# October 28 (Fri) STINT-JSPS Joint Symposium

10:30-10:40, October 28 (Fri)

**Opening Remarks** 

Masi Yamamoto

Tohoku University, Japan

### 10:40-11:25, October 28 (Fri)

Plenary Lecture 1

Chairperson: Masi Yamamoto (Tohoku University)

### PL1 Development of specific TXNRD1, GPX1 and GPX4 inhibitors Elias S.J. Amér<sup>1,2</sup>

<sup>1</sup>Division of Biochemistry, Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden, <sup>2</sup>Department of Selenoprotein Research, National Institute of Oncology, Budapest, Hungary

### 11:25-12:10, October 28 (Fri)

### **Plenary Lecture 2**

Chairperson: Masi Yamamoto (Tohoku University)

### PL2 Selenium biology and related diseases- Application to the pandemic counterplan

### Yoshiro Saito

Graduate School of Pharmaceutical Sciences, Tohoku University, Japan

### 12:10-13:00, October 28 (Fri)

Lunchtime

Venue A

Venue A

♀: online presentation

#### 13:00-15:00, October 28 (Fri)

### Session 1

Chairperson: Takafumi Suzuki (Tohoku University)

#### 13:00-13:30

#### S1?

### Multiplex profiling of cell type-specific expression of TrxR1 and Nrf2 in non-small cell lung cancer

Alfonso Martin-Bernabe<sup>1</sup>, Georgios Tsakonas<sup>1</sup>, Pablo Moreno-Ruiz<sup>1</sup>, Renata Papatella Araujo<sup>2</sup>, Linnéa La Fleur<sup>3</sup>, Johan Botling<sup>3</sup>, Carolina Wählby<sup>2</sup>, Patrick Micke<sup>3</sup>, Artur Mezheyeuski<sup>3</sup>, Elias Arner<sup>1</sup>, Simon Ekman<sup>1</sup>, <u>Arne Östman<sup>1</sup></u>

<sup>1</sup>Department of Oncology-Pathology, Karolinska Institutet, Stockholm, Sweden, <sup>2</sup>Department of Pharmaceutical Biosciences, Uppsala University, Uppsala, Sweden, <sup>3</sup>Department of Immunology, Genetics and Pathology, Uppsala University, Uppsala, Sweden

#### 13:30-14:00

### S2 The NRF2 response to irreparable damage

#### Liam Baird

Graduate School of Medicine, Tohoku University, Japan

#### 14:00-14:30

#### S3?

# NOX2 and immunity regulation through oxidation pathways in inflammation and cancer

### **Rikard Holmdahl**

Karolinska Institutet, Sweden

#### 14:30-15:00

### **S4**

# Recombinant selenoprotein production: A novel opportunity for redox biochemistry

Qing Cheng<sup>1</sup>, Elias S.J. Arnér<sup>1, 2</sup>

<sup>1</sup>Division of Biochemistry, Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden, <sup>2</sup>Department of Selenoprotein Research, National Institute of Oncology, Budapest, Hungary

Venue A

#### 15:00-15:20, October 28 (Fri)

#### Break

Venue A

# Redox Week 2022

### 15:20-17:20, October 28 (Fri)

### Session 2

Chairperson: Yoshiro Saito (Tohoku University)

#### 15:20-15:50

**S5** 

### Increased ion permeability of the plasma membrane through lipid peroxidation is essential for triggering of ferroptosis

### Yusuke Hirata

Laboratory of Health Chemistry, Graduate School of Pharmaceutical Sciences, Tohoku University, Japan

#### 15:50-16:20

### S6 Mitochondrial depletion of glutaredoxin 2 induces metabolic dysfunction-associated fatty liver disease in mice

<u>Lucia Coppo</u><sup>3</sup>, Valeria Scalcon<sup>1</sup>, Alessandra Folda<sup>1</sup>, MariaGiovanna Lupo<sup>2</sup>, Federica Tonolo<sup>1</sup>, Naixuan Pei<sup>3</sup>, Ilaria Battisti<sup>1, 4</sup>, Nicola Ferri<sup>2</sup>, Giorgio Arrigoni<sup>1, 4</sup>, Alberto Bindoli<sup>1, 5</sup>, Arne Holmgren<sup>3</sup>, Maria Pia Rigobello<sup>1</sup>

