

2.10.2 Laboratory: AJINOMOTO Integrative Research for Advanced Dieting

Member:	Professor	Nishiyama, Tohru, Ph.D. (2009.4-2009.9)
	Associate Professor	Nonaka, Masahiko, Ph.D. (2009.4-2009.9)
	Associate Professor	Kondoh, Takashi, Ph.D. (2009.10-2010.3)
	Assistant Professor	Yamazaki, Hanae, Ph.D.
	Assistant Professor	Ito, Hiroaki (2009.4-2009.9)
	Assistant Professor	Matsunaga, Tetsuro, Ph.D. (2009.10-2010.3)
	Post-Doctoral fellow	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Physiological importance of Japanese traditional dried bonito broth (2009.4-2009.9, early half year)

Our goal is to propose Japanese styles and concepts for healthy dieting based upon scientific evidence. In this study, we focused on Katsuo-Dashi (dried bonito broth) which is widely served in Japanese cuisine, its efficacy on health hasn't been authenticated. In addition to the findings reported so far, We've found that Katsuo-Dashi intake can cause, i) suppression in abdominal fat accumulation, ii) suppression in blood glucose increase after meal intake, with the diabetic mice models.

b) Association among genetic factors, nutrition, and autonomic nervous system (2009.4-2009.9, early half year)

The aim of this study is to investigate the associations of genetic polymorphisms and dietary habit with autonomic nervous system (ANS) function in young, healthy Japanese. The present study provide the first evidence that the ghrelin Leu72Met polymorphism was associated with energy intake and gastric electrical activity in Japanese males. The Met allele was significantly associated with both daily energy intake and gastric electrical activity were significantly higher in Met allele carriers compared with Leu/Leu carriers.

c) Fundamental research for developing new processed foods and stockpiling foods (2009.4-2009.9, early half year)

Some plant species, for example, *Helichrysum bracteatum* have aesthetic values without

wilting or discoloration for many years. The mechanisms of structural maintenance and color stabilization could be applicable to improve the quality of dehydrated vegetables. In this research, tissue character about color stabilization and neutral carbohydrate composition floral leaves were investigated. It was indicated that floral leaves maintaining their colors showed low water content. It was indicated that cell walls of most scarious floral leaves included high rate of xylose in common. In addition, the rates of some neutral carbohydrate correlated with water content of floral leaves. So far, it was indicated that some kind of neutral carbohydrate composition inducing low water content in tissue stabilized their color. At present, it remains possible that cell walls directly stabilized their color in another way.

d) Mechanisisms of palatability for dried-bonito dashi (2009.10-2010.3, late half year)

“Bonito” is a fish that swims their whole life without taking rest and, therefore they might have some power of inexhaustible energy. Ingestion of dried-bonito dashi is effective for recovery from fatigue, and make skin more beautiful. Such physiological functions might contribute to palatability of dried-bonito dashi on cuisines. We are investigating the mechanisms.

e) Regulation of energy metabolisms and prevention of lifestyle-related diseases by dried-bonito dashi (2009.10-2010.3, late half year)

We are investigating beneficial effects of chronic ingestion of dried-bonito dashi on food intake, body weight regulation, and energy metabolisms especially in the pancreas and muscle in normal and disease animals.

f) Relationships between dietary habits and autonomic/gastrointestinal functions (2009.10-2010.3, late half year)

We are investigating the contribution of genetic polymorphism, lifestyle-related diseases and food habits on autonomic nervous function in young healthy volunteers. In addition, we are exploring the effects of dried-bonito dashi ingestion on gastric movement and autonomic nervous function.

A-2.Publications and presentations

a) Publications

Original Papers

- Shiori Wakisaka, Riyo Kobayashi, Miyuki Hishikawa, Yukina Yamamoto, Masako Ikeda, Naoki Sakane, Tetsuro Matsunaga, Toshio Moritani, and Narumi Nagai:
Association between skipping breakfast and morning gastric motility monitored by electrogastrography. *J. Jpn. Soc. Nutr. Food Sci.* 62: 297-304 (2009).

