

ISC 2023 Toyama Scientific Program

	7/9 (Sun)		7/10 (Mon)		7/11 (Tue)		7/12 (Wed)	7/13 (Thu)		7/14 (Fri)							
8			OPENING, ICS AWARD CEREMONY* 8:00-9:00		Plenary Lectures* 8:30-10:00 by X.-D. Wang & J.-R. Shen		ICS General Meeting* 8:30-8:45	Plenary Lectures* 8:30-10:00 by P. Fraser & S. Al-babili		Plenary Lectures* 8:30-10:00 by J. von Lintig & E. Johnson	8						
9			Plenary Lecture* 9:00-9:45 by N. Misawa				Plenary Lecture* 8:45-9:30 by B. Robert				9						
Coffee Break			Coffee Break														
10			SESSION 1* Genetics, Biosynthesis and Metabolism		SESSION 2** New Trends of Carotenoid Science		Coffee Break		Plenary Lectures* 10:00-10:45 by R. Sliwka	Coffee Break		Coffee Break	10				
11							SESSION 4* Photochemistry Photophysics and Photosynthesis		SESSION 5** Chronic Disease Prevention and Treatment		Special Lecture* 10:45-11:30 by R. Cogdell	SESSION 8* Plant Carotenoids		SESSION 9** Food, Nutrition and Epidemiology		Awards, Poster Awards and Presentations and Closing Ceremony* 10:30-12:00	11
12							LUNCHEON SEMINAR - I** 12:15-13:45 Sponsored by Fuji Chemical Industries Co., Ltd.		LUNCHEON SEMINAR - II** 12:30-14:00 Sponsored by BASF SE		LUNCHEON SEMINAR - III** 11:30-13:00 Sponsored by Abbott Nutrition	LUNCHEON SEMINAR - IV** 12:30-14:00 Sponsored by DSM Nutritional Products			12		
13					EXCURSION 13:00-18:00	LUNCHEON SEMINAR - IV** 12:30-14:00 Sponsored by DSM Nutritional Products		13									
14			SESSION 3* Astaxanthin Symposium (incl. Plenary Lecture by Y. Naito) 13:45-16:15			SESSION 6* Carotenoid Metabolism and Function		SESSION 7** Chemistry and Analysis		SESSION 10* Carotenoids in the Eye and Brain		SESSION 11** Biotechnology and Industrial Production			14		
15	POSTER SESSION / MIXER*** 16:15-18:00					GROUP PHOTO 16:00-16:30		POSTER SESSION / MIXER*** 16:00-18:00				15					
16						POSTER SESSION / MIXER*** 16:30-18:00						16					
17										17							
18	RECEPTION 14:00- Young Investigator Forum** 15:00-18:00		SUN-SET SEMINAR - I** 18:00-19:30 Sponsored by OmniActive Health Technologies, Inc.		ICS Council Meeting & Dinner# 18:00-21:00						18						
19							BANQUET# 18:30-20:30			19							
20										20							

* 3F Main Hall

** 2F Satellite Hal

*** 1F Gallery

ANA Crowne Plaza Hotel Toyama

SYMPOSIUM PROGRAMME

Sunday 9th July

14:00 ~ Reception

15:00~18:00 Young Investigator Forum

18:30 ~ 20:30 Welcome Mixer (Gallery)

Monday 10th July

8:00 ~ 9:00 Opening, ICS Award Ceremony (Main Hall)

Plenary Lecture (Main Hall)

Session1: Genetics, Biosynthesis and Metabolism

~In memory of Prof. Brian H. Davies~

Chair: Gerhard Sandmann (Germany)

9:00 ~ 9:45 1P

Norihiko Misawa (Japan)

E. coli as the tool of functional analysis for carotenogenic genes

9:45 ~ 10:15 Coffee break

Parallel Sessions 1 & 2

Session1: Genetics, Biosynthesis and Metabolism

~In memory of Prof. Brian H. Davies~ (Main Hall)