<sup>1</sup>Department of Biomedical Sciences, University of Padova, Padova, Italy, <sup>2</sup>Department of Medicine, University of Padova, Padova, Italy, <sup>3</sup>Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden, <sup>4</sup>Proteomics Center, University of Padova and Azienda Ospedaliera di Padova, Padova, Italy, <sup>5</sup>Institute of Neuroscience, CNR c/o Department of Biomedical Sciences, University of Padova, Padova, Italy

#### 16:20-16:50

# S7 Regulation of PTP1B activity by the thioredoxin and glutaredoxin/glutathione systems

Markus Dagnell<sup>1</sup>, Lucia Coppo<sup>1</sup>, Naixuan Pei<sup>1</sup>, Qing Cheng<sup>1</sup>, Elias S.J. Arnér<sup>1, 2</sup>

<sup>1</sup>Division of Biochemistry, Department of Medical Biochemistry and Biophysics, Karolinska Institutet, Stockholm, Sweden, <sup>2</sup>Department of Selenoprotein Research, National Institute of Oncology, Budapest, Hungary

#### 16:50-17:20

#### **S8**

### Detection and structure analysis of lipid-derived radicals and oxidized phospholipids

#### Ken-ichi Yamada

Kyushu University, Japan

### 17:20-17:30, October 28 (Fri)

### **Closing Remarks**

#### Masi Yamamoto

Tohoku University, Japan

### Tohoku University Seiryo Campus, Sendai, Japan

### Venue A

# October 29 (Sat)

# The 12th International NO Conference & The 22nd NOSJ

#### 9:00-9:45, October 29 (Sat)

### Plenary Lecture PL1

Chairperson: Hozumi Motohashi (Tohoku University, Japan)

# PL1 The physiological functions of cyclic octa-sulfur (S<sub>8</sub>) formed endogenously in diverse organisms including mammals

#### Takaaki Akaike

Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine, Japan

### 10:00-12:00, October 29 (Sat)

### Session N1

# "NO and Supersulfide in Cardiovascular Regulation" (TFC Session)

Chairpersons: Motohiro Nishida (Kyushu University / National Institute for Physiological Sciences, Japan) Philip Eaton (Queen Mary University of London, UK)

#### 10:00-10:40

### SN1-1 Accelerating inflammatory resolution to improve endothelial function and vascular health: Targeting the non-canonical pathway for NO

Amrita Ahluwalia Queen Mary University of London

#### 10:40-11:10

# SN1-2 Diverse pathogenetic roles of the NOS system: Lessons from triple NOSs null mice

 $\underline{\text{Masato Tsutsui}}^1$ , Takaaki Ogoshi², Kaori Kato², Hiroaki Shimokawa³, Hiroshi Mukae $^4$ , Kazuhiro Yatera $^2$ 

<sup>1</sup>Department of Pharmacology, Graduate School of Medicine, University of the Ryukyus, Okinawa, Japan, <sup>2</sup>Department of Respiratory Medicine, School of Medicine, University of Occupational and Environmental Health, Kitakyushu, Japan, <sup>3</sup>Graduate School, International University of Health and Welfare, Narita, Japan, <sup>4</sup>Department of Respiratory Medicine, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

Venue A

Venue /

#### 11:10-11:40

#### **SN1-3** Cardiac ischemic stress resistance regulated by supersulfide Motohiro Nishida<sup>1, 2</sup>

<sup>1</sup>Department of Physiology, Graduate School of Pharmaceutical Sciences, Kyushu University, <sup>2</sup>Division of Cardiocirculatory Signaling, National Institute for Physiological Sciences (Exploratory Research Center on Life and Living Systems), National Institutes of Natural Sciences

