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Editorial:

Addressing global hunger

The UK Government Office for Science has recently published the Foresight Project Global Food and Farming Futures final report and executive summary [1]. The aim of this project was to identify the challenges and choices for policy makers and others whose interests relate to the various aspects of the global food system, and to provide guidance for a sustainable and equitable solution. The experts involved put out an urgent call for decisive action and collaborative decision-making to resolve the major challenges that affect our future over the next 20–40 years.

The summary highlights how we are consuming the world's natural resources at an unsustainable rate, failing the most disadvantaged and vulnerable people, who continue to suffer most as a result of shortcomings with the current system. It reminds us that nearly half of the global population of seven billion is malnourished, with one billion people lacking access to sufficient macronutrients (carbohydrates, fats, protein), and another billion affected by hidden hunger (impaired physical and mental development due to deficiencies in micronutrients). At the same time, it says, one billion people are overweight or obese, and are exposed to an increased risk of chronic conditions such as diabetes and cardiovascular disease.

Overall, the project has identified and analyzed five key challenges for the future:

1. Balance future demand and supply sustainably, and ensure that food is affordable.
2. Ensure adequate stability in food supplies, and protect the most vulnerable from any volatility that does occur.

3. Achieve global access to food, and end hunger.
4. Manage the contribution of the food system to the mitigation of climate change.
5. Maintain biodiversity and ecosystem services while feeding the world.

The report recognizes that food production already dominates land and water resources, and has a major impact on the environment, contributing to climate change and destruction of biodiversity. Nevertheless, we are failing to reduce hunger substantially, and many food production systems are unsustainable. Without doubt, given sufficient will and investment, we could make immediate progress using current knowledge and technologies, but it will take more radical changes to the system, and investment in research to find new solutions for future problems. The priorities presented in this report take all options into consideration.

When contemplating the choices before them, policy makers must take a much broader perspective than in the past; they need to consider the global food system from production to plate. This message demands your attention!

1. *Foresight. The Future of Food and Farming (2011) Executive Summary. The Government Office for Science, London, UK. (This document, as well as the final report and all associated background papers can be downloaded from the Internet at: <http://www.bis.gov.uk/foresight/our-work/projects/current-projects/global-food-and-farming-futures/reports-and-publications>).*



A. Bowley

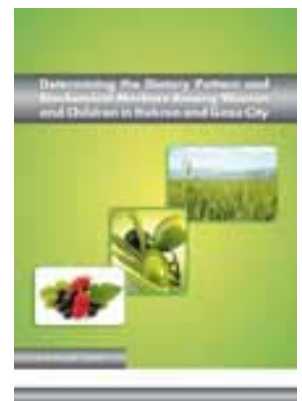
Feature:

Support for Palestinian food fortification efforts

In November 2010, A2Z, the USAID Micronutrient and Child Blindness Project, released a series of documents prepared in collaboration with the Ministry of Health of the Palestinian Authority and ANERA (American Near East Refugee Aid) and designed to support food fortification efforts in the Palestinian Territories. Below is a brief description of the five manuals. All of these documents can be accessed at: <http://www.a2zproject.org/node/89>.

Determining the Dietary Patterns and Biochemical Markers among Women and Children in Hebron and Gaza City

A2Z supported the completion of a 24-hour recall study to determine micronutrient status and nutritional adequacy in Hebron and Gaza City, the two most vulnerable sites for nutritional deficiencies in the West Bank and Gaza Strip, respectively. Dietary data were collected from children aged 3–7 years and women of reproductive age (18–49 years). Analysis of usual intake and biomarker data indicated that children were not receiving sufficient zinc, calcium, niacin or vitamins A and B12. Women had inadequate intakes of iron, zinc, calcium and niacin, as well as the vitamins A, B1, B2, B6 and B12. Low serum levels of vitamin D in women, but not children, suggest that women's traditional clothing habits and few activities outside



the home after adolescence play a role in the metabolic deficiency of the vitamin. The Palestinian Authority uses these and other results to define multiple vitamin and mineral content of the fortification formula for wheat flour.

The Demand for Locally Manufactured Complementary Food Products among Palestinian Caregivers



This study gathered information on the feeding practices of infants and children aged less than three years, as well as caregivers' readiness to accept a variety of locally manufactured complementary foods for children aged 3–35 months. The results of the study indicate that

mothers have favorable and positive attitudes towards breastfeeding and complementary feeding with local ingredients. The study revealed that, although commercially fortified foods are used as snacks for children, women do not perceive them as the usual products for infant feeding. However, mothers showed interest in trying micronutrient powders to improve the nutritional density of their children's meals.

