IAEA Technical Meeting
on
‘The Role of Nuclear Techniques to Tackle Nutritional Challenges in the 21st Century’
(EVT2103664)
10 – 13 October 2023
IAEA Headquarters, Vienna, Austria
Main Room: M5

Agenda

Tuesday, 10 October 2023

9:00 – 9:05  Welcome remarks
Ms May Abdel -Wahab, Director, Division of Human Health, IAEA

9:05 – 9:45  Introduction of participants
Overview of IAEA-supported nuclear work in nutrition over the last decades
Background and rationale, objectives and expected outcomes
Ms Cornelia Loechl, Nutritional and Health-Related Environmental Studies Section, IAEA

Opening Session  Advancing nutrition research and global health with nuclear techniques
Chair: Ms Cornelia Loechl, IAEA

9:45 – 10:25  Untangling the double burden of malnutrition: biological and environmental interactions (20 min)
Mr Daniel Hoffman, Rutgers University, USA

Use of stable isotopes to evaluate interventions combatting the double burden of malnutrition (20 min)
Mr Jonathan Wells, University College London, UK (recorded presentation)

10:25 – 10:45  Present nutrition challenges: additional complexities for stable isotope investigations
Mr Anura Kurpad, St. John’s Medical College, India
10:45 – 11:00 Coffee Break

11:00 – 11:20 Precision nutrition for low- and middle-income countries: Is it a relevant approach to address nutrition challenges?
Mr Klaus Kraemer, Sight and Life, Switzerland

11:20 – 11:40 Understanding the contribution of gut function and the microbiome in addressing nutritional challenges
Mr Paul Kelly, University of Zambia, Zambia (via Webex video)

11:40 – 13:00 Lunch Break

13:00 – 13:20 Leveraging stable isotope techniques to inform on body composition and nutritional status across the life stages and from research to bedside
Ms Dympna Gallagher, Columbia University, USA (via Webex video)

13:20 – 14:20 Opening Session Discussion

Session One Use of nuclear techniques to understand micronutrient bioavailability and status

Chair: Ms Nancy Krebs, University of Colorado, USA

14:20 – 14:40 Nutrient bioavailability in the context of whole diets
Ms Alida Melse-Boonstra, Wageningen University, The Netherlands

14:40 – 14:50 Discussion

14:50 – 15:10 Coffee Break

15:10 – 16:00 Single nutrient bioavailability
Novel or underutilized stable isotope methods to assess nutrient bioavailability and status (20 min)
Mr Kerry Jones, University of Cambridge, UK

Insights on vitamin B12 absorption, excretion and requirements from 13C-cyanocobalamin tracer studies (10 min)
Mr Anura Kurpad, St. John’s Medical College, India

Folate, thiamine and vitamin B6 – opportunities for stable isotope methods to assess bioavailability and nutrient requirements (20 min)
Ms Yvonne Lamers, University of British Columbia, Canada

16:00 – 16:30 Discussion

16:30 – 16:50 Biomarkers of dietary exposure – examining changing sources of sugar intake using stable isotopes
Ms Anne Hope Jahren, University of Oslo, Norway

16:50 – 17:50 Session One Discussion and Wrap-up of Day One
Wednesday, 11 October 2023

### Session Two

**Use of nuclear techniques for the assessment of nutrient flux and metabolic processes to inform nutrient requirements and dietary recommendations**

**Chair:** Mr Anura Kurpad, St. John’s Medical College, India

**9:00 – 9:40**

*Isotope-assisted metabolomics & precision nutrition*

Interrelationships between protein and carbohydrate flux *(20 min)*

**Ms Claire Gaudichon**, AgroParisTech, France

De novo lipogenesis and lipid flux/omics in health and disease: precision nutrition applications *(20 min)*

**Ms Stephanie Chung**, National Institutes of Health, USA

**9:40 – 10:10**

Discussion

**10:10 – 10:30**

Coffee Break

**10:30 – 11:45**

*Nutrient requirements*

Isotope methods to estimate micronutrient requirements: how to best represent diverse populations? *(25 min)*

**Ms Nancy Krebs**, University of Colorado, USA

The use of stable isotope methodology to assess optimal dietary protein and amino acid intake *(20 min)*

**Mr Robert Wolfe**, University of Arkansas, USA *(via Webex video)*

Dietary energy requirements across the lifespan *(20 min)*

**Ms Susan Roberts**, Dartmouth College, USA *(via Webex video)*

Revisiting energy requirements in sedentary Thai adults: insights from isotope studies and implications for national nutrient recommendations *(10 min)*

**Ms Pattanee Winichagoon**, Mahidol University, Thailand

**11:45 – 12:00**

Discussion

**12:00 – 13:00**

Lunch

**13:00 – 13:15**

Precision nutrition efforts at the US National Institutes of Health

**Ms Maren Laughlin**, National Institutes of Health, USA *(via Webex video)*

**13:15 – 14:00**

Session Two Discussion
**Session Three**  
Use of nuclear techniques in clinical nutrition assessments

**Chair:** Mr John Shepherd, University of Hawaiʻi, USA

14:00 – 14:20  
The European Guidelines on $^{13}$C breath tests: background of clinically established tests  
**Mr Heinz Hammer,** Medical University of Graz, Austria