#### 11:40-12:00

#### SN1-4 Nitrite and persulfide lowers blood pressure

Martin Feelisch<sup>1</sup>, Takaaki Akaike<sup>2</sup>, Kayleigh Griffiths<sup>3</sup>, Tomoaki Ida<sup>2</sup>, Oleksandra Prysyazhna<sup>4</sup>, Joanna Goodwin<sup>3</sup>, Nicholas Gollop<sup>3</sup>, Bernadette Fernandez<sup>1</sup>, Magdalena Minion<sup>1</sup>, Miriam Cortese-Krott<sup>6</sup>, Alessandra Borgognone<sup>3</sup>, Rosie Hayes<sup>3</sup>, Philip Eaton<sup>4</sup>, Michael Frenneaux<sup>5</sup>, Melanie Madhani<sup>3</sup>

<sup>1</sup>University of Southampton, Clinical and Experimental Sciences, Southampton, UK, <sup>2</sup>Tohoku University, Graduate School of Medicine, Department of Environmental Medicine and Molecular Toxicoloay, Sendai, Japan, <sup>3</sup>University of Birmingham, Institute of Cardiovascular Sciences, Birmingham, UK, <sup>4</sup>Queen Mary University of London, London, UK, <sup>5</sup>University of East Anglia, Norwich Medical School, Norwich, UK, <sup>6</sup>Heinrich Heine University, Division of Cardiology, Dusseldorf, Germany

### 13:00-13:45, October 29 (Sat)

### **Plenary Lecture PL2**

Chairperson: Takaaki Akaike (Tohoku Univeristy, Japan)

### PL2 therapeutic opportunities

Philip Eaton

Queen Mary University of London

### 15:00-15:50, October 29 (Sat)

### Oral Session O1

Chairperson: Kei Wada (University of Miyazaki, Japan)

#### 15:00-15:15

#### 01-1 Roles of nitric oxide in superoxide scavenging and protection against oxidative damage of cells

### Junichi Fujii, Takujiro Homma, Sho Kobayashi, Tsukasa Osaki

Department of Biochemistry and Molecular Biology, Graduate School of Medical Science, Yamagata University

# Oxidant-induced vasodilation - Mechanisms and

### Venue

#### Venue /

奈 : online presentation

#### 15:15-15:30

# Augmented production of polyamines from incomplete urea cycle fine-tunes NO production in M1 macrophages

<u>Tsukasa Osaki</u>, Junichi Fujii

Department of Biochemistry and Molecular Biology, Graduate School of Medical Science, Yamagata University

### 15:30-15:45

### 01-3 Investigation of the effects of dietary nitrate on vascular function, platelet reactivity and restenosis in stable angina (NITRATE-OCT Study)

<u>Krishnaraj Sinhji Rathod<sup>1, 2</sup></u>, Asad Shabbir<sup>1</sup>, Rayomand Khambata<sup>1</sup>, Gianmichele Massimo<sup>1</sup>, Clement Lau<sup>1</sup>, Anne-Marie Beirne<sup>1, 2</sup>, Ismita Chhetri<sup>1</sup>, Mutsumi Ono<sup>1</sup>, Djouhar R Belgiad<sup>1</sup>, Anantharaman Ramasamy<sup>1, 2</sup>, Vincent Tufaro<sup>1, 2</sup>, Ajay K Jain<sup>2</sup>, Helen R Warren<sup>1</sup>, Thomas Godec<sup>1</sup>, Neil Poulter<sup>3</sup>, Chirstos Bourantas<sup>1, 2</sup>, Daniel Anthony Jones<sup>1, 2</sup>, Anthony Mathur<sup>1</sup>, Amrita Ahluwalia<sup>1</sup>

<sup>1</sup>William Harvey Research Institute, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, United Kingdom, <sup>2</sup>Barts Heart Centre, St. Bartholomew's Hospital, London, United Kingdom, <sup>3</sup>Imperial College London, London, United Kingdom

### 16:00-18:00, October 29 (Sat)

### **Session N4**

# "Nitrite Biology I"

Chairpersons: Miriam Cortese-Krott (Heinrich-Heine-Universität Düsseldorf, Germany) Sruti Shiva (University of Pittsburgh School of Medicine, USA)

