

Bovine Colostrum and the Super Athlete

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Professional athletes have always sought ways to enhance their performance, achieve better results, and gain an advantage over their competitors. The Olympian, or “super athlete” takes this to new heights, and in a world where performance is measured in milliseconds, any natural substance that enhances endurance and reduces recovery time determines who wins the gold and who wins the silver. Many of today’s super athletes are turning to bovine colostrum as a means to that coveted edge. The growth factors in bovine colostrum help burn fat, build lean muscle, build strength, shorten recovery time, and prevent illness after vigorous exercise.

Improved Recovery After Exercise

Early research with elite Australian athletes showed that supplementing with bovine colostrum was advantageous. After four weeks of supplementation, athletes had a 20% increase in endurance and quicker recovery time after intense exercise which in turn, allowed them to train harder and improve performance. Dr. Jon Buckley of the University of South Australia pioneered much of this research,¹ and his results led the Australian Olympic team to put the majority of its athletes on the colostrum supplementation protocol (60 grams powdered colostrum daily), which led to the team winning a disproportionately high number of medals for such a small country in the 2000 and 2004 Summer Olympic Games. The Australians claimed that their winning advantage was attributable to their athletes’ colostrum supplementation during training.^{2,3} This did, however, result in an International Olympic Committee (IOC) inquiry into whether powdered bovine colostrum was a potentially banned substance.⁴ The IOC determined that colostrum was instead a super-food, and their ruling provided athletes with a safe, viable, and legal alternative to doping and other banned substances.

Oxidative stress due to intense exercise contributes to muscle fatigue. Glutathione (and its precursors, cysteine, glycine and glutamic acid) can increase an athlete’s exercise capacity before fatigue sets in by neutralizing free radicals that otherwise cause inflammation and damage muscle tissue. Glutathione and its antecedents are abundant in colostrum.⁵ Added benefits of glutathione for the super athlete include regulation of other less effective antioxidants; anti-viral and anti-bacterial activity; immune system enhancement; enhanced functioning of lymphocytes; and carcinogen neutralization.

Increased Lean Body Mass

Increasing lean body mass and burning adipose tissue is critical for the high-caliber athlete, and increasing quantities of Insulin-like Growth Factor (IGF-1) in the body is the key to achieving success. This can be accomplished in any of three ways: (1) take Human Growth Hormone (HGH) injections; (2) perform weight bearing exercise 1-2 hours daily; (3) supplement with bovine colostrum. First, taking HGH is both unsafe and illegal, although often utilized by athletes. Injectable HGH has serious side effects because it is made from recombinant DNA technology and is only 70% bio-identical to human growth hormone. Second, heavy workouts do cause the body to increase IGF-1 production, but not significantly. Colostrum supplementation is thus, the natural and ideal choice. Colostrum does not act like the anabolic steroid HGH, and is an all-natural super-food; its growth factors are nearly 100% bio-identical to that of humans. Physical activity is required for the growth factors to exert their fat-burning

action at a dosage of 20 grams of powdered colostrum daily.⁶ Most studies show that four to eight weeks of colostrum supplementation are necessary to see results, and that daily use is required for maintenance of health benefits.

The Insulin-like Growth Factor (IGF-1) in colostrum is the *real growth hormone* which promotes muscle growth and favors adipose stores over glucose as a fuel source.⁷ IGF-1 is primarily produced by the liver and production is stimulated by growth hormone. IGF-1 is the only natural hormone capable of promoting muscle growth by itself. Although synthetic IGF-1 is banned by the IOC, naturally occurring IGF-1 in bovine colostrum supplements is not, and IGF-1 is abundant in bovine colostrum. During vigorous exercise, colostrum slows protein breakdown, and stimulates glucose transport in muscle. Muscles are then able to make more efficient use of the fuel available to them, which results in an increase in lean muscle mass without a corresponding increase in adipose tissue. Long-term colostrum supplementation increases IGF-1 levels.⁸ Daily colostrum supplementation benefits skeletal muscle tissue by reducing the oxidant-induced damage during exercise.⁹

Blood Glucose Homeostasis

Keeping blood glucose levels consistent throughout the day avoids catabolism, or *destructive metabolism*, in which muscle protein is broken down into amino acids for fuel. When a person's glucose level begins to drop within two hours of the last meal, those amino acids are converted to glucose in order to raise the blood glucose back into homeostasis to insure the brain has a consistent fuel supply. The body is very efficient in this process, but rather self-defeating if the goal is to preserve or increase muscle tissue. During the fasting state between meals, the body is essentially consuming its muscle tissue to fuel the brain. Anabolism, or *productive metabolism*, is the buildup of muscle protein from amino acids. Having some protein in the body's gas tank keeps the brain fueled and maintains muscle tissue. IGF-1 plays a critical role by preventing catabolism and promoting anabolism.

