

water or formula. Liposomal Delivery enhances the bioavailability, and extensive research shows that such an enhanced delivery method allows ingested bovine colostrum to achieve the intended results. When selecting a bovine colostrum supplement, look for one that is GMP certified, contains a standardized content of active components, is flash pasteurized without loss of effectiveness, and is derived from first-milking pastured cows.

Safety of Bovine Colostrum Supplements

No significant health risks have been reported during or after oral ingestion of immune milk or colostrum preparations. Colostrum supplementation is generally regarded as a non-invasive intervention, and therefore, safe. Bovine colostrum is ideal for formula-fed infants or those with limited breast milk feeding (after potential casein allergy is ameliorated). Infants with specific health issues, such as pathogen-induced diarrhea, may have successful resolution without the side effects of pharmaceutical drugs.

This information is copyrighted and may not be reproduced without express permission from the Center for Nutritional Research.

References

Keim SA, et al. Microbial Contamination of Human Milk Purchased Via the Internet. *Pediatrics* peds.2013-1687; published ahead of print October 21, 2013, doi:10.1542/peds.2013-1687.

Derscheid RJ, Ackermann MR. The innate immune system of the perinatal lung and responses to respiratory syncytial virus infection. *Veterinary Pathology* 2013;50(5):827-41.

Pammi M, Abrams SA. Oral lactoferrin for the prevention of sepsis and necrotizing enterocolitis in preterm infants. *Cochrane Database Syst Rev.* 2011;(10):CD007137.

Panahi Y, et al. Bovine colostrum in the management of nonorganic failure to thrive: a randomized clinical trial. *Journal of Pediatric Gastroenterology and Nutrition* 2010;50(5):551-4.

Belcaro G, et al. Prevention of flu episodes with colostrum and Bifivir compared with vaccination: an epidemiological, registry study. *Panminerva Med.* 2010;52(4):269-75.

Keach A. Peptide immunotherapy: the use of bovine colostrum proline-rich polypeptides in cytokine modulation for the alternative relief of allergic symptoms. *Journal of Allergy and Clinical Immunology* 2008;119(1):S260.

Mehra R, et al. Milk immunoglobulins for health promotion. *International Dairy Journal* 2006;16(11):1262-1271.

Zimecki M, Artym J. [Therapeutic properties of proteins and peptides from colostrum and milk]. *Postępy Hig Med Dosw* (online). 2005;59:309-323.

Artym J, Zimecki M. [The role of lactoferrin in the proper development of newborns]. *Postępy Hig Med Dosw* (online). 2005;59:421-32.

Akisu C, et al. Effect of human milk and colostrum on Entamoeba histolytica. *World J Gastroenterol.* 2004;10(5):741-2.

Read JS. Human milk, breastfeeding, and transmission of human immunodeficiency virus type 1 in the United States. American Academy of Pediatrics Committee on Pediatric AIDS. *Pediatrics* 2003;112(5):1196-1205.

Vaarala O. The gut immune system and type 1 diabetes. *Annals of the New York Academy of Science* 2002;958:39-46.

Solomons NW. Modulation of the immune system and the response against pathogens with bovine colostrum concentrates. *European Journal of Clinical Nutrition* 2002;56(Suppl.3):524-528.

van der Strate BW, et al. Antiviral activities of lactoferrin. *Antiviral Re-*

search 2001;52(3):225-39.

Satué-Gracia MT, et al. Lactoferrin in infant formulas: effect on oxidation. *J Agric Food Chem.* 2000;48(10):4984-90.

Korhonen H, et al. Bovine milk antibodies for health. *British Journal of Nutrition* 2000;84 (Suppl. 1):S135-S146.

Huppertz HI, et al. Bovine colostrum ameliorates diarrhea in infection with diarrheagenic Escherichia coli, shiga toxin-producing E. Coli, and E. coli expressing intimin and hemolysin. *J Pediatr Gastroenterol Nutr.* 1999;29(4):452-6.

Sarker SA, et al. Successful treatment of rotavirus diarrhea in children with immunoglobulin from immunized bovine colostrum. *Pediatr Infect Dis J.* 1998;17(12):1149-54.