Chair: Norihiko Misawa (Japan)

10:15 ~ 10:30 Prof. Norihiko Misawa: A lifetime of carotenoid excellence and achievements
Paul Fraser & Gerhard Sandmann

10:30 ~ 10:50 1I-1

Lourdes Gomez-Gomez (Spain)

Crocins in plants: much more beyond saffron

10:50 ~ 11:10 1I-2

Matsubara Shizue (Germany)

Carotenoid turnover in leaves studied by ¹³CO₂ labeling and LC-MS

- 11:10 ~ 11:30 1I-3
Torbert Rocheford (USA)
 Biofortification breeding for higher levels of macular carotenoids and provitamin A carotenoids in maize grain: An Update
- 11:30 ~ 11:45 1O-1
Susanne Baldermann (Germany)
 Metabolic responses and regulation of carotenoid and flavonoid biosynthetic pathways in lettuce (*Lactuca sativa*) in protected cultivation
- 11:45 ~ 12:00 1O-2
Li Li (USA)
 A novel regulatory mechanism to synchronize photosynthetic pigment synthesis in plants
- 12:00 ~ 12:15 1O-3
Maria J. Rodrigo (Spain)
 Color diversity in fruits of ancestral *Citrus* species: A comparative study of carotenoid metabolism during maturation

Session 2: New Trends of Carotenoids Science

(Satellite Hall)

Chair: Bruno Robert (France)

- 10:15 ~ 10:35 2I-1
John Erdman (USA)
 Is lutein ready for public health dietary recommendations?
- 10:35 ~ 10:55 2I-2
Laurent Dufossé (France)
 So many international symposia on carotenoids (19!!), so few industrially produced carotenoids... What are the problems?
- 10:55 ~ 11:15 2I-3
Manuel Rodriguez-Concepcion (Spain)
 Novel approaches to produce and store carotenoids in plant cells
- 11:15 ~ 11:35 2I-4
Sherry Tanumihardjo (USA)
 Bioefficacy of nixtamalized high β -cryptoxanthin biofortified maize and a novel β -cryptoxanthin supplement
- 11:35 ~ 11:50 2O-1
Daisuke Umeno (Japan)
 Breaking symmetry: laboratory evolution of carotenoid pathways to explore extra-natural space of carotenoid functions

11:50 ~ 12:05 2O-2

Sangho Koo (Korea)

Conductance control in the carotenoid molecular wires by phenyl substituents

12:15 ~ 13:45 Luncheon Seminar

Sponsored by Fuji Chemical Industries Co., Ltd. (Satellite Hall)

“Measuring Health: Future Considerations for Nutrition Research”

Panelists:

Jennifer Lovejoy (Translational Science at the Institute for Systems Biology (ISB), USA)

Suzan Wopereis (TNO, Netherland)

John Nolan (Nutrition Research Centre Ireland (NRCI), Ireland)

Vincent Wood (AstaReal Pte. Ltd., Singapore (Modertor))

Karen Hecht (AstaReal Inc., USA (Modertor))

Session 3: Astaxanthin Symposium

(Main Hall)

Chair: Takashi Maoka (Japan)

13:45 ~ 14:30 3P

Yuji Naito (Japan)

Interventions against gut frailty lead to healthy longevity

Chair: Yuji Naito (Japan)

14:35 ~ 14:55 3I-1

Allah Nawaz (USA)

Astaxanthin treatment improves endurance and ameliorates insulin resistance in the muscle of obese mice.

14:55 ~ 15:15 3I-2

Wataru Aoi (Japan)

The potential role of astaxanthin in metabolic health and exercise performance

15:15 ~ 15:35 3I-3

Mark Miller (USA)

Why is astaxanthin a perfect dietary supplement?

