



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

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 (<i>via Webex video</i>)
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 (<i>via Webex video</i>)
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	<u>Single nutrient bioavailability</u> Novel or underutilized stable isotope methods to assess nutrient bioavailability and status (<i>20 min</i>) Mr Kerry Jones , University of Cambridge, UK
	Insights on vitamin B ₁₂ absorption, excretion and requirements from ¹³ C-cyanocobalamin tracer studies (<i>10 min</i>) Mr Anura Kurpad , St. John's Medical College, India
	Folate, thiamine and vitamin B ₆ – opportunities for stable isotope methods to assess bioavailability and nutrient requirements (<i>20 min</i>) 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

18:00 **Reception**

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 Hawai‘i, USA

- 14:00 – 14:20 The European Guidelines on ¹³C 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 ¹³C-breath tests in assessing disease progression in nutrition and cancer (20 min)
Mr Paul Afolabi, University of Southampton, UK
- ¹³C 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 ¹³C 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

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	<u>The availability of advanced analysis methods for nuclear research</u> Use of model-based compartmental analysis (MBCA) to study vitamin A kinetics during lactation using <i>in-silico</i> 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	<u>Panel Discussion:</u> Optimizing the pipeline of nuclear techniques for use in nutrition Moderator: Mr Victor Owino, IAEA Mr Hassan Aguentaou , 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	<u>Panel Discussion:</u> Strengthening the use of nuclear techniques in nutrition, a capacity building perspective Moderator: Ms Pernille Kaestel, IAEA Mr Hassan Aguentaou , 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