Ylitalo S, et al. Rotaviral antibodies in the treatment of acute rotaviral gastroenteritis. *Acta Paediatr.* 1998;87(3):264-267.

Buescher ES, McWilliams-Koeppen P. Soluble tumor necrosis factor-alpha (TNF-alpha) receptors in human colostrum and milk bind to TNF-alpha and neutralize TNF-alpha bioactivity. *Pediatric Research* 1998;44(1):37-42.

Carver JD, Barness LA. Trophic factors for the gastrointestinal tract. *Perinatology* 1996;23(2):265-285.

Bessler H, et al. Human colostrum stimulates cytokine production. *Biol Neonate.* 1996;69(6):376-82.

Mitra AK, et al. Hyperimmune cow colostrum reduces diarrhoea due to rotavirus: a double-blind, controlled clinical trial. *Acta Paediatr.* 1995;84(9):996-1001.

Shield J, et al. Bovine colostrum immunoglobulin concentrate for cryptosporidiosis in AIDS. *Arch Dis Child.* 1993;69:451-453.

Buescher ES, McIlheran SM. Colostral antioxidants: separation and characterization of two activities in human colostrum. *J Pediatr Gastroenterol Nutr.* 1992;14(1):47-56.

Ebina T, et al. Passive immunizations of suckling mice and infants with bovine colostrum containing antibodies to human rotavirus. *Journal of Medical Virology* 1992;38(2):117-123.

Savilahti E, et al. Low colostral IgA associated with cow's milk allergy. *Acta Paediatr Scand.* 1991;80:1207-1213.

Shortridge KF, Lawton JW, Choi EK. Protective potential of colostrum and early milk against prospective influenza viruses. *J Trop Pediatr.* 1990;36(2):945.

Heaton P. Cryptosporidiosis and acute leukemia. *Arch Dis Child* 1990;65(7):813-814. Treatment of 3 year old with acute cryptosporidia caused diarrhea.

Davidson GP, et al. Passive immunisation of children with bovine colostrum containing antibodies to human rotavirus. *Lancet* 1989;2(8665):709-12.

Hilpert H, et al. Use of bovine milk concentrate containing antibody to rotavirus to treat rotavirus gastroenteritis in infants. *J Infect Dis.* 1987;156(1):158-66.

Brüssow H, et al. Bovine milk immunoglobulins for passive immunity to infantile rotavirus gastroenteritis. *Journal of Clinical Microbiology* 1987;25(6):982-986.

Tzipori S, Robertson D, Chapman C. Remission of diarrhoea due to cryptosporidiosis in an immunodeficient child treated with hyperimmune bovine colostrum. *Br Med J (Clin Res Ed).* 1986;293(6557):1276-7.

Yolken RH, et al. Antibody to human rotavirus in cow's milk. *New England Journal of Medicine* 1985;312(10):605-610.

Ogra PL, Losonsky GA, Fishaut M. Colostrum-derived immunity and maternal-neonatal interaction. *Ann NY Acad Sci.* 1983;409:82-95.

Lawton JW, et al. Interferon synthesis by human colostral leucocytes. *Arch Dis Child.* 1979;54(2):127-30.

Ho PC, Lawton JW. Human colostral cells: phagocytosis and killing of E. coli and C. albicans. *Journal of Pediatrics* 1978;93(6):910-915.

Sabin AB, Fieldsteel AH. Antipoliomyelitic activity of human and bovine colostrum and milk. *Pediatrics* 1962;29:105-115.

Campbell B, Petersen WE. Antibodies in milk for protection against human disease. *Milchwissenschaft* 1959;14:469-473.

Kuttner A, Ratner B. The importance of colostrum to the new-born infant. *Am J Dis Child.* 1923;25(6):413-434.



