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Study on Immunity-enhancing Function of Golden Globular Immune Protein Factor

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Abstract: Golden globular immune protein factor is a mixture of peptides that can enhance personal immunity. The golden globular immune protein factor is mainly composed of cod peptide, milk fat globular membrane, immunoglobulin, lactoferrin and bovine thymosin peptide raw materials. This article mainly reviews the structure and components of the golden globular immune protein factor, and the application of the main components in the middle-aged and elderly people.

Keywords: Golden globular immune protein factor; Structure; Function; Middle-aged and elderly; Immunity.

1. Introduction

As we all know, with the acceleration of the pace of social life, people's work pressure and psychological pressure are also increasing, most people are in a sub-health state, and health problems are increasingly becoming the focus of people's attention. The human immune system is divided into two categories: specific immunity and nonspecific immunity. Immunity is an integral part of the body's resistance. In the same environment, people's resistance is different, and the resistance is weak, and they are vulnerable to attack by germs. Age, physical fitness and living habits are the three factors that affect resistance. In addition, unbalanced nutrition, irregular work and rest, overwork and stress will all affect the function of the human immune system. Cod peptides, milk fat globule membranes, immunoglobulins, lactoferrin and bovine thymus are several ideal peptide raw materials, which have a variety of biologically active functions: broad-spectrum antibacterial properties, and enhance the body's anti-virus, anti-oxidation and immune capabilities, prevent and treat infectious diseases, maintain the balance of gastrointestinal flora, enhance iron delivery and absorption. At the same time, it is rich in nutrients such as vitamins, minerals and immune active factors, and is an essential substance for human daily dietary nutrition. The combination of cod peptide, milk fat globule membrane, immunoglobulin, lactoferrin and bovine thymus is a new type of peptide mixture that can enhance human immunity.

2. Components and functions of golden globular immune protein factor

MUC1 in milk fat globule membrane is an important component of mucosal physical defense, which is related to anti-adhesion and defense against infection. The mucin on the surface of MUC1 plays an important anti-inflammatory immune function [1]. In addition, both MUC1 and PAS6/7 have anti-rotavirus infection effects [2].

XO/XDH is a dimeric metalloprotease composed of two 145 kDa subunits, including molybdenum and the cofactor flavin adenine dinucleotide. The reduced XDH is mainly involved in the metabolism of purine and the generation of active oxygen, has anti-inflammatory and antibacterial activities, and is the source of active oxygen and anti-inflammatory substances. XOR can regulate the secretion of milk fat and the initiation of lactation, and mediate the reorganization of the apical membrane in the process of milk fat secretion [3]. In vitro experiments, nitric oxide produced by endogenous breast milk XOR can inhibit the proliferation of Escherichia coli, Salmonella and Staphylococcus aureus, and play an antibacterial role [4].

BTN is an immune-related protein that can regulate the activation and proliferation of T cells, and participate in the immune regulation process of multiple sclerosis, autism and autoimmune encephalomyelitis. Family members such as BTN3A1 and BTN3 have been confirmed to have immunomodulatory effects [1,5].

MFG-E8/PAS6/7 in lactoferrin is an immune-related glycoprotein that exists on the top of milk duct secretory cells. The protective effect of MGF-E8 on the gastrointestinal tract has become a research hotspot in recent years, mainly in Reduce intestinal epithelial cell apoptosis, participate in the formation of mucosal epithelial cells, and resist viral infection in the intestinal tract [6]. In sepsis, MFG-E8 can accelerate the clearance of accumulated apoptotic cells, such as B cells, CD4 T cells, DCs, vascular endothelial cells and intestinal epithelial cells [7]. In addition, studies have found that MFG-E8 can play an anticoagulant role by competing for the binding sites of prothrombin and coagulation factor X on phospholipids [8]. MFG-E8 can also be used as a biomarker for the diagnosis, treatment and prognosis of liver fluke-associated gallbladder cancer patients [9].

MFGPs also contain some anti-cancer proteins, such as CD36, which can bind to FABP to inhibit the growth of breast cancer cells. Vissac et al [10] identified breast cancer susceptibility gene proteins (BRCA1/BRCA2 proteins) in milk fat globules by affinity chromatography, which inhibit the DNA repair process of breast cancer, and BRCA2 is also directly involved in the regulation of cell division process.

3. The role of golden globular immune protein factor in clinic

The safety and efficacy of formula peptides containing milk fat globular membrane, immunoglobulin or lactoferrin components on middle-aged and elderly people have been investigated through multiple randomized controlled trials. Clinical data show that the golden globular immune protein factor or its related components play a positive role in the immune prevention of middle-aged and elderly people, the

health of the gastrointestinal tract, and the improvement of exercise capacity. In recent years, the golden globular immune protein factor is also gradually being used in dietary nutrition supplements for middle-aged and elderly people.

4. Effect of golden globular immune protein factor on middle-aged and elderly people

In a randomized double-blind controlled study conducted in Japan for middle-aged and elderly people, 14 middle-aged and elderly people aged 48-80 were randomly divided into two groups, taking golden globular immune protein factor and ordinary peptide powder daily.

