

TruActive™'s immune active protein benefits for human nutrition



Introduction

TruActive™ MPC 85 contains more immune active proteins than any other food ingredient available today. The literature below details scientifically proven benefits to human nutrition. While the studies have mostly used extracted compounds, TruActive™ contains significant quantities of each of these immune active proteins.

Beneficial effects in developing infants:

- Infants who received formula supplemented with immunoglobulin-concentrate as found in milk had both significantly reduced incidences and episodes of diarrhea [\[1\]](#).
- Neonates at risk for bacterial infections who were treated with immunoglobulins such as those found in milk had significantly enhanced survival [\[2\]](#).
- Infants have increased protection from diseases caused by gastroenteric infectious agents such as rotavirus and *Escherichia coli* as a result of Immunoglobulin A antibodies found in breastmilk which disrupt microbial adherence processes and microbial cell signaling [\[3\]](#).
- Lactoferrin, an antibacterial protein found in milk, protects newborns against gastrointestinal infections and also plays a role in iron absorption which enhances growth and development [\[4\]](#).
- In neonates, the milk protein alpha-1-antitrypsin protects the infant from hepatic diseases such as cirrhosis [\[5\]](#).

Gastro intestinal disease protection:

- The protein polymeric immunoglobulin receptor (pIgR) is important for proper immune responses and when it is deficient in the colon, there is an increase in the severity of Crohn's disease [\[10\]](#).
- Polymeric immunoglobulin receptor (pIgR) protects the mucosa of the intestinal tract by neutralizing pathogens [\[11\]](#).
- The increased abundance of immunoglobulins in the intestinal tract such as IgA and IgM, as found in milk, prevent enteric infections and inhibit intestinal carcinoma growth [\[12\]](#).
- Increased availability of immunoglobulin antibodies such as IgA and IgM play a significant role in clearing the intestinal parasite *Giardia* from the gastrointestinal tract [\[13\]](#).
- Lactoferrin is an antibacterial protein found in milk which significantly reduces the incidence and multiplicity of carcinomas in the large intestine [\[14\]](#).
- Supplementing the diet with lactoferrin significantly suppressed intestinal polyposis development in the small intestine [\[14\]](#).
- The protein osteopontin protects mucosal surfaces in the intestine during acute inflammatory colitis by preventing massive destruction of intestinal crypts. The protein also plays an important role in protecting the intestine from pathogens [\[15\]](#).

Musculoskeletal beneficial effects:

- The protein alpha-1-antitrypsin reduces bone loss in particular when there is increased risk for severe bone loss due to osteoporosis [16].
- The protein osteopontin is important for proper bone formation and remodeling [17].
- Immunoglobulins which are a significant component of whey protein counteract muscle breakdown in the elderly [18].
- Immunoglobulin containing whey protein aids in recovery after resistance exercise training [18].

Protection against asthma and pulmonary disease:

- The polymeric immunoglobulin receptor (pIgR) protein defends the host against inflammatory agents during pulmonary inflammation and increased availability of it as found in milk is important to abate symptoms in the host [19].
- Children who were breastfed milk that had increased concentration of the protein CD14 had the lowest risk for atopic diseases, such as asthma [20].
- Deficiencies of the protein alpha-1-antitrypsin is associated with increased incidence of airway diseases such as emphysema [5].

Antiviral properties:

- Immunoglobulins found in milk such as IGL strongly assists the host immune system to develop a more effective humoral response during HIV infection to decrease the severity of symptoms [6].
- The protein lactoferrin inhibits viral activity of human immunodeficiency virus (HIV)-1 and human cytomegalovirus (HCMV) [7].
- Protease inhibitors in milk reduce the transmission of HIV to infants [8].
- Lactoperoxidase defends the host with its anti-viral activity and tumoricidal activity [9].

Immune system development:

- Sufficient amounts of immunoglobulins are important to immune system development as deficiencies in the secreted immunoglobulin M (sIgM) leads to decreased T helper activity, increased isotype-specific suppressor T cell activity, as well as defects in intrinsic B cells [21].
- Deficiencies in the immunoglobulin IgM result in an increased susceptibility to autoimmune diseases and to atherosclerosis. Reduced IgM is associated with systemic lupus erythematosus [22, 23].
- The antimicrobial protein GlyCAM-1 in addition to its antimicrobial effects, plays an important role in lymphocyte trafficking in mucosal membranes, such as in the intestine, which is crucial for proper functioning of the host immune system [24].

Anti-pathogenic and anti-microbial effects:

- Polymeric immunoglobulin receptor (pIgR) protein has antimicrobial properties which protects mucosal surfaces from invasion of microbes [11].
- Mucins such as MUC15 and MUC16 play important roles in protecting epithelial cells from invading microbes, modulating immune responses, adhesion and inflammation. MUC15 contains extracellular protein-bound glycans which serve as ligands for receptors mediating recognition events and influence important properties of proteins related to folding and solubility [25].

- The protein Cathelicidin has antimicrobial activity which protects monocytes in the body against pathogens such as *M tuberculosis* [26].
- Lactoperoxidase defends against microbial infections by both bacteriostatic and bactericidal effects against microorganisms [9].

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