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Probiotics and their effects in reduction hyperlipidemia

Negin Farhad[1], Somayeh Shahsavari[2*]

[1]Department of Pathology, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Biotechnology and Medicinal Plants Research Center, Ilam University of Medical Sciences, Ilam, Iran

***Correspondence to:**
Somayeh Shahsavari
somayeh.shahsavari.pbp@gmail.com

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Abstract

Hyperlipidemia is a chronic condition but in many cases it may be reversed by a healthy diet and regular exercise. It is also associated to metabolic syndrome, diabetes, and obesity. Hyperlipidemia is known as one of the risk factors for coronary vessels disease, peripheral artery disease, and cardiac arrest. Drug-therapy is a usual method for treating hyperlipidemia. Consumption of probiotics may improve this problem and reduce the course of disease as well as its signs. The purpose of this review is to assess clinical evidences associating to role and effects of probiotics on the hl. Probiotics have greater influence on persons who suffer from high cholesterol. In the intestine, probiotics can bind to cholesterol and prevent its ingestion. Furthermore, they help in production of some biliary acids which play role in lipid and cholesterol metabolism. Some probiotics can produce short chain fatty acids that prevent formation of cholesterol in the liver. Probiotics are effective factors in reduction of hl

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Introduction

Cardiovascular diseases are the most important factors in mortality in industrialized countries [1, 2]. Hyperlipidemia is a medical phrase used for expressing rise of lipid levels in the blood. If you have hl, then your cholesterol and triglycerides levels are high, too [3, 4]. Hyperlipidemia is a chronic condition but in many cases it may be reversed by a healthy diet and regular exercise [5]. It is also associated to metabolic syndrome, diabetes, and obesity. Hyperlipidemia is known as one of the risk factors for coronary vessels disease, peripheral artery disease, and cardiac arrest [6]. Hyperlipidemia causes heart disease not only directly but also indirectly through stimulation of oxygen free radicals and making atherosclerosis plaques to form. (7, 8). Medications are usual way for control and treating the condition [9]. Probiotics are alive microorganisms which have useful effects on the health and can control pathogenic microbes. The most common probiotics are lactic acid bacteria including bifidobacter species and lactobacillus [10, 11]. Consuming the probiotics may enhance hl and shorten the disease course and reduce its signs. Moreover, these compounds cause improvement in maximum oxygen intake in athletes. Among the other results of probiotics, are as follows: decreasing the antibiotics side effects; remission of arthritis rheumatoid patients; improving patients of helicobacter jejuni; reduction of cholesterol and hypertension; preventing cancer of colon, liver, bowl, breast; and enhancing lactose intolerance [12, 13]. The purpose of this review is to assess clinical evidences associating to role and effects of probiotics on the hl.

Method for review

In this review, the intended articles were evaluated by searching the keywords including probiotic and blood lipid, probiotic, and clinical trial in the time period of 1999 to 2014.

Results

Among studies and clinical trials articles we got eleven articles linked to the effects of probiotics on hl. The results of clinical trials related to the influences on blood lipid are listed in table 1.

Table1. Probiotics and blood lipid

Treatment	Act, dose and time	Ref.
Lactobacillus gasseri	Prescription of fermented milk containing 1011 lactobacillus gasseri for 12 weeks results in significant decrease in abdomen, visceral and subcutaneous fat in obese people at the end of intervention course.	[14]
Lactobacillus plantarum	Taking 50 g probiotic cheese containing 108 bacteria lactobacillus plantarum per gram reduced BMI in obese people with hypertension, significantly.	[15]
Probiotic	Prescription of probiotic yogurt –diverse probiotic species- in different doses for 8 weeks decreased body mass index in obese persons with metabolic syndrome, significantly.	[16]
Lactobacillus paracasei	Prescribing sausages containing 5x109 lactobacillus paracasei for 5 weeks, Jahreis et al. did not observe significant changes in lipid profiles of people suffering from hypercholesterolemia; but, oxidized anti-LDL-C antibodies increased significantly at the end of intervention period.	[17]
Lactobacillus gasseri	Administration of supplementary containing 1010 lactobacillus gasseri for 12 weeks for high weight and obese adults resulted to significant reduction in weight, waist size and hip size compared with control group.	[18]
Bifidobacterium longum	Daily intake of 9x1010 bifidobacterium longum for 4 weeks could result in marked decrease in total cholesterol especially in people with mild hypercholesterolemia.	[19]
Enterococcus faecium	Receiving enterococcus faecium by healthy people for 56 weeks caused reduction in total cholesterol by 12% and decrease in LDL cholesterol by 19%; but no significant changes were observed in HDL-C and triglycerides.	[20]
Lactobacillus acidophilus and Bifidobacterium lactis	Daily prescription of 300 g probiotic yogurt containing 100 lactobacillus acidophilus and 109 bifidobacterium lactis for 6 weeks resulted in significant drop in total cholesterol, LDL-C, total cholesterol toward HDL-C relation, and LDL-C to HDL-C in diabetic people.	[21]
Lactobacillus acidophilus and Bifidobacterium lactis	Consumption of yogurt containing 3x108 lactobacillus acidophilus and bifidobacterium lactis for 6 weeks reduced total cholesterol significantly.	[22]
Probiotic	Intake of probiotic yogurt for 9 weeks resulted in significant reduction in total cholesterol, LDL-C, HDL-C and triglycerides in pregnant women.	[23]
Probiotic	Prescription of probiotic yogurt –diverse probiotic species- in different doses for 8 weeks caused significant decrease in total cholesterol and LDL-C in people suffering from metabolic syndrome.	[16]

Discussion

The mechanisms including reducing intake from bowl and de-conjugation of bile acids leading to their reduced ingestion of them in bowl, entry of a fraction of received fats from foods into these microorganisms' cell membrane, and converting some of cholesterol to indigestible coprostanol are routines of mechanisms to reduction effects of probiotic cholesterol [17, 18]. On the other hand, short chain fatty acids produced from probiotics may inhibit hydroxyl methyl glutarate coenzyme A reductase – an important enzyme in the pathway for synthesis of cholesterol in liver- and finally decrease the production of cholesterol in liver [19-23]. Fatty acid metabolism may be undergo alterations by the bowl microflora; lactobacillus and Bifidobacteria may convert the free linoleic acid to conjugated type. The conjugated linoleic acid has properties including antidiabetic, anti-sclerosis, enhancing immune system and anti-obesity [16]. Bacteria residing in bowl ferments indigestible carbohydrates into short chain fatty acids (acetate, propionate and butyrate). These compounds bind to G-protein-coupled receptors and cause secretion of PYY intestinal hormone. This hormone reduces the intestinal movements so, enhances the foods absorption from the intestine [19-22]. Probiotics have higher influence on people with hypercholesterolemia. In bowl, probiotics may bind to cholesterol and inhibit its ingestion. Furthermore, they help to production of some bile acids that have role in fat and cholesterol metabolism in body. Some probiotics are able to produce short chain fatty acids which may help to inhibit the production of cholesterol in liver. Finally, they are important factors in reduction of blood lipids.

Authors' contribution

All authors contributed equally to the manuscript.

Conflicts of interest

The authors declared no competing interests.

Ethical considerations

Ethical issues (including plagiarism, data fabrica¬tion, double publication and etc.) have been completely ob-served by author.

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