Bovine Colostrum & Infant Health

The importance of colostrum for infants who are not breastfed

Douglas A. Wyatt, Director of Research
Center for Nutritional Research
www.centerfornutritionalresearch.org

Maternal milk offers passive protection to a newborn infant against enteric pathogens, primarily via the transfer of immunoglobulins and growth factors from mother to infant. The historical concept of 'immune milk' (the transfer of passive immunity via lacteal antibodies) dates back to the 1950's. In the 1960's, the underlying mechanisms of passive immunity were realized when the chemical structure of immunoglobulins was discovered. Later in the 1970's, the secretory immune system was identified which gave way to the role of secretory antibodies in the prevention or treatment of enteric infections in mammals. Since the 1980's, there has been considerable interest in utilizing antibodies from the milk and colostrum of heterologous species, particularly ruminants. Studies show that bovine antibodies can be effective in the prevention or treatment of human and animal diseases caused by enteropathogenic microbes (bacteria, viruses, protozoans, and fungi). Bovine colostrum is the most prevalent preparation available

today, and it passes immunity to all the disease-causing pathogens that the cow has encountered in her lifetime, including the antibodies she received from her mother – a broad spectrum pharmacy. The efficacy of any bovine colostrum supplement is determined by the antimicrobial activity of the specific antibodies and complement factors, which must be preserved during the manufacturing process.

Bovine colostrum influences the immune system in two ways. First, by stimulating it to fight infection and second, to modulate it up or down depending on the most efficacious outcome. The newborn gut is unique in that it has not completed maturation at the time of birth and needs the growth factors and other components of colostrum to complete its development. Immunoglobulins are easily assimilated into the newborn's body via the GI tract. Colostrum-LD® has been tested for the active antibodies against the following disease-causing microbes:

Bacteria

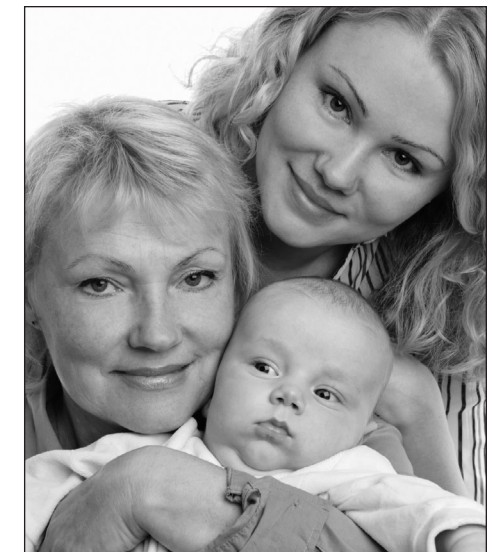
Bacillus cereus
Streptococcus pyogenes
Streptococcus agalactiae
Streptococcus pneumoniae
Streptococcus mutans
Staphylococcus epidermidis
Staphylococcus aureus
Listeria monocytogenes
Yersinia enterocolitica
Escherichia coli
Escherichia coli O157:H7
Haemophilus influenzae
Campylobacter jejuni
Helicobacter pylori
Salmonella enteritidis
Salmonella typhimurium
Klebsiella pneumoniae
Propionibacterium acnes
Vibrio cholera

Viruses

Adenovirus
Alphavirus
Dengue virus
Echovirus
Epstein-Barr virus
Enterovirus 71
Hantavirus
Hepatitis C virus
Herpes viruses
HIV-1
Human Papilloma virus
Influenza
Japanese encephalitis
Measles
Polio virus
Respiratory syncytial virus
Rotavirus
St. Louis virus
West Nile virus
Yellow fever virus

Fungus

Candida albicans



It is important that diagnosis and evaluation of chronic symptoms be determined by qualified health care professionals either natural health care practitioner or complimentary care physician. Statements in this brochure are not intended to diagnose or treat disease and the statements herein have not been evaluated by the Food and Drug Administration.

Common Conditions Affecting Infants and Young Children

Diarrhea

Diarrhea is especially lethal to infants and worldwide, it is the second leading cause of death in infants. Antibiotics are ineffective against virus-caused diarrhea, yet Colostrum-LD® has antibodies against many pathogens, including rotavirus which is very common in infants in young children. Chronic diarrhea caused by opportunistic Cryptosporidia and rotavirus is potentially fatal in children with AIDS because it causes muscle wasting and insufficient nutrient absorption in the gastrointestinal tract. The immunoglobulins in bovine colostrum help fight pathogens and IGF-1 increases muscle mass.

