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ABOUT PREBIOTICS AND PROBIOTICS

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In 1899, Henry Tissier, a French pediatrician, isolated a Y-shaped bacterium in the intestinal flora of breast-fed infant, named it “bifidus”. Gram positive anaerobic branching bacteria that has unique ability to ferment oligosaccharides. Bifidobacterium was found one of the major genera of gastrointestinal tract flora, mainly the colon, in mouth, and in vagina of mammals. Few years later Metchnikoff, director of the first, won the Noble prize for his theory about the importance of intestinal flora and was named the father of Microbiota. He suggested that the type of gut microbiota has great influence on the human wellbeing and longevity.

Since that time Microbiota or” the beneficial bacteria” or “Probiotics” became a major medical and investment concern, uncountable researches and studies done about the role of microbiota in general health and immune modulation. more than 500 species of bacteria has been isolated and manufactured. Trillions of dollars invested in the industry of probiotics with exaggerated claims about its beneficial effects.

Many unbiased studies demonstrated the immune modulatory effect of some probiotics.[1] Some probiotics can compete pathogens and even treat diarrhea induced by pathogens or by antibiotics.[1] some probiotics able to alter the early sensitization phase in high risk allergic infants.[12] some probiotics can be used to sustain remission in inflammatory bowel diseases. Some probiotics may help chronically diseased children suffering from celiac disease, or ulcerative colitis.[3,6,13] Promising results with negligible side effects have been confirmed by clinical studies when probiotics were used as a treatment or prophylaxis.[3,4]

However, it is vital to remember that each positive effect is species specific, and dose dependent.[4] Probiotics are not the same, what is true for Bifidobacterium Longum species,

for example, is not true for Bifidobacterium breve or lactobacillus, or for the spores of Bacillus Clausii. each has its own effects and dose.[5,6,12]

When" Bifidus" first isolated from breast feed infants stool and proved to be the major genera of their gut flora[9], it was clear that Bifidobacterium is related to human milk itself. Further studies disclosed that it is also common in vegetarian people. People who eat a lot of meat has Bacteroides and clostridia mainly in their gut flora.[2] It is documented now that the anti-allergic effects of breast milk is due to its bifidogenic effect[8], while the higher incidence of atopy and allergy in formula fed infants is due to the absence of gut Bifidobacterium during the first 6 months of life.[9,10]

Many autoimmune systemic disease are preceded by major alterations in the quantity or quality of their gut flor species. Inducing remission and maintenance of inflammatory bowel disease attack can be improved significantly when specific species of Bifidobacterium are added to their treatment plan.[5]

The effect of diet, age and medication on microbiota species, activity and distribution has been evaluated and documented by controlled studies worldwide.[4]

Human breast milk contains prebiotics but no probiotics

The bifidogenic effect of human breast milk has been attributed to its contents of oligosaccharides. Both short chain and long chain oligosaccharides present in Human Milk with 9/1 ratio.[7] Oligosaccharide molecule consists of few monosaccharide molecules linked together by (beta1-4) covalent bond different from bonds inside disaccharides and polysaccharides. it pass the digestive tube undigested and reach the colon where it can be fermented by bifidobateria, that is why it is named" prebiotics".[7]

90% of human milk oligosaccharides (HMOS) are short chain like Galacto oligosaccharide (GOS) and 10% are Long Chain similar to Fructo oligosaccharide (FOS).[11] Many species of bifidobacteria and lactobacillus present in breast fed babies intestinal flora but none of them is present in the breast milk itself.

at the same time it is not possible to add all microbiota species exactly and in perfect ratio to infant formula. it seems more efficient to use the substrate utilized by microbiota to modulate

its type. That is why oligosaccharides "**Prebiotics**" started to be added to baby's formula at early infancy.

While GOS can be made from milk lactose by enzymes, FOS are extracted from Chicory plants. Combination of GOS and FOS with 9/1 ratio has been added to infant formula and offered significant improvement in the immunity and general wellbeing of infants and children up to the age of 5 years. The incidence of atopic dermatitis decreased by 51% in high risk infants given this protective formula during the first 6 months of life when compared with control group given standard formula. Also the rate of upper respiratory infections, gastroenteritis decreased significantly. The rate of antibiotic prescribing decreased in the prevented group during the first year of life.[9] Intestinal microbiota changed to majority of bifidobacteria almost similar to that of breast fed infants, while Bacteroides and E. coli formed the majority of microbiota in standard formula fed infants.[8,9] Secretory IGA level in stool increased almost to the same level of breast fed infants.[8] Long term studies demonstrated that most of these positive effects last till the age of 5 years not only during administration of Prebiotics in the first 6 months of life. Nowadays formula manufacturers started to add Prebiotics to infant formula on a large scale due to those confirmed positive effects proved by huge number of clinical studies and research in different countries.

Prebiotics or Probiotics?

It seems too early to ask this question now. Each of them has specific positive effects and more clinical trials still needed on long term for both.

prebiotics, from a prophylactic point of view, seem more natural. To give OS and let the body grow his own flora himself seems more natural and much safer than adding specific organisms to its gut. Prebiotic is not affected by medications or stomach acidity and can be given to immunocompromised children safely, too.

Probiotics on the other hand are better when used to treat specific disease like AAD or UC, or can be applied topically on skin or locally in vagina or rectum. some strains can resist stomach acidity and antibiotic action.

Both, prebiotics and probiotics, form a great support to the traditional medicine. their friendly benefits are incomparable and their side effects are negligible.

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