

HEALTH AND NUTRITION NEWS

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National Institute of Health and Nutrition



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Mecca of health promotion research

Expectation for National Institute of Health and Nutrition

TAKAISHI, Masahiro

Ex director general of National Institute of Public Health

Rapid progress is expected in the area of "health promotion" by the act of the "Health Promotion Law". It is well known that this law has its background in the "Health Japan 21" project. It cannot be overemphasized that "Health Japan 21" specifies the direction of the national health promotion movement in the 21st century as the third measure of national health promotion. While decentralization advances these days, local municipalities strive to make health promotion programs, one after another.

Either on a national or on a local government level, new policies must be supported by scientific proofs. The direction of the policy becomes clear when scientific evidence is accumulated and exact analyses are undertaken. All research institutes must make efforts for research with outstanding ideas and steady application.

Thus, expectation to the National Institute of Health and Nutrition is quite large. It is the only research institute which conducts scientific studies to support national health promotion policies. It is definitely the "Mecca of health promotion research."

In the directory of Incorporated Administrative Agency National Institute of Health and Nutrition, the mission of this institute is clearly written as;

- 1) Researches for health promotion to improve overall health of the nation.
- 2) Researches for nutrition and diet in

Japanese.

I hear that these two missions are steadily improving with three departments such as Department of Human Nutrition, Department of

National Health and Nutrition Survey-Health Informatics, and Department of Food Science Research for Health. And there are already great interests for the results of these researches. Especially, I am interested in the achievement of the human metabolic project by the first constructed human calorimeter in Japan. The results of this project would be reflected in the decision of the 7th revision of the Dietary Reference Intakes of the Japanese and also become a firm foundation of national health promotion based on the scientific evidence. There is no doubt that all other studies are progressing in the same way.

I sincerely hope for the long future of continuing success of National Institute of Health and Nutrition, as a "Mecca of health promotion research".



Current Research Project Introduction

Challenge of Office of International Collaboration

Center for Collaborative Research
Senior Researcher, Hidemi Takimoto

Japan is known as one of the most longevity countries in the world. Not only foreign researchers of health and nutrition, but also people who are in charge of nutrition policy or nutritional ventures are very much interested in why so many Japanese are able to keep their health and longevity. Their interest are mainly caused by Japan's uniqueness of being the only country in developed countries without demonstrating the upward trend of death rate of ischemic heart disease which is one of the popular diseases of arteriosclerosis.

Although we can be proud of our long history of the national monitoring system of health and nutrition, "National Nutrition Survey", and its huge pile of the reports, it is not realistic for the foreigners to read and consult "The Current Status of National Nutrition", one of the reports. It is clear that the past effort to share these information and our experiences with other nations had not been enough. Up until quite recently, even in NIHN, researchers had had to answer the request individually such as provision of information from international organizations such as WHO or FAO, questions about Japanese nutritional research from foreign researchers and companies. Also, provision of professional knowledge and skills to decision and operation of nutritional measure in Asian countries were mostly handled by some voluntary researchers.

Now, Office of International

Collaboration takes charge of answering these requests and questions and organizes the matters according to the needs. Even though this office has just established and as new as Office for Promotion of Industry-University-Institute Cooperation, it has the great responsibility to act as a contact point to flourish the exchange between NIHN and foreign researchers and develop cooperative researches.

On January 16, 2004, Office of International Collaboration will host its first Asian Network Symposium entitled "Optimizing maternal and child nutrition for the prevention of chronic diseases". These days, in most countries in South-East Asia, statistics show the quite high ratio such as 20~50% of children are born as low-birth-weight (less than 2.5kg at birth). These children tend to suffer from chronic diseases such as ischemic heart disease, diabetes, and/or high blood pressure as adults. Urgent prevention starting from a baby in the mother's womb or in infant age is needed. To promote health of the children who shoulder the future, we need the action foresees the risk of future diseases. I would like to exchange the knowledge with Asian researchers from this point of view at the symposium. The detailed program will be soon available on our website, so please keep it in mind and join us at the Asian Network Symposium!



Thoughts on Health and Nutrition Researches

The Satiated Age ~ How long we can call it “ Japanese Tea ” ?