14:20 – 14:30  
Discussion

14:30 – 15:00  
Coffee Break

15:00 – 16:00  
**Breath tests for screening, diagnosis and treatment of NCDs**  
The potential bench-to-beside translation of metabolic $^{13}$C-breath tests in assessing disease progression in nutrition and cancer *(20 min)*  
**Mr Paul Afolabi,** University of Southampton, UK

$^{13}$C substrate tests for effective breast and stomach cancer diagnosis *(20 min)*  
**Mr Faisal Rasheed,** Pakistan Institute of Nuclear Science and Technology, Pakistan

A breath of fresh air: New $^{13}$C stable-isotope breath tests for gastrointestinal function & dysfunction *(20 min)*  
**Mr Roger Yazbek,** Flinders University, Australia

16:00 – 16:30  
Discussion

16:30 – 16:50  
Use of nuclear imaging techniques in sarcopenic obesity in cancer: role of body composition in cancer treatment and survival  
**Ms Carla Prado,** University of Alberta, Canada *(via Webex video)*

16:50 – 17:00  
Discussion

17:00 – 18:00  
**Round Table Discussion:** The way forward on the use of nuclear techniques in clinical nutrition  
**Moderator:** Ms Alexia Alford, IAEA

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**Thursday, 12 October 2023**

**Session Four**  
Technological considerations for the future of nuclear research in nutrition

**Chair:** Mr Tom Preston, University of Glasgow, UK

9:00 – 9:40  
The availability of advanced analytical platforms for nuclear research  
Recent developments in instrumentation for nutritional applications of stable isotope tracers *(20 min)*  
**Mr Tom Preston,** University of Glasgow, UK
Single-cell chemical imaging approaches to uncover gut microbiome nutrient preferences (*20 min*)
Ms Fatima Pereira, University of Southampton, UK

9:40 – 10:00 Discussion

10:00 – 10:30 Coffee Break

10:30 – 11:10 The availability of advanced analysis methods for nuclear research
Use of model-based compartmental analysis (MBCA) to study vitamin A kinetics during lactation using *in-silico* subjects (*20 min*)
Ms Veronica Lopez-Teros, Universidad de Sonora, Mexico

Use of artificial intelligence to predict the risk of nutrition-related disease (*20 min*)
Mr John Shepherd, University of Hawai‘i, USA

11:10 – 11:30 Discussion

11:30 – 12:00 Session Four Discussion

12:00 – 13:30 Lunch

Session Five  **Translating the research and science to practice**

Chair: Mr Daniel Hoffman, Rutgers University, USA

13:30 – 14:30 Panel Discussion: Optimizing the pipeline of nuclear techniques for use in nutrition

**Moderator:** Mr Victor Owino, IAEA
Mr Hassan Aguenou, Ibn Tofail University, Morocco
Mr Kenneth Brown, University of California, Davis, USA
Mr Ullas Kolthur, Tata Institute of Fundamental Research, India
Ms Veronica Lopez-Teros, Universidad de Sonora, Mexico
Ms Pattanee Winichagoon, Mahidol University, Thailand

14:30 – 15:00 Coffee Break

15:00 – 16:00 Panel Discussion: Strengthening the use of nuclear techniques in nutrition, a capacity building perspective

**Moderator:** Ms Pernille Kaestel, IAEA
Mr Hassan Aguenou, Ibn Tofail University, Morocco
Mr Tahmeed Ahmed, International Centre for Diarrhoeal Disease Research, Bangladesh
Mr Anura Kurpad, St. John’s Medical College, India
Ms Germana Leyna, Tanzania Food and Nutrition Centre, Tanzania
16:00 – 17:00  Synergistic strategies to address nutritional challenges using nuclear techniques  
**Moderator:** Mr Daniel Hoffman, Rutgers University, USA

17:00 – 17:30  Discussion and Wrap-up of Day Three

19:00  **Self-contributory Group Dinner**

**Friday, 13 October 2023**

9:00 – 10:00  Panel Discussion: Strengthening the use of nuclear techniques in nutrition, a programmatic perspective  
**Moderator:** Ms Cornelia Loechl, IAEA  
**Mr Mohamed Baro,** UNICEF Mauritania (*via Webex video*)  
**Ms Saskia de Pee,** World Food Programme, HQ (*via Webex video*)  
**Mr Klaus Kraemer,** Sight and Life, Switzerland  
**Ms Germana Leyna,** Tanzania Food and Nutrition Centre, Tanzania  
**Ms Angela de Silva,** World Health Organization, Southeast Asia (*via Webex video*)

10:00 – 10:30  Coffee Break

10:30 – 11:30  Educational materials and training opportunities to advance nuclear research in nutrition  
**Mr Arthur Colaco Pires de Andrade,** IAEA  
**Mr Robert Wolfe,** University of Arkansas, USA

11:30 – 12:30  Panel Discussion: The continuation of using nuclear techniques for the future of nutrition  
**Moderator:** Ms Shruti Shertukde, IAEA  
**Mr Tahmeed Ahmed,** International Centre for Diarrhoeal Disease Research, Bangladesh  
**Mr Kenneth Brown,** University of California, Davis, USA  
**Ms Nancy Krebs,** University of Colorado, USA  
**Ms Veronica Lopez-Teros,** Universidad de Sonora, Mexico  
**Ms Susan Roberts,** Dartmouth College, USA  
**Mr Robert Wolfe,** University of Arkansas, USA

12:30 – 13:30  Lunch

13:30 – 14:00  Closing Remarks

14:00  End of the Meeting