Probiotics Research Laboratory (Endowed Department)

Principal Investigator:
Yuichiro Yamashiro, M.D., Ph.D., (Professor: endowed chair)

This research laboratory was founded in April 2005 as a postgraduate research course based on the basic idea that bacteria can be controlled with bacteria (proposed by Dr. M. Shirota, the founder of Yakult Co.). Yakult Honsha Co., Ltd. (Tokyo) has agreed to provide research funding, which was the first task of this endowed department.

The definition of probiotics is live microorganisms that when consumed in adequate amounts as food, confer a health benefit to the host. The main purpose of this postgraduate course is to confirm that probiotics can improve the consumer’s health and well-being, and potentially reduce their risk of diseases based on the findings of basic and clinical studies.

To achieve our goals, clinical intervention by probiotics and investigation of physiopathological roles of intestinal bacteria are performed using the novel analytical method, YIF-SCAN®, developed by Yakult Central Research Institute, which is based on reverse-transcription quantitative PCR assays targeting bacterial 16 SrRNA “molecules”. This method utilizes a wide array of highly specific primers, and unlike DNA-based methods, provides highly sensitive quantification of “live” bacteria in both blood and fecal samples. The minimum detectable number of targeted bacteria using this method is 1 bacterial cell per 0.5–1 ml of human peripheral blood.

This postgraduate course welcomes graduate students and/or scientists as postgraduate students or research fellows to research probiotics and/or intestinal bacteria. Currently, we have one research fellow from Bangladesh.

Ongoing research activities
I. Pediatrics
1. Study of the etiological role of intestinal bacteria in Kawasaki disease
   One of the most important research projects conducted by Prof. Yuichiro Yamashiro, the principal investigator, was started in the late 1980s to elucidate the etio-pathological role of gut bacteria in this intractable disease in children. The study results may be released by the end of this year (2018).

2. Effects of probiotic supplementation in infants and children
   Bifidobacteria supplementation for dysbiosis in newborns and infants delivered by elective cesarean section. This is a collaborative study with a private OB-GY clinic.

3. Study of suitable bacterial preparations, including species for fecal microbiota transplantation, for children with ulcerative colitis
   Selection of the donor, environmental conditions, such as anaerobic or aerobic, for preparation of fecal samples and combinations of probiotics.
   This is a collaborative study with Dr. Katsuhiro Arai and Dr. Hirotaka Shimizu from the Dept. of Gastroenterology, National Center for Child Health and Development (Tokyo).

II. Diabetes and metabolic syndrome
1. Effects of probiotic supplementation in T2 diabetes
   The second trial of probiotic administration in adult patients with T2DM for improvement of dysbiosis and bacteremia. Our first clinical study on probiotic supplementation with Lactobacillus C. Shirota for patients with T2DM was the first to demonstrate reduction of bacteremia, albeit incomplete. Therefore, we are modifying the composition of probiotics.
including symbiotics, for the second trial.

This is a collaborative study with Dr. Akio Kanazawa and Dr. Junko Sato from the Dept. of Metabolism & Endocrinology, Juntendo University.

2. Roles of dysbiosis in the development of ischemic stroke

Gut dysbiosis is now considered to be associated with metabolic dysfunction and systemic inflammation. One of our research groups reported that dysbiosis results in ischemic stroke. This is a collaborative study with Dr. Kazuo Yamashiro and Dr. Naohide Kurita from the Dept. of Neurology, Juntendo University.

3. Study of dysbiosis in periodontitis in relation with systemic diseases

Both gut dysbiosis and bacteremia can develop in patients with periodontitis, which is highly suspected to lead to the development of systemic diseases, such as T2DM, and other metabolic diseases. This is a collaborative study with the Dept. of Periodontology, Tokyo Medical & Dental University, and 6 clinical Depts. of Juntendo University: General Medicine (Prof. Toshio Naito), Metabolism & Endocrinology (Dr. Akio Kanazawa), Cardiovascular Medicine (Dr. Kazunori Shimada), Gastroenterology (Prof. Kenichi Ikejima), Neurology (Dr. Kazuo Yamashiro) and Ophthalmology (Dr. Yoshimune Hiratsuka).

Publications in 2017:

〈Originals〉


〈Reviews〉


〈Supplement special issue of a medical journal〉

Prof. Yuichiro Yamashiro contributed to publish a supplement of the special issue of a medical journal, Annals of Nutrition and Metabolism, entitled “Bacteremia and Probiotics” as the Editor, published by Karger (Basel, Switzerland).

Research staff

Visiting Professor: Satoru Nagata, M.D., Ph.D.
Visiting Professor: Satoshi Matsumoto, Ph.D.
Visiting Professor: Koji Nomoto, Ph.D.
Visiting Associate Professor: Takuya Takahashi, Ph.D.
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