Blood glucose homeostasis also requires avoiding simple carbohydrates which rapidly increase blood glucose levels and then stimulate the pancreas to secrete insulin, thereby causing glucose levels to plummet. Hypoglycemia can produce symptoms, such as dizziness, lightheadedness, confusion, anxiety, and weakness, which may be temporarily debilitating. Depending on the exercise regimen and/or propensity for hypoglycemia, eating some type of protein every four hours is important. Colostrum contains amino acids and IGF-1, so it is ideal to supplement between meals.

Tissue Repair & Accelerated Healing

The super athlete experiences injury at a high rate and although skeletal muscle does repair itself through regeneration, injured muscle does not fully recover its strength.¹⁰ The natural growth factors in colostrum are significant to healing. IGF-1, highly expressed during the early inflammatory phase of an injury, appears to aid in fibroblast proliferation and migration and subsequently increases collagen production.¹¹ Platelet-derived growth factor (PDGF) in colostrum helps stimulate IGF-1 production as well as other growth factors. Growth hormone has been shown to accelerate bone regeneration.¹²

Additionally, Transforming Growth Factor (TGF-alpha and TGF-beta) in colostrum stimulate the production and repair of DNA and RNA. Heavy exercise damages muscle fibers, tendons, and ligaments but TGF along with Fibroblast Growth Factor (FGF) and Epithelial Growth Factor (EGF) repairs them. FGF is a powerful stimulator of angiogenesis and a regulator of cellular migration and proliferation. Accelerated repair means that athletes recover more quickly from

injuries and can resume training. Less downtime keeps athletes competitive and less likely to miss competitive events.

Improved Immune System Function

Following intense exercise, the immune system temporarily shuts down so that the body can recover from the physical stress. The production of T-cells and natural killer (NK) cells is suppressed. During training, athletes are consistently in an immune-compromised state which opens them up to opportunistic bacteria and viruses, particularly those that cause upper respiratory infections. Colostrum transmits immunity for common pathogens via antibodies, thereby effectively terminating the immune system shutdown. Bovine colostrum contains natural antibodies against Enterococcus, E. coli, campylobacter, salmonella, staphylococcus aureus, and klebsiella pneumonia, among hundreds of others. Athletes self-report a lower incidence of upper respiratory infections while taking bovine colostrum.^{13, 14} New research suggests that bovine colostrum is more effective than influenza vaccinations,¹⁵ so supplementation is an alternative if athletes object to vaccines.

Prevention of Leaky Gut

Colostrum can also benefit the tendency for “leaky gut” that occurs with heavy exercise, thereby preventing heat stroke.¹⁶ Gut disorders are common in long distance runners. The physiological response to increased gut permeability is to expel gut contents, usually by diarrhea, which may diminish performance. Research showed that highly trained runners could experience a 250% increase in gut leakage accompanied by a two-degree body temperature increase. With daily colostrum supplementation for two weeks, that initial amount of gut leakage decreased by 80%, despite the same temperature increase.

To some extent, most people have some degree of Leaky Gut Syndrome (LGS), which makes the intestinal lining more permeable to macromolecules and pathogens. Frequently used antibiotics for upper respiratory infections along with non-steroidal anti-inflammatory drugs (NSAIDs) and prescription analgesics for muscular pain are the three primary causes of LGS and are consequences of high intensity training. Bovine colostrum has been shown to reduce NSAID-induced intestinal permeability.¹⁷

Other triggers of LGS include parasites, corticosteroids; birth control pills; GMO's; pesticide-contaminated foods; molds, yeast, and bacteria; an excessive intake of refined sugars, caffeine, alcohol, or food additives; surgery; and a decrease in blood supply to the bowel. Although super athletes are likely to be more health conscious than most, consuming contaminants in the food supply is generally unavoidable. The damage from LGS may not be obvious at first and take many years to develop, yet the major health consequences outside of GI pathogens are allergies and autoimmune diseases. Being the fittest of the fit does not preclude Olympians from having autoimmune diseases.

As mentioned previously, antibodies in colostrum can help ward off opportunistic bacteria and viruses. Colostrum's growth factors help heal gut ulcerations which otherwise allow pathogens to enter the bloodstream and reduce the efficiency of nutrient uptake. Colostrum allows more of the carbohydrates and amino acids from food to be utilized as fuel during exercise. The hypothesis is that healing a leaky gut will increase energy levels and even out performance, particularly in athletes with Irritable Bowel Syndrome (IBS) resulting from incomplete digestion with protein supplementation.¹⁸

Colostrum and the 2016 Olympics

Due to the extremely high air pollution levels in Rio de Janeiro, British researchers are looking into whether colostrum can help reduce lung inflammation caused by inhaling pollutants, such as carbon dioxide and nitrogen dioxide.¹⁹ Cyclists will drink 20 grams (0.705 ounces) of bovine colostrum every day for two weeks and will cycle in a special chamber which replicates the humidity and pollution in Rio. Lung function will be measured as an indicator of colostrum's hypothetical protective effect. Researchers predict that their study will not only impact Great Britain's Olympic team, but have applications for people who work and live in polluted environments.

