

## Workshop on Gut Microbiome in Young Kids



On 10<sup>th</sup> October 2016, Workshop on Gut Microbiome in Young Kids was jointly held by International Life Sciences Institute Focal Point in China and National Institute for Nutrition and Health, China CDC at Beijing Guangxi Hotel, chaired by Dr. Junshi Chen. In the opening, Dr. Junshi Chen firstly reviewed the emphasis of latest two workshops on functions of microbiome on immunity and probiotics effect on special intestinal diseases. Furthermore, Dr. Junshi Chen pointed out the aim was to exchange the latest research results on health effects of infant intestinal microbiome and its application.



In the first, Ms. Bin Cao, from Department of Maternal and Child Health gave the first speech on Overview on Nutrition and Health Status of Chinese Infants and Young Children. According to Ms. Cao's speech, nutrition of Chinese children improved greatly in the past 30 years,

showed in increasing physical growth, quality of life and health level and decreasing malnutrition. What's more, Ms. Cao introduced national strategies on improving children nutrition, which was achieved high attention from CPC and government, socio-economic and medical development. Ms. Cao also mentioned the challenges in children nutrition and health, including disparities between rural and urban areas, and more severe, increase of migrant and left-behind children. Besides, she pointed out that children nutrition improvement was set as part of national strategies in the 13th Five-Year-Plan, and that children nutrition improvement pilot program for distressed areas was set up.

In the second speech, Dr. Jean-Michel Antoine from Danone introduced the Overview on the Importance of Gut Microbiome in Kids. As Dr. Antoine said, the number of microbe in human body was titanic and even surpassed the number of cells, and those microbes could be classified into three phyla and 100 to 500 species. The microbes differed in different bodies and organs, while different microbes could generate similar metabolites. Microbes had great significance on human health. Besides, microbe imbalance was highly correlated with diseases. The composition of bacterial flora changed as human grew. It took some time for intestinal flora to recover after diarrhea. Besides, antibiotics would led to bacterial flora imbalance. In addition, Dr. Jean-Michel Antoine emphasized the triangle relation among human, microbe and diet. To be specific, food needed to be digested and influenced the composition of microbe, and diet and microbe affected health.

Then, Professor Dennis Bier, from Baylor College of Medicine, introduced The Gut Microbiome: Development, Metabolism & Nutrition. First, Prof. Bier reviewed the changes of people's knowledge of genetics, from the



genetic determinism in the 20th century to the influence of environment, epigenetics and microbiome in the 21st century. Specifically, Prof. Bier explained how symbiotic bacteria interacted with body and affected health through ATP and short-chain fatty acid. Prof. Bier spoke of latest research findings about effect of microbe on obesity and malnutrition in childhood, and how intestinal affected growth of small intestine through epigenetics, such as DNA methylation. Based on abundant basic and systematic research, clinical trials would instruct treatment with interaction of flora and body. At last, Prof. Bier reminded the audience to recognize the different composition of intestinal flora in mice and human.

Dr. Laurent Favre from Nestle shared *New Advances in Infant Nutrition: Probiotics and Immunity*. As Dr. Laurent Favre said, the immunity of newborn was immature and non-energy-yielding substances in breast milk could moderate immunity and stimulate growth of newborn immune system. Infants could get intestinal bacteria through placenta from mothers and acquire ideal intestinal bacterial colonization in eutocia. However, infants might have harmful bacteria colonization in cesarean, and therefore growth and immune system would be interfered. What's more, infants delivered by cesarean had higher risk on asthma, food allergy, allergic rhinitis and gastrointestinal infection. Breast could have colonization of bifidobacteria and lactobacillus, while milk powder fed babies had mixed bacterial flora. The analysis of flora in breast milk of Chinese women showed that the main flora was streptococcus and staphylococcus and there were low level of bifidobacteria and

lactobacillus, which was similar with other countries. Component of infant formula milk powder was close to breast milk, bifidobacteria lactis in formula milk could influence intestinal flora of newborn babies, promote immune maturity in early life, increase specific antibody responses for babies delivered by cesarean and prevent diarrhea, even to speed up recovery from diarrhea. However, the function and safety depended on the specific flora. At the end of this speech, Dr. Laurent Favre said that the clinical benefits and influence on health of probiotics needed further proof and complexity of target ecological system and mechanisms of probiotics should be better understood.

