Summary Report

Mini-Symposium on
“The New Frontier: Diet, Microbiome and Health”
May 26, 2016, CRC Auditorium, NUS, Singapore

There is a rapidly expanding body of research around the bone health and gut microbiome. Prebiotics have influence on the enhancement of bone properties through shifts in gut microbiota, which offers a strategy to improving calcium nutrition and bone health. Bone health is a rising issue in Asia, where building peak bone mass in youth and retaining it with advancing age is a key strategy to reducing risk of osteoporosis. Gastrointestinal microbes also play important roles in the health and disease of the human body. It is of great interest to characterize both composition and succession of the intestinal microbiota. Interaction among the diet, our gut microbiome, and health, such as bone health, is a new frontier. As such, ILSI SEA Region co-organized a 2.5 hour mini symposium with the Clinical Nutrition Research Centre, which comprised of 2 scientific presentations from experts specializing in these areas.

The Mini-Symposium, held on May 26, 2016, discussed the interactions of diet, microbiome and bone health, as well as reviewed and discussed the Asian microbiota profile among different Asian population. It was well attended by researchers and academia in gut microbiome, nutrition and health professionals, and food and nutrition industry professionals.

Prof. Jeyakumar Henry, Director of Clinical Nutrition Sciences at the Singapore Institute for Clinical Sciences (SICS) and Mr. Geoffry Smith, President of ILSI SEA Region, Singapore, gave the welcome and opening remarks for the symposium. Prof. Henry then proceeded to chair the symposium.

Prof. Connie Weaver, Purdue University, USA, presented the paper on Diet, Gut Microbiome and Bone Health. She gave an introduction of how adequate calcium intake can help to prevent osteoporosis and that increasing dietary calcium will increase calcium absorption and reduce bone resorption. She pointed out that prebiotic fibers can also improve calcium absorption and net bone balance. In one of her studies, galactooligosaccharides (GOS) have been associated with increased bone mineral density and bone strength in rats. She reported that a more recent study on the effect of GOS on colonic calcium absorption in pre-menarcheal girls has concluded that 5g and 10g per day of GOS supplementation increased calcium absorption by 10%. She also shared that an increase in peak bone mass by 10% has been estimated to delay osteoporosis by 12 years. She also highlighted that prebiotic fiber consumption has been associated with shifts in microbial communities, typically in fiber fermenters. These shifts are significantly positively associated with increased in calcium absorption significantly.
Prof. Weaver’s latest study on the effect of added soluble corn fiber, a prebiotic fiber, on net bone calcium retention in postmenopausal women has also concluded that soluble corn fiber improved bone calcium retention in a dose-responsive manner among postmenopausal women. The same fiber shifted the gut microbiome and altered several functional pathways in healthy men too. She concluded that more research can be done to study the possible benefits of prebiotic fiber for the non-healthy population as well.

Prof. Yuan Kun Lee, National University of Singapore, Singapore, gave the next presentation, Mapping Asian Gut Microbiota Across Age and Geography – What are the Health Implications? He introduced the Asian Microbiome Project (AMP) and shared that Phase I was initiated in 2009 to examine the microbiota profile among healthy youngsters in 10 Asian cities as a pilot study. Phase II was launched in 2013 to examine the adult and elderly, and Phase III was launched in 2014 to examine the mother and infant pairs. He pointed out that the study data indicated that variation in the gut microbiota of Asian children is clustered into two groups, each defined by Prevotella (P-enterotype of the South East Asia and Northern Asia) and Bifidobacterium/Bacteroides (BB-enterotype of the Central Asia). He explained that the geographical location, immigration pattern and the diet impacts on the variation of the gut microbiota. He also shared that the type of carbohydrate diet could affect the bile acid metabolism. He explained that high resistant starch would reduce bile acid in the colon, which in turn promoted the P-enterotype species. In contrary, a diet with less resistant starch increases bile acid in the colon, which reduces the growth of the P-enterotype species, hence promoting the BB-enterotype species. The profile is confirmed by the microbiome of the adults and elderly of the respective cities, albeit a general decline in Bifidobacteriaceae, increase Enterobacteriaceae, and overall decrease in bacterial diversity.

Prof. Lee concluded that such perspective studies provide markers for the stage of health and positive guidance for microbial colonization through interference. Currently, regardless of regions, urbanization-like effect was observed. The microbiota profile among Asians is different from that of the Westerners due to different dietary and cultural habit and ethnicity, and the difference in profile may correlate to the differences in susceptibility to different diseases.

The symposium concluded with the experts emphasizing the new frontier, where methodological advances can provide more insights to the interactions of the diet, human gut microbiome and health.