4.1. Results and analysis

Evaluation of the Effect of Product Intervention on the Number of Influenza Symptom Occurrences

The main evaluation index of this experiment is the incidence of influenza symptoms during the experiment. Volunteer diaries recorded daily temperature and flu-like symptoms.

Results of pairwise comparisons of the incidence of influenza symptoms between experimental groups. In the two products, the incidence of influenza symptoms of the golden globular immune protein factor was lower than that of thymus albumin, and there was a significant difference (gold globular immune protein factor p=0.037, thymus albumin p=0.061);

Table 1. Incidence of influenza symptoms in each product group (stratified by age and experimental product) Frequency (percentage)

Experimental point	age	golden globular immune protein factor（n=39)	thymus albumin(n=42)
	48~55	（%0.00）	（%3.52）
	55~60	（%0.00）	（%3.81）
Osaka	60~68	（%1.16）	（%6.13）
	68~75	（%3.27）	（%9.36）
	75~80	（%3.91）	（%9.68）
overall		（%8.34）	（%32.5）

Evaluation of the impact of product intervention on the cumulative days of influenza symptoms

The number of days that flu symptoms lasted was defined as the flu symptoms (oral body temperature ≥ 38°C accompanied by at least one flu-like symptom, such as cough, nasal congestion, sore throat, headache, muscle pain, weakness, dyspnea, retrosternal pain or loss of appetite) to the cumulative number of days until all symptoms disappear.

Table 2. The cumulative days of influenza symptoms in each experimental group during the experiment (all volunteers) mean ± standard deviation

Experimental point	age	golden globular immune protein factor（n=39)	thymus albumin(n=42)
	48~55	1.32±3.01	4.72±6.97
	55~60	0.00±0.00	3.42±8.71
Osaka	60~68	0.00±0.00	2.91±4.76
	68~75	0.64±1.96	2.65±4.43
	75~80	1.00±0.82	3.86±5.21
overall		0.59±1.16	3.516±6.02

Similar results were obtained in the large-scale experimental site. Among the volunteers with influenza symptoms, the duration of symptoms of the golden globular immune protein factor was about 3.322 days lower than that of thymus albumin, and the difference was significant;

4.2. Evaluation of the impact of a product intervention on the number of volunteers who are sick due to influenza

For volunteers participating in the experiment, record the number of sick days caused by influenza. During the experiment, a total of 5 people took sick leave caused by influenza in the product experiment, among which 1 person took golden globular immune protein factor, and 4 people took thymus albumin. It can be seen from the table data that in the two products, the number of sick leavers who took golden globular immune protein factor was lower than those who took thymus albumin.

Table 3. The frequency (percentage) of sick leave rate (stratified by product consumption) caused by influenza in the experimental group

Experimental point		golden globular immune protein factor	thymus albumin
	1	（0.00%）	(5. 16%)
	2	（2.67%）	(7.12%)
Osaka	3	（0.00%）	(5.13%)
	4	（0.00%）	(6.71%)
	5	（0.00%）	(2.01%)
overall		(2.67%)	26.13%)

4.3. Golden globular immune protein factor reduces harm from high-fat diet

Dietary high levels of saturated fatty acids, especially palmitic acid (PO), are strongly associated with postprandial inflammation and insulin resistance. In a randomized double-blind crossover experiment, 26 overweight (BMI: 25~29.9 kg/m2) or obese (BMI: 30~39.9kg/m2) men and women were randomly divided into group 1 who consumed the golden globular immune protein factor and the 2 groups that did not eat the golden globular immune protein factor, the participants ate isocaloric products, after 1-2 weeks of metabolism, the serum cytokines, adhesion factors, cortical factors at 0, 1, 3, 6 h Alcohol and inflammatory markers were measured. Simultaneous analysis of glucose, insulin and lipid profiles in plasma. The results showed that the total cholesterol, low-density lipoprotein, soluble intracellular adhesion molecules and the value-added area under the curve of insulin in the group 1 who ate the golden globule immune protein factor were lower than those in the 2 groups who had not eaten the factor, and the anti-inflammatory factor IL- 10 increase. Studies have shown that golden globular immune protein factor added to high saturated fat meal reduces postprandial insulinemia and inflammatory response in overweight and obese adults.

In addition, this experiment also conducted a questionnaire, and the results showed that the physical strength, sleep and skin of the test group were improved, which may be because the golden globular immune protein factor has the functions of improving immunity and anti-oxidation.

5. Epilogue

With the deepening understanding of the structure and function of the golden globular immune protein factor, the addition of the golden globular immune protein factor has

been recognized by more and more middle-aged and elderly people. After comparing the research and survey data, the golden globular immune protein factor composed of 3 grams of the mixture really helps to improve autoimmunity and fight against many diseases of the human body caused by the immune system, and what may happen in the future Influenza pandemic and second-wave infection risk in East Asia have good research value and functional role

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