- Hiroaki Ito, Kuniko Nishikawa, Tatsuya Awano, Munetaka Hosokawa, and Susumu Yazawa: Secondary cell walls at a scarious floral leaf in several plant species including *Helichrysum bracteatum*. Hort. Res. (Japan) 9: 19-23 (2010).
- Tetsuro Matsunaga, Ning Gu, Hanae Yamazaki, Tetsuya Adachi, Koichiro Yasuda, Toshio Moritani, Kinsuke Tsuda, Tohru Nishiyama, and Masahiko Nonaka: Association of estrogen receptor- α gene polymorphisms with cardiac autonomic nervous activity in healthy young Japanese males. Clinica Chimica Acta 411: 505-509 (2010).
- Anh Son Ho, Etsuro Hori, Phuong Hong Thi Nguyen, Susumu Urakawa, Takashi Kondoh, Kunio Torii, Taketoshi Ono, and Hisao Nishijo: Hippocampal neuronal responses during signaled licking of gustatory stimuli in different contexts. Hippocampus Jan 19 (2010) [Epub ahead of print]

Reviews

- Takashi Kondoh, Hruda Nanda Mallick, and Kunio Torii: Physiological significance of glutamate signaling in gut-brain communication. Biosci. Microflora 28: 109-118 (2009).
- Hanae Yamazaki, Kathleen C. Zawalich, and Walter S. Zawalich: Physiologic implications of phosphoinositides and phospholipase C in the regulation of insulin secretion J. Nutr. Sci. Vitaminol. 56: 1-8 (2010).

b) Conference and seminar papers presented

- The 63rd Annual Meeting of the Japanese Society of Nutrition and Food Science: 2 Presentations
- The 56th Annual Meeting of the Japanese Society of Nutrition and dietetics: 1 Presentations
- The 51st Annual Meeting of the Japanese Society of Gastroenterology: 1 Presentation
- The 18th Annual Meeting of the Nutrition and dietetics in Gifu: 1 Presentation
- The 13th Annual Meeting of the Japan Society of Metabolism and Clinical Nutrition: 1 Presentation
- Annual Meeting of the Japan Society for Bioscience, Biotechnology, and Agrochemistry 2010: 1 Presentation

A-3.Off-campus activities

Membership in academic societies

- Nonaka, Masahiko, Ph.D. : Japanese Association of Food Hydrocolloids (permanent committee)

- Kondoh, Takashi, Ph.D. : The Japanese Pharmacological Society (academic councilor)

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Young Scientists (B) : Yamazaki, Hanae, Ph.D. : The physiological mechanism of rewarding effect of sugar intake in term of energy intake signal

- Young Scientists (B) : Ito, Hiroaki : The role of characteristic thickened cell walls contributing to the super-prolongation of flower ornamental periods

- Young Scientists (B) : Matsunaga, Tetsuro, Ph.D. : Multifaceted assessment of association of autonomic nervous system function with genetic polymorphisms and lifestyle-related factors in young Japanese subjects

B.Educational Activities (2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level: Small Seminar "Discuss about the future of Food Sciences"
(Nonaka, Yamazaki, Ito)

- Graduate level: Food Science and Biotechnology II (Nishiyama and Nonaka)
Lecture at the prof. Shintaro Funahashi's laboratory (Kondoh),
Lecture at the prof. Masaya Nagao's laboratory (Kondoh), Lecture
at the prof. Nobuya Inagaki's laboratory (Kondoh)

B-3.Overseas teaching

Lectures and seminars

- Yamazaki, hanae, Ph.D.

Event of Dashi in Bangkok - An Introductory Guide To Traditional Japanese Cuisine(Open Lecture) : kyoto University(Thailand)