15:35 ~ 15:55 3I-4

Takashi Maoka (Japan)

Astaxanthin: Discovery, history, and distribution in nature

15:55 ~ 16:10 3O-1

Caroline Autenrieth (Germany)

A new modular expression platform for the high-level production of hydroxy- or ketocarotenoids in the purple photosynthetic bacterium *R. rubrum*

16:15 ~ 18:00 Poster session & Mixer (Gallery)

18:00 ~ 19:30 Sunset seminar

Sponsored by OmniActive Health Technologies, Inc. (Satellite Hall)

“Macular Carotenoids and the Eye-Brain Connection: A Panel Discussion on the Evolving Basic Science, Clinical Translation and Product Innovation Landscapes”

Panelists:

Paul Bernstein (University of Utah, USA)

Rudarani Banik (Ichan School Medicine, USA)

Dan Stein (Bausch & Lomb, Canada)

Deshanie Rai (OmniActive Health Technologies, USA (Moderator))

Tuesday 11th July

Plenary Lectures (Main Hall)

Session 5: Chronic Disease Prevention and Treatment

Chair: Jaume Amengual (USA)

8:30 ~ 9:15 5P

Xiang-Dong Wang (USA)

Mechanistic understanding of carotenoid benefits against chronic diseases

Session 4: Photochemistry, Photophysics and Photosynthesis

~In memory of Prof. Yasushi Koyama~

Chair: Hideki Hashimoto (Japan)

9:15 ~ 10:00 4P

Jian-Ren Shen (Japan)

Binding patterns and functions of fucoxanthin and related pigments in photosynthesis

10:00 ~ 10:30 Coffee break

Parallel Sessions 4 & 5

Session 4: Photochemistry, Photophysics and Photosynthesis

~In memory of Prof. Yasushi Koyama~

(Main Hall)

Chair: Hideki Hashimoto (Japan)

10:30 ~ 10:50 4I-1

Tomáš Polívka (Czech Republic)

Relation between carotenoid structure and spectroscopy: Implications for function of carotenoids in photosynthesis

10:50 ~ 11:10 4I-2

Daisuke Kosumi (Japan)

Photophysics in natural and artificial carbonyl carotenoids

11:10 ~ 11:30 4I-3

Jian-Ping Zhang (China)

Chlorophyll excitation quenching dynamics of the light harvesting complex II from the marine green alga *Bryopsis corticulans*

- 11:30 ~ 11:45 4O-1
Constantinos Varotsis (Cyprus)
 Probing the fucoxanthin-chlorophyll *a/c*-binding proteins (FCPs) of the marine diatom *Fragilariopsis sp* by resonance Raman, FTIR, and fluorescence spectroscopy
- 11:45 ~ 12:00 4O-2
Vaclav Sebelik (Czech Republic)
 Radical cation formation during the two-photon excitation of β -Apo-8'-carotenal
- 12:00 ~ 12:15 4O-3
Soichiro Seki (Japan)
 Structures of siphonaxanthin and its acyl ester in marine green algal light-harvesting complex II
- 12:15 ~ 12:30 4O-4
Valentyna Kuznetsova (Czech Republic)
 New insights into carotenoids higher electronic states dynamics

Session 5: Chronic Disease Prevention and Treatment

(Satellite Hall)

Chair: Xiang-Don Wang (USA)

- 10:30 ~ 10:50 5I-1
Jaume Amengual (USA)
 Tissue-specific expression of BCO1 and its implication in cardiometabolic disease
- 10:50 ~ 11:10 5I-2
Tatsuya Sugawara (Japan)
 Potential of siphonaxanthin for disease control and prevention
- 11:10 ~ 11:30 5I-3
M. Luisa Bonet (Spain)
 Early-life metabolic programming by micronutrients and food bioactives with special focus on preformed vitamin A and beta-carotene: insights from murine models
- 11:30 ~ 11:45 5O-1
Yoav Sharoni (Israel)
 Mechanisms involved in the protective effect of carotenoids and estradiol in human skin cells under mitochondrial oxidative stress