Manual of Methods for Determining Micronutrients in Fortified Foods

This manual provides detailed step-by-step instructions on methods to qualitatively and quantitatively determine iron, vitamin A and water-soluble vitamins (riboflavin, thiamin, niacin and folic acid) in wheat flour and other foods, such as cereal-based products, milk

and edible oils. It presents a method to determine the soluble iron coming specifically from ferrous sulfate, as well as an improved method for measuring vitamin A in flours. The Palestinian Ministry of Health and the Central Public Health Laboratory already implement the methods described.

Inspection Manual for Monitoring Salt and Flour Fortification

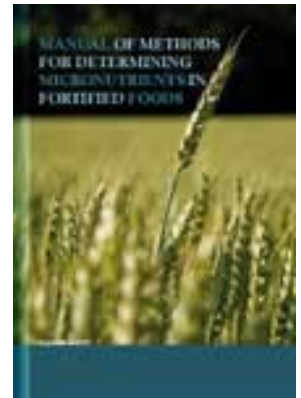


This manual, available in English and Arabic, summarizes the steps necessary for supervising and inspecting production and sales of iodized salt and wheat flour, as endorsed by the food inspectors of the Department of Environmental Hygiene, Ministry of Health of the Palestinian Authority.

Analysis of Inspection Results from Salt and Wheat Flour Samples

This document reports the results for iodized salt and wheat flour samples taken during 2009 in the West Bank, and compares them to the data obtained in 2008. The Environmental Health Department, Ministry of Health of the Palestinian Authority, took the samples as part of its inspection activities in wheat mills, salt factories, wholesale/retail stores and imported products, and analyzed the results in collaboration with A2Z using the methods described in the manuals above. Results show that the salt iodization program is performing well, and that the wheat flour fortification program has progressively improved in quality and coverage since its introduction in 2005.

For more information on A2Z Project's work in food fortification, please visit <http://www.a2zproject.org>.



Source: media release, A2Z Project

Feature:

Beta-carotene important as safe source of vitamin A

Experts in the field of carotenoids from the USA, Europe and Asia met at the Hohenheim consensus conference in Stuttgart-Hohenheim, Germany, in July 2009 to elucidate the current status of beta-carotene research, and to summarize current knowledge with respect to the chemical properties, physiological functions and intakes of beta-carotene. Their findings have been published in the Journal of Nutrition [1].

According to recent data from national nutrition surveys, dietary intakes of preformed vitamin A and the vitamin A precursor beta-carotene are inadequate in a substantial part of the population in the USA, Europe and

Asia. Many people may also find it difficult to produce sufficient amounts of vitamin A from beta-carotene due to genetic mutations. The meeting participants therefore propose a substantial increase in beta-carotene intake recommendations to ensure that most individuals achieve an adequate vitamin A status.

Intakes critically low

Vitamin A is essential for many functions in the human body, such as normal growth and development, immune function and vision. Because it is particularly important for child survival, higher intakes are recommended

during pregnancy and lactation. Only animal products, such as liver, eggs and dairy, contain preformed vitamin A. Populations whose intake of animal products is low (most people in Asia and Africa) might meet vitamin A requirements by eating foods rich in provitamin A carotenoids (mainly beta-carotene).

Nevertheless, dietary intakes of vitamin A and beta-carotene fail to reach recommended levels in many countries. Groups especially at risk of inadequate intake are young women (especially during pregnancy and lactation), newborns, infants with frequent infections, elderly and vegans. Recent evidence has shown that suboptimal intakes of vitamin A and beta-carotene, even if not sufficiently low to cause a clinical deficiency syndrome, can increase the risk for chronic diseases.

Gene variants affect deficiency risk

Numerous factors can influence the bioavailability of beta-carotene. These include food-related factors (food matrix, fiber and fat content, food processing, amount consumed), as well as consumer-related factors (vitamin A status, gut integrity, genetic variations). Studies indicate that almost half of the population tested has a reduced ability to produce vitamin A from beta-carotene because of genetic variations in the enzyme responsible for converting beta-carotene. This means that individuals with this genetic trait who rely mainly on beta-carotene as a source of vitamin A are at a particularly high risk of vitamin A deficiency.

