X ISTERH CONFERENCE

TRACE ELEMENT RESEARCH ON HEALTH AND DISEASES

KEIO PLAZA HOTEL TOKYO, TOKYO, JAPAN 18-22 NOVEMBER 2013

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Foreword

TRACE ELEMENT RESEARCH ON HEALTH and DISEASES

The present issue of Journal of Trace Element in Medicine and Biology contains abstracts submitted to the 10th Conference of the International Society for Trace Element Research in Humans (ISTERH). This conference is an international forum for clinicians and researchers to exchange information regarding advances in trace element research. The meeting was organized in collaboration with the Japanese Society for Biomedical Research on Trace Elements (JSBRTE) and Japanese Society of Clinical Nutrition (JSCN). It was held at the Keio Plaza Hotel in Tokyo on 18-22, November, 2013. The theme of the 10th ISTERH is TRACE ELEMENT RESEARCH ON HEALTH and DISEASES.

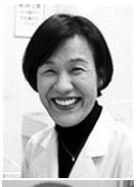
ISTERH is a non-profit scientific society that was established by Drs. Prasad, Brewer, Okada and Tomita and others in 1984. Its mission is to: 1) encourage and promote increased scientific and clinical research on the causes, alleviation of suffering and the cure of trace element disorders; 2) to accumulate information about trace elements, and promote its dissemination to scientists and physicians and other concerned parties; and 3) to educate the general public and medical profession about the existence, diagnosis and treatment of trace element disorders. It is a badge of honor for us to organize the memorable 10th Conference.
The 10th ISTERH conference covered recent advances in analysis, metallomics, environmental problems and genetic diseases and disorders associated with trace elements.

The program accommodated eight plenary lectures presenting distinguished scientists of the world. Sixteen symposia were organized/chaired. Organizers include Symposium (sym.1) by Toshiyuki Fukada and Taiho Kambe (symposium 1), as well as Masao Sato and Katsuyuki Nakajima (sym.2), Paevez Harris and Jun Yoshinaga (sym.3), Jeanne Freeland-Graves and James McClung (sym.4), Daigo Iwahata and Kazumi Inagaki (sym.5), Seiichiro Himeno and Yasumitsu Ogra (sym.6), Noboru Saito and Mamoru Nishimuta (sym.7), Sangeeta Shukla (sym.8), S.K. Roy (sym.9), Stephen G Kaler and Haruo Shintaku (sym.10), Ingrid S Surono and Rizky Abdulah (sym.11), Atsushi Takeda (sym 12), Forrest H Nielsen (sym.13), Michael Aschner and Wei Zhang (sym. 14), Thomas Ong and Shinobu Ida (sym.15), and Hideo Sugiyama and Satoshi Yoshida (sym. 16). Four mini-symposia and poster presentations also were presented. This volume contains 173 abstracts from speakers from numerous countries all over the world.

A large number of sponsors have supported individual speakers or symposia. Four luncheon seminars were supported by Nobelphama Co. Ltd., Novo Nordisk Pharm. Ltd., Nestlé Health Science, and Eli Lilly Japan K.K. We hereby express our gratitude for their indispensable generousity and thank all our sponsors.

Tokyo is the capital city of Japan where modern and traditional cultures are mixed together. Until around 100 years ago, we had closed our country and stopped the communication with foreign countries for 300 years. During this time we had incubated our own culture. Today the unique culture of Japan still exists in Tokyo. The Sky Tower in Tokyo is now the highest tower in the world, and this year Mount Fuji was declared a World Heritage Site. We hope that you will enjoy seeing the many beautiful sights of Tokyo.

Hiroko Kodama
President



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P-29
Epidemiological study: Interaction between iron deficiency and lead poisoning on Moroccan children's health

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Iron deficiency and lead poisoning are common among infants and children in many parts of the world and often these two problems are associated to one another. Both conditions are known to cause anemia and if they are combined, they tend to cause a more severe form of anemia. Even though the nature of their relationship is not completely elucidated, characterization of a common iron-lead transporter and epidemiological studies among children strongly suggest that iron deficiency may increase susceptibility to lead poisoning. Recent human studies suggest that high iron intake and sufficient iron stores may reduce the risk of lead poisoning. Future clinical trials are necessary to assess the effect of iron supplementation in the public health prevention of lead poisoning.

Indeed, the supplementation iron's study done in Marrakech, Morocco on an anemic infant population (3 to 13 years) living in a lead polluted area confirms this fact.

P-30
Use of human primary tooth enamel as a biomarker for lead, iron, copper and zinc exposure during prenatal and neonatal development

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Lead (Pb) may affect neurodevelopment of children by direct toxicity. There is also evidence that zinc (Zn), copper (Cu) and iron (Fe) status affect early development. In this work, we examine pre- and neonatal exposures to trace metals using the enamel of 151 primary teeth gathered from children in Quebec, Canada, as a biomarker for Pb, Zn, Cu and Fe exposure.
In primary tooth enamel, divalent cations may substitute for isovalent calcium (Ca) sites in hydroxyapatite [$Ca_{10}(PO_4)_6(OH)_2$], the main component of which enamel is formed. The highly conservative nature of the hydroxyapatite crystal may allow for its use as a biomarker of cumulative exposure to Pb, Fe, Zn, and Cu. Once teeth are shed naturally, they can be analyzed in an energy dispersive x-ray fluorescence spectrometer. Trace element quantities in deciduous tooth enamel will be compared to measured neurological outcomes including full WASI IQ test scores and Santa Ana motor neuron functionality test scores.

P-31
Trace elements and inflammatory and oxidative markers in hemodialysis patients

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Oxidative stress, inflammation and trace element imbalance occur in most hemodialysis (HD) patients.
In order to test trace element status and the possible influence of inflammatory state and oxidative stress in HD patients on biomarkers in plasma and erythrocytes, we assessed related parameters in 100 HD patients. They included: Fe, Cu, Zn, and Se levels in plasma and erythrocytes; total and non-transferrin Fe, ferritin, C-reactive protein, albumin/globulin, ceruloplasmin, protein carbonylation and superoxide dismutase.
Plasma Fe and Cu markers were clearly affected by inflammatory state and oxidative stress, while erythrocyte concentrations remained unaffected. HD patients showed Zn and Se deficiency and apparently normal Fe and Cu plasma levels.
In HD patients, Fe and Cu plasma level was not a reliable marker of body status. Using erythrocytes as a marker of trace element status should be evaluated, especially in relation to the role of Fe (indirectly of Cu, as well) for efficient anemia treatment in HD patients.

P-32
Assessment of Human Body Iodine Status using Hair, Blood, and Urine: Scaling Matters

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Currently, human iodine (I) status is assessed by analyzing urinary I with the *a priori* assumption that the geometrical organization of data is linear. This study involved the analysis of hair I (H_I) levels in 870 Croatians, whole blood I (B_I) levels in 311 Croatians, and urinary I (U_I) levels in 98 Cameroon men and women from a WHO 2007 study. Data were analyzed via the median derivative method (the power function). All resulting bio-indicators exhibited a characteristic sigmoid curve with a linear section, having medians of 0.05, 0.12, and 0.50 $\mu g \cdot g^{-1}$ for B_I, U_I, and H_I, respectively. This linear region can be graded into low adequate (LA), adequate (A), and high adequate (HA) ranges, depending on the degree of bio-indicator saturation with iodine. We estimated optimal I saturations (70%) to be: B_I (0.068), U_I (0.156) and H_I, (0.857) $\mu g \cdot g^{-1}$. The current linear scaling used in geometrical organization of bio-indicator iodine data is false, and should be replaced with the power function.