### 16:00-16:25

# SN4-1 The nitrate-nitrite-NO pathway: Past-present-future

Eddie T Weitzberg

Karolinska Institutet

### 16:25-16:55

# SN4-2 Nitric oxide: From systems biology to diagnostic models and therapeutic targets for autism spectrum disorder

Haitham Amal, Manish Tripathi, Maryam Kartawy, Shashank Ojha, Wajeha Hamoudi, Huda Soluh, Shira Mencer, Shelly Ginzburg, Igor Khaliulin School of Pharmacy - Faculty of Medicine - Hebrew University

October 29 (Sat)

Venue I

# Redox Week 2022

#### 16:55-17:25

# SN4-3 Nitrate-nitrite-NO biology in pregnancy: Opportunities and challenges

### Elizabeth Cottrell

Maternal and Fetal Health Research Centre, Faculty of Biology, Medicine and Health, University of Manchester, Oxford Road, Manchester, UK

#### 17:25-17:50

### SN4-4 Red blood cells from endothelial nitric oxide synthasedeficient mice induce vascular dysfunction involving oxidative stress and endothelial arginase I

Zhengbing Zhuge<sup>1</sup>, Sarah. McCann Haworth<sup>1</sup>, Carina Nihlén<sup>1</sup>, Lucas Rannier Carvalho<sup>1</sup>, Sophia K. Heuser<sup>2</sup>, Andrei L. Kleschyov<sup>1</sup>, Miriam M. Cortese-Krott<sup>1, 2</sup>, Eddie Weitzberg<sup>1, 3</sup>, Jon O. Lundberg<sup>1</sup>, <u>Mattias Carlstrom<sup>1</sup></u>

<sup>1</sup>Dept. of Physiology & Pharmacology, Karolinska Institutet, Stockholm, Sweden, <sup>2</sup>Division of Cardiology, Pulmonology and Vascular Medicine, Medical Faculty, Heinrich-Heine-University, Düsseldorf, Germany, <sup>3</sup>Dept. Perioperative Medicine & Intensive Care, Karolinska University Hospital, Stockholm, Sweden

### 10:00-12:00, October 29 (Sat)

### Session N2

# "NO and Supersulfide in Neural Function"

Chairpersons: Kohji Fukunaga (Tohoku University Department of CNS Drug Innovation, BRI Pharma Inc, Japan) Yasuo Watanabe (Showa Pharmaceutical University, Japan)

#### 10:00-10:30

# SN2-1 Targeting nitrosative stress relieved cisplatin-induced neurotoxicity

Feng Han, Meiling Sun, Qian Zhang, Xiang Chen, Yaming Tang, Yingmei Lu School of Pharmacy, Nanjing Medical University

#### 10:30-11:00

# SN2-2 STAT1/STAT3 redox signaling in reactive microglia and neuroinflammation

Elena Butturini, Alessandra Carcereri De Prati, Sofia Mariotto University of Verona

중 : online presentation

#### 11:00-11:30

#### Glutathione trisulfide improves memory impairment in **SN2-3** cerebral ischemia mice

Kohji Fukunaga<sup>1, 2</sup>, Kazuhiro Kojima<sup>1</sup>, Ichiro Kawahata<sup>1</sup>

<sup>1</sup>Tohoku University Department of CNS Drug Innovation, <sup>2</sup>BRI Pharma Inc

#### 11:30-12:00

#### Coordination among calcium/calmodulin-dependent SN2-4 protein kinase II and NO and supersulfide in neurons

Yasuo Watanabe<sup>1</sup>, Shoma Araki<sup>1</sup>, Koji Osuka<sup>2</sup>, Tsuyoshi Takata<sup>1, 3</sup>, Yukihiro Tsuchiva

<sup>1</sup>Showa Pharmaceutical University, <sup>2</sup>Department of Neurological Surgery, Aichi Medical University, Aichi, Japan, <sup>3</sup>Department of Environmental Health Sciences and Molecular Toxicology, Graduate School of Medicine, Tohoku University, Miyagi, Japan

### 12:15-12:45, October 29 (Sat)

### **NOSJ Council and General Meeting**

### 15:00-15:50, October 29 (Sat)

### Oral Session O2

Chairperson: Hirovasu Tsutsuki (Kumamoto University, Japan)