Higher intakes needed

When people do not consume enough preformed vitamin A to ensure an optimal vitamin A status, an adequate intake of beta-carotene becomes essential. Evidence suggests that current intake recommendations of 2–4 mg beta-carotene daily might not be enough.

The meeting participants therefore conclude that people with low intakes of preformed vitamin A should consume 7 mg beta-carotene daily. Individuals with reduced conversion of beta-carotene might need to increase their daily intakes even further. This recommendation is based on a realistic conversion efficiency of 12:1 (12 mg beta-carotene produces 1 mg vitamin A),



Foods rich in beta-carotene help to meet vitamin A requirements

which should ensure that at least 95% of the population meets the recommended intake of vitamin A.

When considering which form of beta-carotene is preferable, the experts agree that there is no difference in function between naturally occurring and chemically synthesized beta-carotene. However, the bioavailability of all-trans beta-carotene, the form used for most dietary supplements and fortified foods, is much greater than that of natural beta-carotene in fruits and vegetables.

As the general population does not obtain sufficient beta-carotene from fruit and vegetables, dietary supplements and foods fortified with beta-carotene can be important contributors to the daily supply of vitamin A.

Source

I. Grune T, Lietz G, Palou A, et al. Beta-Carotene is an important vitamin A source for humans. Hohenheim Consensus Conference. J Nutr 2010; 140: 2268–2285.

Source: media release, Hohenheim Conference

Guatemalan Science and Technology Medal 2010:

Guatemala recognizes Noel Solomons' research efforts

On December 13, 2010, Dr Rafael Espada, Vice President of the Republic of Guatemala, presented the National Science and Technology Medal for 2010 to Dr Noel W. Solomons in recognition of his scientific research in the area of nutrition, and its significant contributions to health in the country. The National Council of Science and Technology (Consejo Nacional de Ciencia

y Tecnología, CONCYT) introduced this annual award in 1997 to recognize outstanding and meritorious research with a social impact for Guatemala.

Accompanied at the ceremony by the President of the National Legislature, Congressman José Roberto Alejos Cámbara, and the Director of the National Council for Science and Technology, Dr Rosa María

López Amaya, Dr Espada congratulated Dr Solomons, and confirmed that his work has helped the country to make progress in inspiring its youth and strengthening the integrity of its people through the education of science and technology.

Dr Solomons graduated as a physician at Harvard University, USA, in 1970, and has dedicated much of his professional life to nutrition research in Guatemala. He has more than 35 years' experience in teaching nutrition at various international universities, as well as the University of San Carlos de Guatemala and the Institute of Nutrition of Central America and Panama. Among the many professional societies, of which he is a member, he is currently active in the American Society for Nutrition, the Latin American Society for Nutrition (SLAN) and the International Society for Trace Element Research in Humans. He serves on ten editorial boards, including that of Nutriview.

His research has had a significant impact on child nutrition policies at national and international levels, influencing the decisions of Guatemala's Ministry of Public Health and Welfare to improve nutrition in children and the concept of standards and nutrition interventions. It has also had a significant impact on the establishment of policies and programs to promote positive early nutritional efforts to prevent obesity, diabetes and cardiovascular disease in adults, allowing to develop comprehensive strategies aimed at reducing



Congressman José Roberto Alejos Cámara (left), Dr Rosa María López Amaya, and Dr Espada congratulate Dr Solomons at the award ceremony

chronic diseases, including cancer. Findings from his institute, CeSSIAM, currently serve to promote the fortification of sugar with vitamin A (one of the most important achievements and contributions to public health in the country).

Recently his research has focused on the nutritional impact of the economic downturn, natural disasters and environmental pollution, including the potential health problem of water consumption by school children. He has also pioneered research on the effects of nutrition in the elderly, urban nutrition in the tropics, and cardiovascular risk factors in the elderly.