Fumiko Hirahara

Division of Food Science

Meal Solution, Home Meal Replacement, Eat-in, Convenience Food, Delicatessen, Copied Food, citrulline, etc. These are the key words in the questions from people in recent ten days. As these show, we are living in a raging flood of information on health including many foreign terms. Reflecting people's health concerns, there is at least one program focusing on food and diet, whenever you turn on the TV. Some programs pick up real hot news from professional journals, even I myself learn from TV sometimes. But usually, I watch this kind of shows wondering how much of these issues can reach to the audience and be understood.

Not only about these BIG words above, of course there are well thought inquiries about such issues; “consumption at a place of production”, “prepared meals”, “each meal perfect”, “solitary eating”, and “education through intakes”. Some asked me about Dr. Hayami's and Dr. Saiki's researches, or even wanted to know about achievement over a half century ago in “Food Analysis Conspectus : First edition of Food analysis (document reports)”. It is interesting that some seem to want semblance of health information, on the other hand, some pursue substantial knowledge.

There are some pathways of information flow. S to S (Specialist to Specialist) and S to M (Specialist to Mass media and to public) are well known. We have to be careful because when information flows in an inappropriate way, it can possibly cause “health

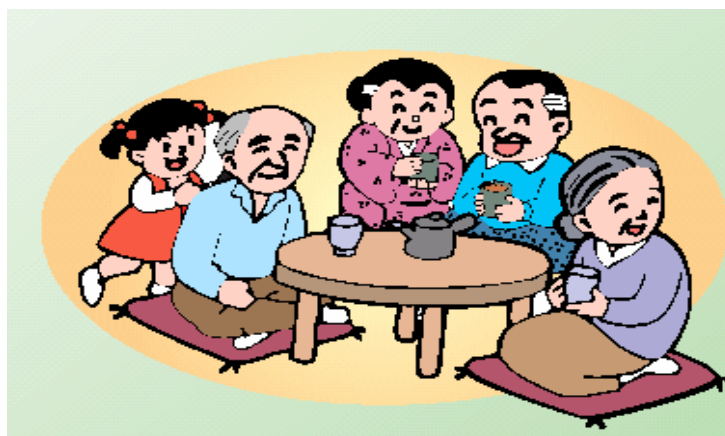
hazards.”

Nowadays we hear of “queer eating (strange combination of foods)”, such as mixing up all the food and sauce with boiled rice to eat, typically observed in young people. This was also introduced in a TV program, and some people said it was disgusting. But a dietician said, “It doesn't matter so far as they eat a balanced diet.”

There are three functions in foods; 1) Filling up, 2) Enjoying taste, shape, color, fragrance, and texture, 3) Maintaining one's health (The function of food). Recently, although the 3rd function comes under the spotlight as well as the 2nd attracts the gourmet, number of people grows who just take food to fulfill his/her stomach and pay no attention to 2nd or 3rd values.

We import a variety of foods from other countries to fill our stomach, such as rice and Japanese tea. Both of them are estimated to keep a high self-sufficiency rate, but I wonder how long we can call it as “Japanese tea” or “Japonica rice”. I find “Japanese tea” without real Japanese tea taste, or “wash-free rice” with less taste and texture. Is it possible to keep our health with these foods?

We are living in an age that one has to take responsibility to keep and improve his/her health. I think it is very important to us, the specialists, how and what kind of health related information to offer to public nearly drowning in the flood of information



Current Research Findings

Low fish oil consumption inhibits SREBP-1 proteolytic activation, and high level consumption suppresses SREBP-1 expression