#### 15:00-15:15

#### 02-1 Circulating xanthine oxidoreductase (XOR) underlies nitrite induced modulation of platelet reactivity

Tipparat Parakaw<sup>1, 2</sup>, Rayomand Khambata<sup>1</sup>, Nicki Dyson<sup>1</sup>, Gianmichele Massimo<sup>1</sup>, Amrita Ahluwalia<sup>1</sup>

<sup>1</sup>William Harvey Research Institute, Barts and London Faculty of Medicine & Dentistry, Queen Mary University of London, London, United Kingdom, <sup>2</sup>Department of Pharmacology, Faculty of Dentistry, Mahidol University, Bangkok, Thailand

#### 15:15-15:30

# 02-2

### Cold plasma-irradiated cysteine attenuates aberrant sulfide metabolism induced by ischemia

Kakeru Shimoda<sup>1, 2</sup>, Akiyuki Nishimura<sup>2</sup>, Tomoaki Ida<sup>3</sup>, Shota Sasaki<sup>4</sup>, Tomohiro Tanaka<sup>2, 5</sup>, Toshiro Kaneko<sup>4</sup>, Takaaki Akaike<sup>3</sup>, Motohiro Nishida<sup>1, 2</sup>

<sup>1</sup>Department of Physiology, Graduate School of Pharmaceutical Sciences, Kyushu University, <sup>2</sup>Division of Cardiocirculatory Signaling, National Institute for Physiological Sciences, National Institutes of Natural Sciences, <sup>3</sup>Department of Environmental Medicine and Molecular Toxicology, Graduate School of Medicine, Tohoku University, <sup>4</sup>Department of Electronic Engineering, Graduate School of Engineering, Tohoku University, <sup>5</sup>Center for Novel Science Initiatives, National Institutes of Natural Sciences

Venue I

Venue B

15:30-15:45

# O2-3 PKA regulatory Rlα subunit oxidation protects mice against lipodystrophy and diabetes

Alisa Kamynina, Philip Eaton

William Harvey Research Institute, Queen Mary University of London, United Kingdom

## 16:00-18:00, October 29 (Sat)

Venue B

### **Session N5**

# "Arginine and Arginase - from Sickle Cell Disease to COVID" (TFC Session)

Chairperson: Claudia R Morris (Emory University School of Medicine; Children's Healthcare of Atlanta, USA)

#### 16:00-16:30

### **SN5-1** Clinical manifestations of an arginine deficiency syndrome Claudia R Morris<sup>1,2</sup>

<sup>1</sup>Emory University School of Medicine, <sup>2</sup>Children's Healthcare of Atlanta

#### 16:30-16:55

# SN5-2 Arginine therapy in children with sickle cell vaso-occlusive painful episodes: Lessons from Nigeria

<u>Richard Onalo<sup>1</sup></u>, Peter Cooper<sup>2</sup>, Antoinette Cilliers<sup>2</sup>, Uche Nnebe-Agumadu<sup>1</sup>, Oluseyi Oniyangi<sup>3</sup>, Oladimeji Matthew Damilare<sup>4</sup>, Claudia R. Morris<sup>5</sup>

<sup>1</sup>University of Abuja, <sup>2</sup>University of the Witwatersrand, <sup>3</sup>National Hospital Abuja , <sup>4</sup>Cees Assit Resource Abuja, <sup>5</sup>Emory University School of Medicine

#### 16:55-17:20

# SN5-3<sup></sup> Treating arginine deficiency after trauma/surgery (physical injury)

### Juan Bernardo Ochoa Gautier

Medical Director ICU - Hunterdon Medical Center

중 : online presentation

#### 17:20-17:35

### SN5-4 Severe COVID-19 an arginine depletion syndrome? Effects on immunity and arginine supplementation strategies

Matthew J. Dean, Maria Dulfary Sanchez-Pino, Jovanny Zabaleta, Jone Garai, Luis Del Valle, Dorota Wyczechowska, Lyndsey Buckner Baiamonte, Phaethon Philbrook, Ramesh Thylur Puttalingaiah, Bobby Nossaman, W. Mark Roberts, Andrew G. Chapple, Jiande Wu, Chindo Hicks, Jack Collins, Brian Luke, Randall Johnson, Hari K. Koul, Chris A. Rees, Claudia R. Morris, Julia Garcia-Diaz, Augusto C. Ochoa, Juan B. Ochoa