Translated and adapted from the Vice-President's report (<http://www.vicepresidencia.gob.gt/v2/content/medalla-de-la-ciencia-y-tecnolog%C3%AD-para-el-doctor-noel-w-solomons>)

Rainer Gross Award 2010: Latin American researchers honored

On September 25, 2010, during the II World Congress of Public Health Nutrition in Porto, Portugal, the Hildegard Grunow Foundation (<http://www.hgrunowfoundation.org/>) presented the Rainer Gross Award in recognition of recent innovations that show promise to improve nutrition in developing countries for the first time. Joint recipients of the 2010 Award were Angela Cespedes, Regional Nutrition Advisor for the UN World Food Programme in Central America, based in Panama, and Aarón Lechtig, President of the International Agency for Food Security and Nutrition, from Peru. Jury members were Irwin Rosenberg, Director and Professor of Nutrition at Tufts University, Joachim von Braun, Director of the Center for Development Research, and Professor for Economic and Technological Change at the University of Bonn (and former Director General of the International Food Policy Research Institute), Werner Schultink, Chief of Nutrition at UNICEF, Noel Solomons, Scientific Director of CeSSIAM, and Klaus Schümann, President of the Hildegard Grunow Foundation.

Both recipients of the award were honored for their work on model projects conducted independently in their relative countries to improve nutrition, living standards and the hygienic situation, and to investigate



Dr Ursula Gross, widow of the late Rainer Gross, congratulates the recipients of the first Rainer Gross Award, Aarón Lechtig and Angela Cespedes

the mutual supportive impact on physical and intellectual development and educational achievements in children. The evaluation of Peru's Good Start in Life program was published in 2009 (Lechtig A, et al. Decreasing stunting, anemia, and vitamin A deficiency in Peru: Results of the Good Start in Life Program. *Food Nutr Bull* 2009; 30: 37–48); the report on a strategy to ensure that social safety nets will decrease the prevalence of malnutrition and undernutrition (Cespedes A, et al) has been accepted for publication in the same journal.

In his remarks at the award ceremony, Dr Lechtig recounted how he first met Rainer Gross in Peru in 1968, and how he had been impressed by an idealistic German graduate student intent on providing practical solutions to the nutrition problems of the nation, and intent on someday returning to contribute to the train-

ing of Peruvian nutrition leaders. Then, reminiscing the second phase of their relationship from 2001, he remembered how a mature and seasoned Rainer Gross had returned to Peru, and had realized his three-decade aspiration by setting up the postgraduate course on public nutrition at the La Molina National Agrarian University in Lima.

Until his untimely death in 2006, Rainer Gross was in charge of the Department of Nutrition at UNICEF Headquarters in New York. He was devoted to investigating the impact of micronutrients on health, as well as the physical and mental development of children. Moreover he introduced a number of innovations to improve the micronutrient supply in Indonesia, Peru and Brazil. The Hildegard Grunow Foundation plans to present the Rainer Gross Award on a biennial basis, with the next one scheduled for 2012.

Source: media release,
Hildegard Grunow
Foundation

News in brief:

Vitamin A supplements save lives

The meta-analysis conducted by Imdad et al [1] provides an up-to-date assessment of the best-available evidence for vitamin A supplementation (VAS) as a low-cost, and easily administered way to reduce mortality, infections and blindness in children affected by vitamin A deficiency (currently about 190 million of those under five years of age). Convinced that large-scale supplementation can lead to substantial public health benefits, the World Health Organization (WHO) has recommended VAS for young children and pregnant or breastfeeding mothers since 1997.

The review evaluated 43 randomized controlled trials of prophylactic supplementation involving 215,633 community-dwelling, disease-free children aged between six months and five years. In seventeen trials, supplementation reduced deaths from all causes by 24%; seven trials reported a 28% reduction in deaths due to diarrhea. VAS reduced morbidity due to measles and diarrhea, but had no significant effect on mortality associated specifically with measles, respiratory disease and meningitis.

The authors conclude that VAS programs (currently in place in more than 70 countries) may be among the most cost-effective public health interventions available. Reducing mortality by 24% could save almost a million lives annually. They therefore strongly recommend continuing VAS in areas at risk of vitamin A deficiency until better, long-term solutions, such as food fortification, biofortification and improved access to a micronutrient-rich diet, are established.

1. Imdad A, Herzer K, Mayo-Wilson E, et al. Vitamin A supplementation for preventing morbidity and mortality in children from 6 months to 5 years of age. *Cochrane Database of Systematic Reviews* 2010, Issue 12.

Vitamin D deficiency a global threat

This review [1] evaluated published studies from six regions (Asia, Europe, Middle East and Africa, North America, Latin America and Oceania) to provide a global perspective of vitamin D status, and to identify common and significant determinants of hypovitaminosis D.

