Bifidobacterium is a large genus of bacteria that inhabit the human gastrointestinal tract, primarily the colon, have powerful effects for influencing health, and are important for maintaining a population of healthy colonic intestinal bacteria while reducing those that can be harmful or pathogenic. Bifidobacterium breve M-16V was one strain of Bifidus first isolated from a healthy human infant and is currently used to improve the health and intestinal environment of infants and adults through several diverse functions as proven by numerous human clinical studies. The research evidence includes benefits of B. breve M-16V for immune support, skin health, intestinal health, and respiratory and breathing support.

**Improved immune and respiratory functions**

Research shows that M-16V positively influences an immune factor known as transforming growth factor (TGF) beta 1 which is related to mucosal regulation, including induction of oral tolerance, potent anti-inflammatory effects, mucosal IgA expression, and effects on epithelial cell proliferation and differentiation. A study of 19 preterm infants divided into 2 groups found that those receiving B. breve M-16V supplementation can up-regulate TGF–beta 1 signaling, and that supplementation may be beneficial in reducing inflammatory and allergic reactions in these infants (Fujii, 2006).

**Cow’s milk sensitivity improved**

Administering bifidobacteria influenced the intestinal microflora of infants with cow’s milk hypersensitivity who had atopic dermatitis (AD). Infants with cow milk hypersensitivity and atopic dermatitis having less than 30% Bifidobacterium in their intestinal microflora were selected for the study. In the bifidobacteria-administered group, the proportion of Bifidobacterium in the fecal microflora increased while the proportion of aerobic bacteria decreased after 3 months and was related to a significant improvement of allergic symptoms (Taniuchi, 2005).

**Asthma**

Atopic dermatitis that can afflict infants can cause a much higher risk of developing asthma; however, early intervention with synbiotics (combined probiotics and prebiotics) using Bifidobacterium breve M-16V and a galacto/fructooligosaccharide mixture can reduce the prevalence of asthma-like symptoms in infants with AD as shown in a double-blind, placebo-controlled multicenter trial of infants older than 7 months. In the study, infants received synbiotics for 12 weeks and then after 1 year to measure the prevalence of respiratory symptoms and use of asthma medication. The frequency of frequent wheezing and wheezing and/or noisy breathing apart from colds was significantly lower in the treatment group than in the placebo group (13.9% vs. 34.2%), and significantly fewer children in the synbiotic than in the placebo group needed to start on asthma medication after baseline (5.6% vs. 25.6%). This demonstrated that use of Bifidobacterium breve M-16V with a prebiotic prevents asthma-like symptoms in infants with AD (van der Aa, 2011).

B. breve M-16V was also tested for its effect on the allergic responses in 29 adults with established allergic asthma in a double-blind, parallel study in a symbiotic format. Both the morning and evening peak expiratory flow significantly increased during synbiotics treatment (morning 0 = 0.003, evening 0 = 0.011). In addition, the increase in serum IL-5 after allergen challenge, ex vivo allergen-induced Th2–cytokine IL-5, and IL-4+ IL-13 production by a type of white blood cells involved in allergic response was significantly inhibited by the synbiotic (Van de Pol, 2011). The shift in balance to Th1 cytokines was a positive improvement in reducing the allergenic tendency.

Since infants with AD have a high risk of developing asthma, the effect of giving a symbiotic mixture of M-16V and a galacto/fructooligosaccharide mixture (Immunofortis®) was evaluated for its efficacy in reducing this risk. In a double-blind, placebo-controlled multicenter trial with 90 infants under age 7 months having AD, significantly fewer children in the synbiotic than in the placebo group had started to use asthma medication after baseline (5.6% vs. 25.6%), and no children in the synbiotic group developed elevated IgE levels against cat allergen but 5 children (15.2%) in the placebo group did, showing that this symbiotic mixture can prevent asthma-like symptoms in infants with AD (Van der Aa, 2011).

**Skin allergies**

Probiotics have a benefit for reducing some of the immune reactivity in those with allergies. When B. breve was given to 24 test subjects with atopic dermatitis, the intestinal microflora was increased in the probiotic group and the objective severity score for AD significantly improved in the probiotic group compared with the placebo group. In the quality-of-life assessment, the total score had significantly improved in the B. breve group (Yoshida, 2010).