Colostrum Dosing

There are differing opinions as to the optimal dosage. Early studies with Australian athletes utilized 60 grams of powdered colostrum daily, which may have been over-kill. Later studies showed significant results at 20 grams daily which is likely to be more in line with that which is necessary to produce the desired results. For athletic performance, colostrum should be taken 45-60 minutes prior to an intense training session. If the athlete has a propensity for hypoglycemia, colostrum should also be taken between meals and before bedtime.

Colostrum Safety

There are currently no known contraindications for colostrum supplementation in super athletes or the general public. Colostrum supplementation is generally regarded as a non-invasive intervention, and therefore, safe. However, colostrum does contain milk proteins, so anyone with a dairy intolerance should check with his/her physician. A pregnant or lactating athlete should also check with her physician.

Colostrum vs. Isolated Amino Acid Preparations

Bovine colostrum is different than other amino acid supplements intended for increased athletic performance. Foremost, colostrum is an all-natural, "whole food" supplement which contains more essential amino acids than singular amino acid preparations and even more than whey protein. Additionally, the handling of amino acids is critical to maintaining the specific health benefit each amino acid provides. Amino acids in whey protein are often denatured during processing; this is not the case with colostrum.

Creatine is widely used among athletes participating in activities involving intense, brief bursts of energy. Like all other isolated singular amino acid preparations, creatine is not a food, the way colostrum is. Because it is a preparation, it may contain impurities. Amino acid preparations are relatively new concepts and no long-term safety studies have been performed.²⁰ Bovine colostrum, on the other hand, dates back to ancient times and was referenced in the Old Testament's *Book of Sirach* as being one of the "necessities of life".²¹ Ironically, colostrum has more recently been labelled the "new creatine" by athletes and trainers.²²

Full Disclosure

Bovine colostrum and IGF-1 are not without controversy. Some research has shown that increased levels of IGF-1 accelerate growth of existing cancer cells,²³ but other studies failed to confirm the results. Certainly, there is **no evidence** that colostrum itself causes cancer. The proline-rich polypeptides (PRPs) and lactoferrin in colostrum actually increase the body's natural killer (NK) cells by up to 400%.²⁴ Any theoretical cancer cell proliferation due to IGF-1 would be attenuated by the significant number of NK cells.

In the late 1980's and early 1990's, Monsanto sparked outrage by developing recombinant bovine growth hormone (rBGH) for dairy cows that would lengthen milk production from ten months to eleven months. Armed with the fact that IGF-1 promotes cell division in certain cells, "reactivists" led the charge that rBGH would be expressed in the milk and the presumed increase in IGF-1 levels would exert a cancer-accelerating effect. Essentially, overplaying an over-simplified understanding of cancer growth spread great fear that drinking milk would cause cancer; no research has supported the idea that consuming colostrum causes or accelerates cancer.²⁵

As far as clinical studies that have reported conflicting results in athletic performance, there are two important considerations. First, studies have not been conducted with a standardized dose and length of supplementation. Second, bioavailability of the active components in the specific colostrum product utilized in the study is typically not established.²⁶ Many colostrum products on the market today contain very little, if any, IGF-1 and TGF. This is because manufacturers dry the colostrum at high heat, which destroys the growth factors and turns the colostrum into nothing more than powdered milk. Future research on the influence of bovine colostrum on athletic performance will only be of value if these issues are addressed and high quality colostrum with verified bioavailability is used.

Efficacy & Quality Colostrum

Bovine colostrum for human consumption is essentially worthless if the active components have been destroyed during processing. The quality and thus, effectiveness of colostrum depends on four factors – the colostrum source, processing methods, testing and verification of active components, and Liposomal Enhanced Delivery (LD)²⁷. Trainers who recommend colostrum supplements to athletes should recommend a quality product with verified results and the following features:

- Colostrum is obtained from pasture-fed dairy cows that are certified to be healthy, BST, BSE, and antibiotic-free.
- Colostrum is flash pasteurized and dried with low heat, as opposed to the high heat of milk pasteurization, which preserves rather than destroys any of the bioactivity.
- Every batch is tested for quality, efficacy and safety in an FDA licensed facility.
- Liposomal Enhanced Delivery (microcoating of every colostrum particle) is applied to ensure the colostrum will bypass digestion and remain bioavailable at the cellular level.

Conclusion

Athletes will go to great lengths to achieve superior performance, as evidenced by seemingly pervasive doping and illegal growth hormone use in professional sports. There is an alternative that won't cause unnecessary harm later in life for professional athletes who want to improve performance naturally, healthfully, and within the guidelines of their respective governing authorities. The super athletes choose bovine colostrum. Bovine colostrum can help shorten recovery time following intense exercise; build lean muscle mass; burn adipose tissue; maintain ideal blood glucose levels; accelerate healing of injuries; preserve and boost immune function; and heal Leaky Gut Syndrome. Weekend warriors and everyday exercisers can benefit as well, without feeling the need to put harmful or unproven substances into their bodies.

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