Respiratory Infections

Infants, particularly those born prematurely, are most susceptible to diseases affecting the lungs and respiratory tract because their immune systems are not fully developed. Respiratory Viral Syndrome (RVS) is a common cause of infant mortality in the first two years. With no effective vaccine available, the administration of RVS immune prophylaxis is a viable solution. Research shows that lactoferrin and Proline-Rich Polypeptides (PRPs) in colostrum block entry of the virus into cells, either by blocking cellular receptors, or by direct binding to the virus particles. Seasonal influenza is also a concern for infants and young children, and in the absence of vaccination, bovine colostrum is a viable alternative. Viralox® contains Proline-Rich Polypeptides (PRPs) and lactoferrin. This oral spray is easily administered to infants and young children. Colostrum-LD® can be added to infant formula, milk, applesauce, yogurt for easy ingestion at most ages.

Allergies (including Milk Allergy)

Approximately one out of twenty infants is unable to tolerate the caseins in cow's milk/colostrum. Thus, cow's milk should not be introduced into the diet until this allergy is alleviated, so as to avoid any potential adverse reactions. Proline-Rich Polypeptides (PRPs) in colostrum modulate the pro-inflammatory cytokines, which can help improve or eliminate symptomatology of both allergies and autoimmune diseases. Additionally, PRPs inhibit the overproduction of lymphocytes and T-cells and ameliorate the major symptoms observed in allergies and autoimmune conditions (pain, swelling and inflammation). Colostrum IC® (oral Immune Concentrate spray) is suited for children under two years of age who have not yet been exposed to either cow's milk or cow's colostrum.

Colostrum Supplementation: Literature Summary

Studies with bovine colostrum have demonstrated the antiviral activity against rotavirus, the primary cause of diarrhea in infants and young children (Sarker SA, et al. 1998; Ylitalo S, et al. 1998; Mitra AK, et al. 1995; Davidson G, et al. 1989; Brüssow H, et al. 1987; Yolken RH, et al. 1985).

Bovine colostrum supplementation has also been shown to be a useful method, in addition to known medical and psychological treatments, to increase the weight of children with nonorganic failure to thrive (Panahi Y, et al. 2010).

Oral lactoferrin (a component of colostrum) prophylaxis reduces the incidence of late-onset sepsis in infants weighing less than 3.3 pounds and most effective in infants weighing less than 2.2 pounds (Pammi M, Abrams SA. 2011).

In a case study of a commercial hyperimmune bovine colostrum with potent anticryptosporidial activity, a four year old child with AIDS and severe cryptosporidiosis-associated diarrhea experienced significant clinical improvement in the diarrhea and permanent elimination of the parasite from the gut (Shield J, et al. 1993). In another case study of bovine colostrum, a three year old child with acute cryptosporidia caused diarrhea was treated and recovered within two weeks (Heaton P. 1990)

Lysozyme, which is added to formulas but found in colostrum naturally, is beneficial for the treatment of periodontitis and the prevention of tooth decay. Milk enriched with lysozyme has also been used to feed premature infants suffering from concomitant diseases. (Zimecki M, Artym J. 2005).

Growth Factors in Bovine Colostrum

Growth factors play an important role in maintaining the human body by stimulating cell growth, proliferation, differentiation and migration; responsible for repair of leaky gut epithelia; bone remodelling and maintenance; fracture repair; wound healing; increased collagen production; and growth of blood vessels into damaged areas. There is an increasing use of growth factors for the treatment of hematologic and oncologic diseases and cardiovascular diseases. The most significant growth factors in bovine colostrum for the infant/child's benefit include: Insulin-like Growth Factor, Epithelial/Epidermal Growth Factor, Transforming Growth Factor, and Vascular Endothelial Growth Factor.

Insulin-like Growth Factor I (IGF-1) – a protein hormone with a similar structure to insulin and a major growth factor that stimulates cell proliferation in wounds.

Insulin-like Growth Factor II (IGF-2) – a protein

hormone with a similar structure to insulin and a major fetal growth factor; promotes growth during gestation.