The authors confirm that maintaining an adequate vitamin D status is important for calcium homeostasis and bone mineralization, and that vitamin D might also play a role in other physiological and disease processes, such as muscle strength, blood pressure, psoriasis, multiple sclerosis, diabetes and certain forms of cancer. Vitamin D status is usually established by measuring blood levels of the precursor 25-hydroxyvitamin D [25(OH)D]. Although there is currently no standard definition of an optimal status, levels between 50 nmol/L and 75 nmol/L have been proposed. Severe hypovitaminosis D (below 25 nmol/L) is associated with rickets in infancy and osteomalacia in adults.

After presenting details of surveys conducted in the various regions, the authors conclude that suboptimal 25(OH)D levels are a global phenomenon with hardly any region spared. This should be considered as a major cause for concern. Prevalence and degree of hypovitaminosis D depend on a wide range of factors, such as skin pigmentation, sunlight exposure, diet and age. Prevention strategies include vitamin D supplementation, increasing exposure to UV radiation and improving dietary intake (e.g. through food fortification or eating fatty fish).

1. Mithal A, Wahl DA, Bonjour J-P, et al. (on behalf of the International Osteoporosis Foundation Committee of Scientific Advisors Nutrition Working Group). Global vitamin D status and determinants of hypovitaminosis D. *Osteoporos Int* 2009; 20: 1807–1820.

Calcium and vitamin D reference intakes updated

Do calcium and vitamin D play a role in preventing cancer, cardiovascular disease, hypertension, diabetes and other disorders? How much should we consume to ensure good health? To help clarify these issues, the US Institute of Medicine (IOM) set up an expert committee to review the evidence, and update the Dietary Reference Intakes (DRI) [1].

In the previous edition of Dietary Reference Intakes (1997) there was insufficient scientific evidence available to calculate an Estimated Average Requirement (EAR), so an Adequate Intake (AI) was set instead. Since then, a strong body of evidence from rigorous testing has developed, and the committee was able to assess more than 1000 studies before setting the EAR and RDA for these nutrients.

On the basis of this evidence, the committee set the EAR for calcium at the following levels: 1–3 years old: 500 mg/day; 4–8 years old: 800 mg/day; 9–18 years: 1100 mg/day; 19–70 years: 800 mg/day; women over 50 and men over 70 years: 1000 mg/day; during pregnancy and lactation, depending on age: 1100 or 800 mg/day. The new EAR for vitamin D (assuming minimal sun exposure) is 400 IU (or 10 µg) daily, although people aged over 70 may need 800 IU. The Tolerable Upper Intake Levels (UL) for calcium are still in the range of 2000–3000 mg/day; those for vitamin D are now at 4000 IU/day for all individuals over 9 years of age (double the earlier recommendation).

Following their exhaustive review, the committee decided that the evidence supports a role for calcium and vitamin D in bone health, but not in other health conditions. It concludes that most Americans and Canadians consume adequate amounts of these nutrients (often in the form of supplements or fortified foods), while emerging evidence suggests that the risk for harm begins to increase when intakes of vitamin D surpass 4000 IU daily.

I. A. Catharine Ross, Christine L. Taylor, Ann L. Yaktine and Heather B. Del Valle, Editors. Dietary Reference Intakes for Vitamin D and Calcium. Institute of Medicine, 2010. ISBN: 0-309-16395-1. (<http://www.nap.edu>)

B supplements slow dementia progress

Brain atrophy is a normal process of old age. Studies have shown however, that cognitive decline, and thus the risk of developing dementia and Alzheimer's disease, is increased in people with moderately elevated levels of homocysteine. To determine whether lowering the level of plasma total homocysteine can slow the rate of brain atrophy, Smith et al. [1] conducted a double-blind, controlled supplementation trial in elderly (over 70 years of age) with mild cognitive impairment. The main outcome measure was the change in rate of brain

atrophy assessed by magnetic resonance imaging (MRI) scans at the start and end of the study.

Following the initial MRI scan, 85 of the trial participants took a daily supplement containing 0.8 mg folic acid, 20 mg vitamin B6 and 0.5 mg vitamin B12 for 24 months; 83 took an identical-looking placebo. The group that received the active supplement showed a significantly lower annual mean rate of brain atrophy than the placebo group (0.76% vs. 1.08%). Individuals with the highest homocysteine levels (more than 13 micromol/L) achieved the greatest benefit from supplementation. The rate of cognitive decline was directly related to the rate of atrophy.