11:45 ~ 12:00 5O-2

Nicole Stringham (USA)

Lutein, zeaxanthin, and meso-zeaxanthin supplementation attenuates markers of systemic inflammation and oxidative cardiovascular processes

12:00 ~ 12:15 5O-3

Hoyoku Nishino (Japan)

Carotenoids as health promoting natural gifts

12:15 ~ 12:30 5O-4

Marina Green (Ireland)

Targeted nutrition with xanthophyll carotenoids and reduced cardiometabolic risk: A randomised double-blind placebo-controlled study

12:30 ~ 14:00 Luncheon Seminar

Sponsored by BASF SE (Satellite Hall)

“Why and how to fortify with carotenoids?”

Panelists:

Ute Obermueller-Jevic (BASF SE, Germany)

Wolf Pelletier (BASF SE, Germany)

Cosima Hirschberg (BASF A/S, Denmark)

Christian Koepsel (BASF SE, Germany)

Parallel Sessions 6 & 7

Session6: Carotenoid Metabolism and Function

(Main Hall)

Chair: Johannes von Lintig (USA)

14:00 ~ 14:20 6I-1

Loredana Quadro (USA)

Mechanisms of carotenoid transport across the maternal-fetal barrier

14:20 ~ 14:40 6I-2

T. Michael Redmond (USA)

Structural and functional role of cysteine palmitoylation in mammalian carotenoid cleavage dioxygenases

14:40 ~ 15:00 6I-3

Philip Kiser (USA)

Structure-function studies of a carotenoid isomeroxygenase reveal mechanistic diversity in the synthesis of 11-*cis*-retinoids for animal vision

- 15:00 ~ 15:20 6I-4
Jessica Cooperstone (USA)
 Integrating multi-omics techniques towards understanding metabolism and the health effects of carotenoids
- 15:20 ~ 15:35 6O-1
Naoki Takatani (Japan)
 Identification and tissue distribution of fucoxanthin-derived novel metabolites
- 15:35 ~ 15:50 6O-2
Anthony Miller (USA)
 Exploring the role of HDL in carotenoid efflux and delivery to tissues

Session 7: Chemistry and Analysis

~In memory of Prof. Takao Matsuno, Prof. Synnøve Liaaen Jensen and
 Prof. Kurt Bernhard~

(Satellite Hall)

Chair: Richard Sliwka (Norway)

- 14:00 ~ 14:20 7I-1
Takashi Maoka (Japan)
 My chemical and biochemical studies of natural carotenoids during 45 years
- 14:20 ~ 14:40 7I-2
Daniele Giuffrida (Italy)
 Apocarotenoids determination in Capsicum species and biological fluids by supercritical fluid extraction-supercritical fluid chromatography-triple quadrupole/mass spectrometry
- 14:40 ~ 15:00 7I-3
Kazutoshi Shindo (Japan)
 Structural analyses of the compounds produced by acidic treatment of epoxycarotenoids (violaxanthin, 9-*cis*-violaxanthin, antheraxanthin, and 9-*cis*-antheraxanthin), and the antioxidant activities of epoxycarotenoids and the acid treatment products.
- 15:00 ~ 15:15 7O-1
Sangho Koo (Korea)
 Rapid assembly of carotenoids of phenyl, phenolic, and acyl end groups with superior antioxidant activities

15:15 ~ 15:30 7O-2

Ryuju Suzuki (Japan)

Analysis of optical properties of carotenoid nanoparticles by considering molecular softness

15:30 ~ 15:45 7O-3

Veronika Nagy (Hungary)

Effect of the aggregation behaviour on the antioxidant capacity of carotenoids

15:45 ~ 16:00 7O-4

A. Ligia Focsan (USA)

Chemistry of carotenoid radicals and complexes: A compilation of tens of years of research

16:00 ~ 16:30 Group Photo

16:30 ~ 18:00 Poster session & Mixer (Gallery)

