Doctors Viewpoint on Immunocal/HMS-90

I am an Oral and Maxillo Facial Surgeon and when I first heard about Immunocal I wasn't very interested. When I finally read the clinical studies about Immunocal and realized how this product worked on optimizing the immune system response, I felt strongly that this product was going to have a major impact on the health profession and I wanted to be a part of it. I feel more convinced today about the impact of Immunocal on the health of people after having seen such dramatic health results of those people on it." **Dr. Jim McCallum**

"Almost everyone I put on Immunocal tells me that they feel better as soon as they start taking the product. This is explained by the fact that Immunocal brings to all the cells in our body, the building blocks necessary to produce glutathione, a small protein that each cell needs to function properly. In severe asthmatics taking Immunocal, the attacks become less frequent and less severe. The need for medication is decreased, they sleep better, they don't miss work or school as often, resulting in a better quality of life."

Dr. Jean Marcoux, Board Certified Allergist, Immunologist

"Immunocal is the future of the wellness movement - nothing else I know can impact the ability of every cell in the human body to defend itself from the common pathological mechanisms. To raise glutathione levels is to reduce premature oxidation, to eliminate destructive free radicals and help detoxify the poisons inside each cell when it needs to. Only Immunocal is clinically proven to do that in a safe, effective and convenient way."

Dr. Allan Somersall

"Current research is uncovering the fact that the underlying culprit in most disease and aging processes is free radical damage and oxidative stress. Therefore, the most reasonable way to combat these degenerative changes is to find a safe and effective way to raise anti-oxidant levels. I have concluded that glutathione is the crucial anti-oxidant. I believe that Immunocal is the safe, effective, and natural way to raise glutathione levels. Taking Immunocal everyday should be a vital component to anybody's proactive health plan." **Dr.**

Tom Iwama

" Immunocal works and it's safe. I believe it is the safest and most effective supplement available to help raise glutathione levels in every cell of your body. GSH or glutathione is the body's most powerful antioxidant and healing agent. **Immunocal itself is not an antioxidant!** Also, Immunocal is the best way that I know to support and maintain the immune system. This is especially important at a time when medicine is beginning to recognize how many diseases are caused by a deficiency of the immune system. But that's not the whole story - just as important, are the people behind the product. Everyone at Home Office is of the highest integrity. As a doctor, I appreciate the power and efficacy of Immunocal. As a person, I enjoy being associated with dedicated and delightful people."

Dr. Tom Kwyer

Immunocal Amino Acid Profile Review

As a nutritional chemist, PHD and a certified Sports Performance coach with over 2 decades of experience working with a wide variety of athletes including elite World and Olympic medalists, I was very impressed upon reviewing the amino acid profile of Immunocal.

It has been our experience working with these athletes, and is well documented, that exercise exerts a huge systemic demand for amino acids on the human body.

Many studies, such as Lemon at Kent State University, have demonstrated that certain amino acids are consumed much faster than others during even moderate exercise. L-glutamine, in particular, is known to be the most abundant amino acid in muscle tissue and shows the highest blood concentration of all the amino acids after an exercise session. Immunocal supplies almost 1.8 grams of L-glutamine/glutamate in one pouch!

Also, the three branched chain amino acids (BCAAs), L-leucine, L-isoleucine and L-valine, are absolutely fundamentally necessary for the maintenance, repair and growth of lean, functional muscle tissue, are available in a high percentage in Immunocal/HMS-90.

Young at MIT showed that L-leucine oxidation is increased by 240 % during even moderate exercise! [Immunocal provides almost one gram of L-leucine in one pouch! The total amount of the three BCAAs in one pouch of Immunocal is over 2.2 grams!](#)

Knowing the superb bioavailability of Immunocal to human beings and the excellent profile of Immunocal, particularly with respect to the aforementioned amino acids, it should be obvious to any athlete and coach that supplementing with Immunocal will greatly aid recovery from workouts and help any athlete achieve his or her goals, safely, legally and effectively.

- Immunocal is a bioactive whey protein nutraceutical, cystine delivery system that supports the immune system, raises T cell levels and detoxifies the liver.
- It is rich in cysteine-cysteine and glutamyl-cysteine dipeptides.
- It supplies about 1.8 grams of L-glutamine/glutamate per serving.
- It supplies almost 2.2 grams of the essential branched chain amino acids, including 1 gram of L-leucine, per serving.
- It contains <1% fat, cholesterol and lactose.
- It is safe, effective and [legal](#) for use in all sporting organizations.
- Proven to improve volitional muscle performance 13%! (Lands, et al., Journal of Applied Physiology Vol.87 / 1381-1385, 1999)

It will greatly aid athletes by reducing soreness, enhancing recovery and minimizing down time from illness.

Nutritional Breakdown	1 Packet 10 g	100 g	30 packets 1 box
Total Fat	0.01 g	0.13 g	0.39 g
Saturated Fat	0.01 g	0.08 g	0.24 g
Polyunsaturated Fat	0	0.01 g	0.03 g
Monounsaturated Fat	0	0.04 g	0.12 g
Cholesterol	0.04 mg	0.37 mg	1.11 mg
Sodium	25 mg	250 mg	750 mg
Potassium	30 mg	300 mg	900 mg
Total Carbohydrate	0.10 g	1.0 g	3g
Dietary Fiber	0	0	0
Sugars	0.15 g	1-5 g	4.5 g
Protein	9g	90 g	270 g
Vitamin A	<1 g	<10g	<30g
Vitamin C	0	0	0
Calcium	60 mg	600 mg	1800 mg
Magnesium	9mg	90 mg	270 mg
Chloride	0.5 mg	5 mg	15 mg
Iron	0.93 mg	9.3 mg	27.90 mg
Thiamin	0	0	0
Riboflavin	0	0	0
Niacin	0	0	0
Phosphorus	21 mg	210 mg	630 mg
Calories	37	366	1098
Calories from Fat	0.1	1.0	3

**Amino Acid Profile of ImmunoCal
g/10g of ImmunoCal**

AMINO ACID	ImmunoCal	AMINO ACID	ImmunoCal
ASP	1.143	TYR	.279
THR	.747	PHY	.279
SER	.477	HIS	.162
GLU	1.773	LYS	.855
GLY	.180	ARG	.153
ALA	.504	PRO	.567
VAL	.567	CYS	.225
ILE	.612	MET	.225
LEU	.981	TRP	.180

The Safety of Immunocal

Immunocal is a broad-spectrum nutraceutical food derivative with biologic capability to modulate cellular function. More than 100,000 people have used Immunocal with no significant adverse side effects.

Production of Immunocal meets or exceeds the requirements of the USDA for dairy products.

The total bacterial count is less than 1000/g with no detectable pathogens and/or antibiotics.

The whey protein concentrate (WPC) marketed as Immunocal has been tested in hundreds of laboratory experiments on mice (20% in formula diets) from 1980 to 1992 without any signs of toxicity. WPC fed mice were not distinguishable from controls, in terms of growth rate, hair appearance, serum protein, etc. 1-8

Immunocal has also been administered in clinical trials in adults and children in doses varying from 10/g to 40/g per day without side effects. 9-12

In addition, Immunocal is sold in Canada, United States, Europe, Japan, Malaysia, Taiwan and other countries to thousands of customers and no clinically relevant complications have been reported.

* 21 Code of Federal Regulations §184.1979c affirms whey protein concentrates as GRAS and the FDA has determined there are no questions regarding safety for human consumption.

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