Epithelial/Epidermal Growth Factor (EGF) – stimulates the proliferation and differentiation of epidermal cells, including the intestinal lining, to maintain gut integrity.

Transforming Growth Factor Beta 1 & 2 (TGF-β1, TGF-β2) – controls cell growth, proliferation, differentiation, and apoptosis; stimulates production of IgA by B lymphocytes; is a vital factor in skeletal growth, bone mass maintenance, and fracture healing.

Vascular Endothelial Growth Factor (VEGF) – creates new blood vessels during embryonic development and new blood vessels after injury.

VIRALOX® Immune Oral Spray (PRPs)

The Proline-Rich Polypeptides (PRPs) in Viralox® are key to helping the immune system be more effective in fighting off viral and bacterial invaders. In other words, Viralox® boosts the body's own immune system to eliminate pathogens and helps keep children from getting sick. And unlike over-the-counter cold and flu medications, Viralox® treats the cause of illnesses, not the symptoms.

Colostrum IC® (Immune Concentrate Oral Spray)

This super concentrate of all of colostrum's most important immune modulating components is key to helping the immune system remain balanced and effective during the allergy and autoimmune response. A world renown PhD and colostrum specialist recently explained the attenuation of cow's milk allergy:

“Since many infants are unable to tolerate caseins in cow's milk, Colostrum IC® is recommended for two weeks prior to introducing cow's milk or cow's colostrum into the diet, particularly if the child is under two years of age. PRPs and growth factors in bovine colostrum modulate the casein sensitivity and restore homeostasis.”

A Case For Extended Breastfeeding

The newborn gut is unique in that it has not completed maturation at the time of birth and needs the growth factors and other components of the mother's colostrum to complete its development. This incomplete development of the gut is of benefit to the newborn as it allows large proteins, such as immunoglobulins, to easily enter the body. Immunoglobulins in colostrum and mother's milk bind to disease-causing pathogens on the mucosal surfaces of the GI tract, thereby preventing them from colonizing and causing infection. This modulation by the immune system creates passive immunity for the infant.

Early weaning or exclusive formula use deprives the

child of the immunity provided by the mother. Immunoglobulins are not present in pasteurized milk or infant formula. Breastfeeding not only helps prevent disease in infants, but research shows that longer breastfeeding is associated with better mental health through childhood and into adolescence.

In modern times, the length of breastfeeding has been determined by social norms, mothers returning to the workplace, and the successful marketing of infant formulas. From 1900 to 1960, negative attitudes caused a significant decline in breastfeeding, however, the trend has been reversing. Experts now recommend that children be breastfed within one hour of birth (for mother's colostrum), exclusively breastfed for the first six months, and subsequently breastfed until age two complimented with age-appropriate and nutritionally adequate foods.

A note about infant formulas: these are basically “junk food”. Although infant formulas contain protein, fats, carbohydrates, vitamins, and minerals, they contain none of living components present in bovine colostrum and mother's milk. Formulas simply cannot provide protection against disease-causing pathogens which attack an infant's immature immune system. If we rob children of these living components, bovine colostrum is the best substitute we presently have.

A note about breast milk sharing: a recent study showed that while good intentioned, 74% of breast milk samples purchased via the internet contained infectious bacteria and 21% contained cytomegalovirus (a herpes-type virus). Another study reported that 10% of the human breast milk purchased over the Internet contained added cow's milk or infant formula. Proper handling and storage, temperature issues, dilution or contamination, as well as questions about a milk donor's prescription or illicit drug use and alcohol consumption are definitely not an issue with Colostrum-LD® supplementation. Mothers can feel safe knowing that Colostrum-LD® is an alternative way to impart the “life-giving” substances without the potential risks of breast milk sharing. When mothers discontinue breast feeding before the age of two, bovine colostrum supplementation is strongly recommended for continued support and growth of all body tissue for optimum development and health.

Liposomal Delivery & Standardization

To achieve the gastrointestinal benefits of bovine colostrum, it is crucial that the active components will bypass digestion in the stomach and be bioavailable for uptake and distribution to the body's cells. Additionally, colostrum must be soluble for free dispersion throughout the GI tract as well as be able to readily disperse in