18:00 ~ 21:00 ICS Council Meeting & Dinner (ANA Crowne Plaza Hotel Toyama)

Wednesday 12th July

8:30 ~ 8:45 ICS General Meeting (Main Hall)

Plenary Lecture (Main Hall)

Session 2: New Trends of Carotenoid Science

Chair: Richard J. Cogdell (UK)

8:45 ~ 9:30 2P

Bruno Robert (France)

Carotenoids: the plant toolbox

9:30 ~ 10:00 Coffee break

Plenary Lecture (Main Hall)

Session 7: Chemistry and Analysis

~In memory of Prof. Matsuno Takao, Prof. Synnøve Liaaen Jensen and
Prof. Kurt Bernhard~

Chair: Kazutoshi Shindo (Japan)

10:00 ~ 10:45 7P

Richard Sliwka (Norway)

Carotenoids – an account of arbitrary exclusion and subjective inclusion

Special Lecture (Main Hall)

Chair: Hideki Hashimoto (Japan)

10:45 ~ 11:30 SL

Richard J. Cogdell (UK)

Carotenoids in photosynthesis: unlikely molecules?

11:30 ~ 13:00 Luncheon Seminar

Sponsored by Abbott Nutrition (Satellite Hall)

“Lutein as a modulator of oxidative stress: implications to health and disease”

Panelist:

Elizabeth J. Johnson (Tufts University, USA)

13:00 ~ 18:00 Excursion

18:30 ~ 20:00 Banquet (ANA Crowne Plaza Hotel Toyama)

Thursday 13th July

Plenary Lectures (Main Hall)

Session 11: Biotechnology and Industrial Production ~In memory of Prof. Chengfu Zhu~

Chair: Norihiko Misawa (Japan)

8:30 ~ 9:15 11P

Paul Fraser (UK)

Plant cell factories for industrial and nutritional carotenoids

Session 8: Plant Carotenoids

Chair: Giuliano Casaccia (Italy)

9:15 ~ 10:00 8P

Salim Al-babili (Saudi Arabia)

Plant apocarotenoid formation: destruction for construction

10:00 ~ 10:30 Coffee break

Parallel Sessions 8 & 9

Session 8: Plant Carotenoids

(Main Hall)

Chair: Salim Al-babili (Saudi Arabia)

10:30 ~ 10:50 8I-1

Claudia Stange (Chile)

Illuminating carotenoid synthesis regulation in the carrot taproot grown underground

10:50 ~ 11:10 8I-2

Giovanni Giuliano (Italy)

Dissection of the saffron crocin biosynthesis pathway and its biotechnological applications

11:10 ~ 11:30 8I-3

Patricia Leon Mejia (Mexico)

Carotenoid derived signals and their impact in plant development

11:30 ~ 11:50 8I-4

Barry Pogson (Australia)

Carotenoids, apocarotenoid signals and plant development

11:50 ~ 12:05 8O-1

Alen Albreht (Slovenia)

Using renewable sources of xanthophylls to produce xanthophyll esters with improved physicochemical properties in a sustainable manner

Session 9: Food, Nutrition and Epidemiology

(Satellite Hall)

Chair: Sussanne Bolderman (Germany)

10:30 ~ 10:50 9I-1

Antonio J. Meléndez-Martínez (Spain)

Increasing the bioaccessibility of carotenoids by cooking practices.
Sustainability aspects

10:50 ~ 11:10 9I-2

Torsten Bohn (Luxembourg)

Dietary-derived factors influencing aspects of carotenoid bioavailability –
focus on protein-interactions

11:10 ~ 11:30 9I-3

Volker Böhm (Germany)

Photoprotection with food rich in carotenoids

11:30 ~ 11:45 9O-1

Masashi Morifuji (Japan)

Fermented milk containing high content of exopolysaccharide enhance
dietary carotenoid bioavailability in humans.

