Bifidobacterium breve B-3 for Weight Loss and Skin Health

The strain of the probiotic Bifidobacterium breve B-3 has beneficial actions for weight loss and skin health and beauty, and has been researched in both human and animal studies. It has been discovered that gut microbiota play a role in the development of obesity and metabolic syndrome. When germ-free mice were inoculated with normal gut microbiota harvested from the caecum of a normal mouse, there was a 60% increase in body fat content and insulin resistance in a short time. Obese mice have a 50% reduced level of some bacteria and a proportional increase in Firmicutes. Studies found obese people also had a lower proportion of Bacteroidetes/Firmicutes than lean people, and this proportion increased with weight loss in a low-calorie diet. Gut microbiota is thought to be involved in regulating energy metabolism by several mechanisms, including harvesting energy from the diet, regulating fat storage, and regulating fat formation and fatty acid oxidation.

In addition, low-grade inflammation has also been shown to play a role in the development of obesity. Lipopolysaccharides associated with a high-fat diet are inflammatory factors linked to the development of metabolic syndrome. A high-fat diet is linked to metabolic endotoxemia, which is believed to trigger the development of obesity, inflammation, insulin resistance, Type 2 diabetes, and atherosclerosis. Normal population of the levels of Bifidobacterium spp. and the Eubacterium rectale/Clostridium coccoides group are significantly reduced in high-fat-fed mice as compared with those receiving the standard high-carbohydrate diet.

Weight loss and anti-metabolic syndrome effects

Metabolic syndrome and obesity usually cause a combination of high blood lipids, prediabetes or diabetes, and hypertension. These are considered to be risk factors for heart attack and stroke. In animal experiments, B-3 suppresses weight gain and body fat accumulation as well as lowers blood glucose and total cholesterol levels (Morinaga, 2013). Subsequently, similar benefits have been shown in human subjects with moderately high body-mass index (BMI) who consumed a food containing the probiotic B-3 Bifidobacterium breve (Minami, 2015). The study was conducted in 52 diabetic patients being treated at Nakajima Naika Clinic (Yokosuka City, Kanagawa Prefecture, Japan). Subjects with moderately high BMI (24–30) were randomized into 2 groups and received either B-3 capsule (B-3 group, 5×10^10 CFUs/day) or placebo capsule (control group) for 12 weeks. Body composition measurements and blood tests were conducted every 4 weeks. In the B-3 group, body weight was significantly decreased after 12 weeks of consumption compared with baseline. A significantly lowered fat mass was observed in the B-3 group compared with the placebo group at week 12 (see Figure 1).

Blood tests of liver function measuring ALT, ALP, and γ-GTP taken in the B-3 group at week 12 of consumption showed improvements (red) (Figure 2) (Minami, 2015). The changes in ALT and γ-GTP were correlated with the changes in body fat.

Skin health and beauty improvements

Studies have shown that some probiotic strains improved skin photodamage induced by short-term UV irradiation in animals and humans by anti-inflammatory effects and by improving the skin barrier function. Probiotics may help prevent accelerated aging of skin from short-term UV exposure. The administration of B. breve B-3 (2×10^9 CFUs/mouse/day) improved transepidermal water loss, skin hydration, and epidermal thickening and attenuated the damage to the tight junction structure and basement membrane induced by chronic UVB irradiation (see Figure 3) (Satoh, 2015). Administration of B. breve B-3 also inhibited production in
the skin of an inflammation mediator known as interleukin-1β caused by UV exposure ($p = 0.09$), which is thought to help preventing photoaging induced by chronic UV irradiation (Satoh, 2015).

**Figure 3. Effect of UV irradiation and administration of Bifidobacterium breve B-3 on skin barrier function in hairless mice (Satoh, 2015).**

* P<0.05, ** P<0.01, significant difference between the UV(+) saline and UV(+) B-3 groups; # P<0.05, ## P<0.01, significant difference between the UV(-) saline and UV(+) saline groups.

**References**