Division of Clinical Nutrition
Teruyo Nakatani

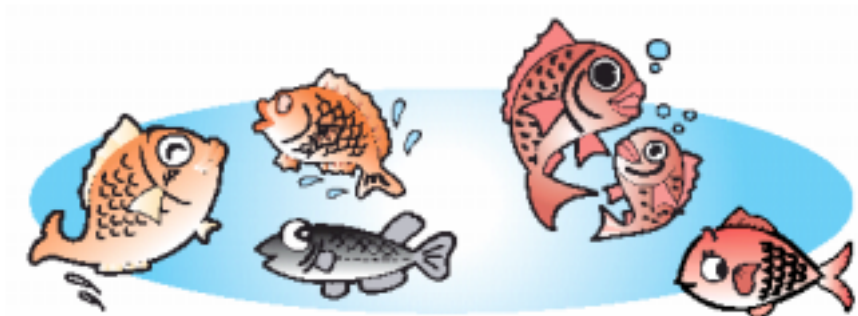
Fish is well known as a healthy food. Fish consumption prevents chronic diseases such as ischemic heart disease and stroke. What is the reason for these health effects? Fat is considered unhealthy, but some fat is needed for your body. Therefore, the body tries to maintain its fat volume at a certain range. When there is loss of body fat, the body tries to increase it. We need to produce enzymes for lipid synthesis, and we need “transcription factors” for these enzyme production. All metabolic processes going on in our organs are chemical reactions, and these reactions need enzymes. When a transcription factor works for lipid synthesis, the enzyme needed is produced, and then lipid synthesis starts.

Consumption of fish oil is known to decrease the transcription factor SREBP-1c needed for lipid synthesis. In our study, we fed 10~60 fat energy percent of fish oil to mice, and examined the change in SREBP-1c.

It has been assumed that the decrease in SREBP-1c due to polyunsaturated fatty acid was regulated at the messenger RNA level, but our study revealed that the intake of fish oil at usual dietary levels controlled SREBP-1c levels in liver through “suppressing the activation of SREBP-1c protein”, which means that the amount of SREBP-1c acting as a transcription factor decreased; therefore suppressing lipid synthesis. The metabolic processes are affected by the diet, through the expression of certain genes such as changing the amount of transcription factors.

Changing our usual diet may keep us away from life-style related diseases, such as fatty liver and atherosclerotic disease.

Source: A low fish oil inhibits SREBP-1 proteolytic cascade, while a high-fish-oil feeding decreases SREBP-1 mRNA in mice liver: relationship to anti-obesity. Nakatani T, Kim H-J, Kaburagi Y, Yasuda K, Ezaki O : J. Lipid. Res.:44(2):369-379, 2003



Current Research Findings

Diurnal variations in human urinary excretion of nicotinamide catabolites

Effect of stress on the metabolism of nicotinamide

Division of Human Nutrition

Mamoru Nishimuta

Human studies are indispensable for examining human nutritional requirements. "Niacin", one of the water-soluble vitamins, is the generic name for nicotinamide and nicotinic acid, both are stored in liver. One of the features of this vitamin is that it is synthesized from tryptophan (one of the essential amino acids) in the body, and plays an important role in the energy metabolism.

In order to examine the dietary niacin requirement, we conducted the 12 days experiment at the NIHN with 12 female university students' volunteers. The protocol was as follows:

- 1) Four daily menus were devised and were fed in rotation.
- 2) Daily energy intake was 1890kcal/ day.
- 3) Meals included 13.3mg niacin and 706mg tryptophan (which will be converted into 11.8mg niacin). Niacin equivalent was 25.0mg/ day.
- 4) First 4 days were for adaptation, then, the subjects experienced one of the following artificial stresses once in the following period.
 - (1) Cold exposure: staying in a 4 room, two and half hour in the morning and in the afternoon.
 - (2) Calculation: three hours non-stop calculation with 3rd graders level in the morning and in the afternoon.
 - (3) Dark exposure: sitting and keeping silence on a chair without backrest three hours with wearing eye mask in a dark room in the morning and in the afternoon.

5) Urine samples were collected and pooled during 5 specific periods (0630 to 0830, 0830 to 1300, 1300 to 1830, 1830 to 2200, 2200 to 0630 of the next day).

We determined the amount of catabolites of niacin excretions in urine such as N¹-methylnicotinamide (MNA), N¹-methyl-2-pyridon-5-carboxamide (2-py), and N¹-methyl-4-pyridon-3-carboxamide (4-py), and observed the diurnal rhythm and the effect of stress on niacin metabolism. For a comparison, we took the value of the excretion from the day with same menu without stress tests.

As a result, it became clear that there was a daily rhythm in the metabolism of niacin with urine analysis. Taking into account of the enzymatic process of synthesis and degradation of niacin, the intake of total niacin per day was enough in this experiment. Also it can be said that niacin is used mainly in the day time while energy expenditure level is high, and during the night time the usage of niacin decrease and fully preserved. This is why MNA level was higher in the early morning urine.