11:45 ~ 12:00 9O-2

Naomi Fitzpatrick (Australia)

Validation of dietary lutein and zeaxanthin screeners in healthy Australian
adults

12:00 ~ 12:15 9O-3

Mohammed Iddir (Luxembourg)

Whey- and soy protein isolates added to a carrot-tomato juice alter
carotenoid bioavailability in healthy adults

12:30 ~ 14:00 Luncheon Seminar

Sponsored by DSM Nutritional Products (Satellite Hall)

“Importance of Lutein throughout life stages”

Panelists:

Paul Bernstein (University of Utah, USA)

Lisa Renzi (University of Georgia, USA)

Christian Schaefer (DSM, Switzerland)

Parallel Sessions 10 & 11

Session 10: Carotenoids in the Eye and Brain

(Main Hall)

Chair: Elizabeth Johnson (USA)

14:00 ~ 14:20 10I-1

Akira Obana (Japan)

Application of the measurement of skin carotenoids by refractive spectroscopy, Veggie Meter.

14:20 ~ 14:40 10I-2

Billy Hammond (USA)

Functional effects of macular pigment density on the central nervous system

14:40 ~ 15:00 10I-3

Matthew Toomey (USA)

The mechanisms and meaning of ketocarotenoid-based signals in animals

15:00 ~ 15:20 10I-4

John Nolan (Ireland)

Macular carotenoids: Keeping an eye on vision and beyond!

15:20 ~ 15:40 10I-5

Paul Bernstein (USA)

Noninvasive screening for vitamin A deficiency in high-risk populations using skin carotenoid measurements

15:40 ~ 15:55 10O-1

Ana Maria Rodriguez Guerrero (Spain)

Brain regulation of gene expression by β -carotene and metformin: possible role in the control of energy metabolism and cognitive function

Session 11: Biotechnology and Industrial Production ~In memory of Prof. Chengfu Zhu~

(Satellite Hall)

Chair: Paul Fraser (UK)

14:00 ~ 14:20 11I-1

Briardo Llorente (Australia)

Multi-subcellular engineering for carotenoid production

14:20 ~ 14:40 11I-2

Daichi Kuwahara (Japan)

Industrial production of carotenoids using *Paraococcus carotinifaciens* and carotenoid applications for animal feed

14:40 ~ 15:00 11I-3
Gerhard Sandmann (Germany)
Metabolic engineering of xanthophyllomyces dendrorhous for the production of commercially interesting carotenoids and the generation of novel structures

15:00 ~ 15:20 11I-4
Tomohisa Hasunuma (Japan)
Dynamic metabolomics approach and engineering biology for microbial carotenoid production

15:20 ~ 15:35 11O-1
Paola Ferrante (Italy)
Nicotiana benthamiana as a cell factory for high value-added (apo)carotenoids

15:35 ~ 15:50 11O-2
Nadja-Alina Henke (Germany)
Perturbing native gene expression with a CRISPRi-library and application of a genetically encoded biosensor to study carotenogenesis

15:50 ~ 16:05 11O-3
Maiko Furubayashi (Japan)
Engineering novel retinal-related compounds through carotenoid pathway engineering and enzyme mutagenesis

16:10 ~ 18:00 Poster session & Mixer (Gallery)

Friday 14th July

Plenary Lectures (Main Hall)

Session 6: Carotenoid Metabolism and Function

Chair: Loredana Quadro (USA)

8:30 ~ 9:15 6P

Johannes von Lintig (USA)

Molecular components affecting carotenoid homeostasis in mammalian cells and tissues

Session 10: Carotenoids in the Eye and Brain

Chair: Paul Bernstein (USA)

9:15 ~ 10:00 10P

Elizabeth Johnson (USA)

Lutein and cognitive function throughout the lifespan: an update.

10:00 ~ 10:30 Coffee break

10:30 ~ 12:00 Awards, Poster Awards and Presentations and Closing Ceremony