The authors conclude that, by lowering plasma homocysteine levels, supplementation with B vitamins can slow the accelerated rate of brain atrophy in elderly with mild cognitive impairment.

I. Smith AD, Smith SM, de Jager CA, et al. Homocysteine-Lowering by B Vitamins Slows the Rate of Accelerated Brain Atrophy in Mild Cognitive Impairment: A Randomized Controlled Trial. PLoS ONE 2010; 5(9): e12244. (<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0012244>)

Fortified milk improves child growth

To evaluate the impact of feeding fortified milk on growth, anemia and iron status, Sazawal et al. [1] randomly allocated 633 children (1–4 years of age) from poor families in India to receive either milk fortified with zinc, iron, selenium, copper, and vitamins A, C and E, or control milk without added micronutrients. Mothers were instructed to give three portions of milk daily for one year in addition to the normal diet. Hematological parameters were measured at the start and end of the study.

Children fed fortified milk grew significantly faster (weight increase 2.13 kg/year; height increase 8.6 cm/year) than those fed standard milk (1.92 kg/year and 8.1 cm/year, respectively). They also showed greater increases in hemoglobin and serum ferritin levels, and had a significantly lower risk of iron deficiency anemia. Compliance was similar in both groups (85%).

This study provides evidence that feeding milk fortified with critical micronutrients can have a similar or better effect on growth, anemia and iron status of preschool children than supplementation.

I. Sazawal S, Dhingra U, Dhingra P, et al. Micronutrient Fortified Milk Improves Iron Status, Anemia and Growth among Children 1–4 Years: A Double Masked, Randomized, Controlled Trial. PLoS ONE 2010; 5(8): e12167. (<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0012167>)

Events:

7th Asia Pacific Conference on Clinical Nutrition, June 5–9, 2011, Bangkok, Thailand.

This 5-day conference will provide fascinating insights, the most up-to-date multidisciplinary scientific knowledge, and practical know-how on a wide range of topics (enteral/parenteral nutrition; clinical nutrition in inflammatory diseases, allergy and immunology; nutrients in clinical practice, dietary supplements and nutraceuticals in clinical nutrition; clinical nutrition and metabolism; infant formulas in clinical practice, and clinical nutrition in pediatrics, etc).

For further information, please contact: c/o Kenes Asia, 2nd Floor, PICO Creative Centre, 20 Kallang Avenue, Singapore 339411. Tel: +65 6292 4706; Fax: +65 6292 4721. E-mail: apccn2011@kenes.com; web site: <http://www.apccn2011.org>

Symposium of Micronutrients—from Past Experiences to Current Challenges, June 13, 2011, Washington, DC.

A2Z, the USAID Micronutrient and Child Blindness Project, is convening a special symposium to examine more than 20 years of experiences with similar projects in many countries of the world, as well as to discuss priorities and adjustments to face the current challenges of food security and public health nutrition worldwide. This activity, free of charge but requiring prior registration, takes place one day before the meeting of the Global Health Council.

For further information, please contact: Morgan Hillenbrand, A2Z/AED. Email: mhillebrand@aed.org; web site: www.a2zproject.org

14th International Meeting on Trace Elements in Man and Animals, September 19–24, 2011, Enshi, China.

According to the theme: “Meeting in selenium-rich Enshi; exploring trace elements: science, innovation and application”, TEMA-14 plans to highlight the latest discoveries in trace element research, stimulate translational research and enhance disciplinary impacts, renew and expand the world forum for idea exchange and research collaboration, and explore unique bio-sources of trace elements with authentic culture and splendid geography. Enshi, the “selenium capital of China” in Hubei Province, is located 470 km west of the province capital, Wuhan.

For further information, please contact: Junquan Gao General-Secretariat, TEMA 14 Office; Fax: 86718-8211869; E-mail: tema14_china@sina.com; web site: <http://www.tema14.org>

11th Conference of the International Society of Trace Element Research in Humans, October 16–21, 2011, Belek (Antalya), Turkey.

This conference will present findings from all aspects of trace element research relevant to human health: nutrition and diet, public health, diseases, toxicity, environment, metabolic research, genetics and genomics, analysis, and speciation and modeling. Deadline for abstract submission: June 1, 2011.

For further information, see the ISTERH web site at: <http://www.isterh.com>

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