In the following, Dr. Liisa Lehtoranta, from DuPont Nutrition & Health, introduced *t Role of Diet and Probiotics on Microbiota of Young Kids*. In this speech, food could moderate existing flora and introduce new flora. The use of antibiotics was a key factor for growth and composition of flora, for example, macrolide continuously changed composition and metabolism of microorganism. But adding probiotics could balance intestinal flora and affect recovery of flora after antibiotics treatment. Except for intestinal health, probiotics could reduce allergic eczema risk in the long term and risk of ordinary cold and produce different effects in respiratory tract infection.

Dr. Wang Shugui, from Danone, presented *Gut Microbiome in Kids – Evolution and Application*. At first, Dr. Wang Shugui introduced the first 1000 days. The microbe was very important during this period, and the imbalance would lead to metabolic, immunological and cerebral problems. Besides, C-section changed composition of microbe and epigenetics. Their research discovered that prebiotics supplemented by galactooligosaccharides and polyfructosan could increase numbers of bifidobacteria, stimulate special bifidobacteria, reduce number of pathogenic bacteria, prevent diarrhea, reduce use of antibiotics, strengthen secretion of sIgA from intestinal immune system, prevent

allergy dermatitis, and provide long-term protection.



Dr. Yang Yunsheng, from The General Hospital of the People's Liberation Army, discussed Gut Microbiome in Kids with Different Methods of Delivery. Infants delivered by caesarean had higher incidence of food allergy and asthma than those delivered by eutocia. His research revealed that intestinal flora composition in meconium was different for caesarean group and eutocia group. To be specific, eutocia group showed higher diversity than caesarean group, and main species were respectively propionibacteria and bacillus licheniformis in eutocia and caesarean group. Furthermore, intestinal flora in two groups still showed significant difference as age increased.



The last speaker was Professor Zhang Lin from Department of Pediatrics, The Third Hospital of Hebei Medical University. Professor

Zhang presented Development of the Intestinal Microbiota and Its Impacts on Children Health. First, Professor Zhang introduced establishment and evolution of infant intestinal flora in early life and transfer mother's intestinal microorganisms to breast milk. Additionally, Professor Zhang mentioned the significance of delivery and feeding ways on intestinal flora colonization. Then, Professor Zhang showed the structure and effects of intestinal flora, including its effect in immune system and intestines-brain circuit. At the ending, Professor Zhang mentioned the

relation between evolution of intestinal flora and children long-term diseases, for instance, intestinal flora imbalance increased the risk of NEC, IBD and allergy.

After the speeches, the experts and audiences had heated discussions. The experts discussed on the key concerns and reached agreements on following issues. First, human was a super creature with plenty of microbes. It was important for human and related to short-term or long-term diseases, and had significant clinical meanings. Then, some relations between intestinal flora and diseases were well explained, which we could re-examine our understanding of diseases considering effect of microbes. The first 1000 days was an important window phase. And breast feeding and eutocia was significant for infants. The flora from infants was more fragile and susceptible to influence in many factors. Therefore, antibiotics use for infants should be carefully considered, especially infants below 1 year old. For breast feeding babies and non-breast feeding babies, flora recovery after antibiotics use, pharmacokinetics, dose and effect on flora with time were different. Although administering intestinal flora was effective in the short term, the effect was not optimistic in the long run. Consequently, microbes should be reasonably used. To keep a long-lasting stable flora, abundant nutrition should be ensured.

The concept of probiotics was more and more remarkable, yoghurt probiotics was already accepted in North America, South America and Southeast Asia, but still limited in Europe. In the long run, probiotics list of Chinese yoghurt and industrial was extending, while enough trial evidence were demanded to support.

Prebiotics was beneficial for infants of imbalanced intestinal flora, while dose and types should be personalized. Different prebiotics had various effects on bacteria, and this also applied for probiotics. As a result, choice should be made according to requirements.

(Source: ILSI FP-China)