**Digestive and colon health improvement**

Another study has shown that early administration of B. breve M-16V preparation to extremely premature infants is useful in promoting the formation of a normal intestinal microflora in the normal time frame, and is especially effective for reducing the adverse effects of antibiotics on intestinal microflora. In the control group, which didn’t receive the probiotic and which was given antibiotics, there was a significantly greater delay in the establishment of normal colonization of the gut, while the M-16V–supplemented groups had normal colonization in the normal time period (Akiyama, 1994; Li, 2004).

Short-chain fatty acids (SCFAs) are known to provide energy to colonocytes, whereas overproduction of SCFAs can cause mucosal injury in premature infants since these acids can be very irritating when found in excess. In a controlled clinical study, fecal lactic, acetate, propionic, and butyric acids from 66 premature infants were analyzed, and 4 weeks after B. breve M-16V administration, the fecal butyric acid concentrations were significantly decreased compared with those of the control group, which may be helpful in protecting low-body-weight (LBW) infants from digestive diseases such as necrotizing enterocolitis (NEC) (Wang, 2007).
B. breve M-16V has had lifesaving effects in premature infants who typically have weakened immune and digestive systems. In a study of 133 extremely low-birth-weight infants, 49 infants were administered M-16V for prevention of NEC. The NEC incidence was 9 infants (10.7 %) in the control group and only 1 infant (2.0 %) in the probiotic group (p = 0.06). Death by NEC occurred in 5 infants (5.6%) in the control and no infants in the probiotic group. Delayed sepsis that was positive on a blood culture test was observed for 28 infants (33.3%) in the control and 4 infants (8.2%) in the probiotic group, respectively (p < 0.01). The various effects of M-16V included not only the prevention of NEC but also the improvement of intestinal health and nutritional status, and decreases in the incidence rate for serious infections (Umeda, 2010; Patole, 2014). In addition, M-16V can influence the occurrence of cow’s milk protein intolerance in newborns that undergo small intestine surgery (Ezaki, 2012).

Healthy flora colonization
The effects were tested in a clinical study of bifidobacteria on the intestinal microbiota in low-birth-weight infants, using a single strain of B. breve M-16V (5 x 10^8 CFU of one-species group) or a mixture of three species composed of B. breve M-16V, B. longum subsp. infantis M-63, and B. longum subsp. longum BB536 (5 x 10^8 CFU of each strain in the three-species group). The results found that the proportion of bifidobacteria in the three-species group was significantly higher than in the one-species group at weeks 1 and 6. The proportion of infants with bifidobacteria-predominant microbiota was significantly higher in the three-species group than in the control group during the test period. The detection rates of Clostridium were lower in the probiotic groups. The proportions of Enterobacteriaceae were significantly lower in the three-species group compared with the other groups (weeks 4 and 6). Among the three strains administered, B. breve M-16V and B. infantis M-63 were detected in 85% or more of the infants during the administration period, while B. longum BB536 was detected in 40% or less. Compared with administration of one species, administration of three species of bifidobacteria resulted in earlier formation of a bifidobacteria-predominant fecal microbiota and maintenance of this microbiota (Ishizeki, 2013).

Colon and mucous membrane health in infants
There are powerful beneficial effects of Bifidobacterium breve M-16V for premature infants and for children with cancers undergoing chemotherapy. In a clinical study of 338 very low-birth-weight infants over a 5-year period, those in the Bifido group given a daily dose of 1 x 10^9 cells per day had significantly reduced necrotizing enterocolitis (none) compared with 6 in the controls, and infection also markedly decreased. In addition, mucositis, also known as mucosal barrier injury, in children given chemotherapy was significantly lower in the Bifido group than in the placebo group. Healthy intestinal microbiota is damaged after chemotherapy leading to larger population levels of harmful Enterobacteriaceae, which were more pronounced in the placebo group. The study results strongly support the use of B. breve as an effective therapy for the prevention of NEC and infection in premature infants, and as a promising treatment for reducing chemotherapy-induced mucositis in children with cancers (Yamashiro, 2010).

References