LSU-LCMC Cancer Center, NEW ORLEANS, School of Medocine

#### 17:35-17:50

### **SN5-5** Beneficial effects of L-arginine in COVID-19 patients: A randomized, double-blind, placebo-controlled, parallelgroup trial

Angela Lombardi<sup>1</sup>, Antonietta Coppola<sup>2</sup>, Giuseppe Fiorentino<sup>2</sup>, Raffaele Izzo<sup>2</sup>, Valentina Trimarco<sup>2</sup>, Mariano Bernardo<sup>2</sup>, Anna Annunziata<sup>2</sup>, Bruno Trimarco<sup>2</sup>, Gaetano Santulli<sup>1, 2</sup>

<sup>1</sup>Albert Einstein College of Medicine, <sup>2</sup>Federico II University - Naples (ITALY)

#### 17:50-18:00

Discussion

### 10:00-12:00, October 29 (Sat)

Session N3

# "NO and Supersulfides in Inflammation and Aging" (TFC Session)

Chairpersons: Tomohiro Sawa (Kumamoto University, Japan) Hasan Zaki (UT Southwestern Medical Center, USA)

#### 10:00-10:28

#### SN3-1 Interplay between diet, gut microbiota, and inflammatory disorders

Hasan Zaki

UT Southwestern Medical Center

Venue (

### 10:28-10:56

### SN3-2 Maximized lifespan and healthspan extension via caloric restriction in mice is dependent on the H<sub>2</sub>S generating enzyme cystathionine γ-lyase

<u>Christopher M. Hine</u>, Yoko O. Henderson, Nazmin Bithi, Christopher Link, Jie Yang, Natalia Llarena

Cleveland Clinic Lerner Research Institute

### 10:56-11:24

# SN3-3 Glutaredoxin-mediated control of glutathione through metabolic reprogramming

### Yvonne Janssen-Heininger

Department of Pathology and Laboratory Medicine, University of Vermont Larner College of Medicine, Burlington VT 05405 USA

#### 11:24-11:42

### SN3-4 Reactive persulfide species in chronic respiratory diseases: Potential roles in airway protection, TCR signaling and allergic inflammation

Tadahisa Numakura

Department of Respiratory Medicine, Tohoku University Graduate School of Medicine

#### 11:42-12:00

# SN3-5 Regulation of innate immune responses by reactive sulfur species

### Tomohiro Sawa

Department of Microbiology, Graduate School of Medical Sciences, Kumamoto University

### 15:00-15:50, October 29 (Sat)

### Oral Session O3

Chairperson: Akiko Ogawa (Tohoku University, Japan)

### 15:00-15:15

# 03-1 Tryptophanyl-tRNA synthetase mediates high-affinity tryptophan uptake into human cells

Keisuke Wakasugi<sup>1, 2</sup>, Takumi Yokosawa<sup>2</sup>

<sup>1</sup>Graduate School of Arts and Sciences, The University of Tokyo, <sup>2</sup>Graduate School of Science, The University of Tokyo

⇒: online presentation

15:15-15:30

# 03-2 Redox-dependent alternative internalization (REDAI) of GPCRs

<u>Kazuhiro Nishiyama</u><sup>1</sup>, Akiyuki Nishimura<sup>2,3</sup>, Kakeru Shimoda<sup>2,3,4</sup>, Yuri Kato<sup>1</sup>, Yoshito Kumagai<sup>5</sup>, Takaaki Akaike<sup>6</sup>, Philip Eaton<sup>7</sup>, Koji Uchida<sup>8</sup>, Motohiro Nishida<sup>1,2,3,4</sup>