From the stress exposure experiment, MNA and niacin catabolites in total increased only with cold stress. This means that cold stress activated the energy expenditure along with niacin synthesis from tryptophan.

Source: Diurnal variations in human urinary excretion of nicotinamide catabolites; effects of stress on the metabolism of nicotinamide. Okamoto H, Ishikawa A, Yoshitake Y, Kodama N, Nishimuta M, Fukuwatari T, Shibata K. Am J Clin Nutr:77:406-410, 2003



Current Research Findings

Bowel habits among the Japanese population

Colon diseases, including cancer and diverticulitis, have been increasing recently in Japan. This is probably related to bowel disorders such as constipation, however, details regarding bowel habits among the Japanese population are very rarely published or discussed in the public domain. To clarify this issue, it is important to examine the relationship between colon diseases and bowel disorders. On the other hand, the defecatory status of subjects, especially constipation, are decided subjectively in daily life, though several definitions for defecatory condition are used in the scientific field. However, studies detailing self-evaluation of the defecation status in general population study groups do not exist; this may be attributed to difficulty in obtaining objective assessments of bowel habits.

We conducted a research study based on a structured interview involving 1,195 residents (40 years old and beyond) from rural areas in Iwate-ken (a prefecture in north-east Japan) about their bowel habits. The interview elicited responses to a number among self-reported bowel habits, including "Bowel movement frequency"; "Length of time for bowel movement"; "Straining after bowel movement"; "Regular bowel movements" "Changes in bowel movements associated with journeys away from home"; "Alternating diarrhea/constipation disorder"; "abdominal pain associated with bowel movement; and "Stool appearance".

The status of defecation was categorized under 1) normal, 2)marked constipation 3)moderate constipation, 4)mild constipation, 5) alternating diarrhea/constipation disorder, 6)diarrhea. When the results were analyzed according to sex, more males answered "normal" (79.3%) compared with females (60.5%). The results also clearly showed that the proportion of constipation was greater in females than in males, with respective men and women responses for marked, moderate, and mild constipation of 3.6%/6.3%, 3.9%/14.2%, and 6.3%/15.5%, respectively. On the other hand, the incidence of diarrhea was greater in males than in females at 3.9% compared with 1.8%. When the data were analyzed by age, more women in any age group tend to be constipated than men, and the constipation tendency increased in both genders concomitantly with age. The reasons

Division of Health Promotion and Exercise Takashi Kumae

for this can be assumed to be; 1) Decreased large bowel function with increasing age, and 2) Decreased fiber intake associated with lower energy intake.

Additionally, a logistic regression analysis was carried out to analyze the association between the complaint of constipation and the other eight parameters, and the odds ratio for each parameter was calculated. The highest odds ratio value was seen for the item "Bowel movement frequency"; especially the value "Once per three days or more" was noted in both genders (odds ratio: 13.38 and 42.46 in men and women, respectively). In addition, "Stool appearance", "Length of time for bowel movement", "Straining after bowel movement", "Alternating diarrhea/constipation/ disorder" and "Changes in bowel movements associated with journeys away from home" were significantly related with the complaint of constipation in both genders. All such parameters were thus utilized by the subjects themselves to evaluate constipation in the general population. On the other hand, the odds ratio for "Abdominal pain associated with bowel movement" was not significant for women, in contrast to that for men. In conclusion, the item "Bowel movement frequency" was limited as an objective index for evaluating bowel habits, if only this parameter is assessed.

Our data allowed us to clarify the differences in the status of defecation by gender and age group. It would be of great help when discussing of epidemiological research to elicit and elucidate the relationships between large bowel diseases and defecation. Our data also revealed the status of personal judgment regarding constipation, which should help to establish clinical guidance during the treatment of constipation.

Source: Bowel habits among the Japanese Population. Matsuzaka M, Nkaji S, Umeda T, Suzuki K, Sugawara K, Sakamoto J, Wada S, Kumae T, Tokunaga S: *J Phys Fit Nutr Immunol* 13:9-16