<sup>1</sup>Graduate School of Pharmaceutical Sciences, Kyushu University, <sup>2</sup>National Institute for Physiological Sciences (NIPS), National Institutes of Natural Sciences (NINS), <sup>3</sup>Exploratory Research Center on Life and Living Systems (ExCELLS), NINS, <sup>4</sup>Department of Physiological Sciences, SOKENDAI (School of Life Science, The Graduate University for Advanced Studies), <sup>5</sup>Faculty of Medicine, University of Tsukuba, <sup>6</sup>Graduate School of Medicine, Tohoku University, <sup>7</sup>The William Harvey Research Institute, Charterhouse Square, Barts and the London School of Medicine and Dentistry, Queen Mary University of London, <sup>8</sup>Graduate School of Agricultural and Life Sciences, The University of Tokyo

#### 15:30-15:45

**O**3-3

### 3 Deficiency of mitochondrial H<sub>2</sub>S exacerbates heart failure with reduced ejection fraction via attenuating branchedchain amino acids catabolism

<u>Zhen Li</u><sup>1</sup>, Huijing Xia<sup>1</sup>, Thomas E. Sharp<sup>1</sup>, Kyle B. Lapenna<sup>1</sup>, John W. Elrod<sup>2</sup>, Kevin M. Casin<sup>3</sup>, Ken Liu<sup>4</sup>, John W. Calvert<sup>3</sup>, Vinh Q. Chao<sup>5</sup>, Fadi N. Salloum<sup>5</sup>, Shi Xu<sup>6</sup>, Ming Xian<sup>6</sup>, Noriyuki Nagahara<sup>7</sup>, Traci T. Goodchild<sup>1</sup>, David J. Lefer<sup>1</sup>

<sup>1</sup>Cardiovascular Center of Excellence, Louisiana State University Health Sciences Center, New Orleans, LA, <sup>2</sup>Center for Translational Medicine, Lewis Katz School of Medicine, Temple University, Philadelphia, PA, <sup>3</sup>Cardiothoracic Research Laboratory, Department of Surgery, Emory University School of Medicine, Atlanta, GA, <sup>4</sup>Clinical Biomarkers Laboratory, Department of Pulmonary, Allergy, Critical Care and Sleep Medicine, Emory University School of Medicine, Atlanta, GA, <sup>5</sup>VCU Health Pauley Heart Center, Department of Internal Medicine, Division of Cardiology, Virginia Commonwealth University, Richmond, VA, <sup>6</sup>Department of Chemistry, Brown University, Providence, RI, <sup>7</sup>Isotope Research Center, Nippon Medical School, Tokyo, Japan

### 16:00-18:00, October 29 (Sat)

### **Session N6**

# "NO and Supersulfide in Plants"

Chairpersons: Yasuhiro Ishimaru (Tohoku University, Japan) Hideo Yamasaki (University of the Ryukyus, Japan)

#### 16:00-16:24

# **\$N6-1** Ca<sup>2+</sup> and reactive oxygen species crosstalk in plants

### Alex Costa

University of Milan

Venue C

#### 16:24-16:48

### SN6-2 Hydrogen peroxide is perceived by cell-surface receptor kinase HPCA1/CARD1 in plants

Zhen-Ming Pei<sup>1, 5</sup>, Feihua Wu<sup>1</sup>, Yuan Chi<sup>1, 2</sup>, Yikun He<sup>1, 3</sup>, Weizhong Liu<sup>1, 3</sup>, Zhonghao Jiang<sup>1, 2</sup>, Fang Yuan<sup>1, 4</sup>, Tuan Vo-Dinh<sup>5</sup>

<sup>1</sup>Department of Biology, Duke University, <sup>2</sup>College of Life and Oceanography Sciences, Shenzhen University, <sup>3</sup>College of Life Science, Capital Normal University, <sup>4</sup>College of Horticulture and Landscape, Hunan Agricultural University, <sup>5</sup>Fitzpatrick Institute for Photonics, Duke University

#### 16:48-17:11

# SN6-3 Mining of ROS sensor proteins that positively regulate plant immune responses

<u>Hirofumi Yoshioka</u>, Yuta Hino, Keita Okamoto, Taichi Inada, Tatsuhiko Kondo, Hitoshi Mori, Miki Yoshioka

Graduate School of Bioagricultural Sciences, Nagoya University, Nagoya, Japan

#### 17:11-17:34

### SN6-4 Regulation of reactive molecular species by phytoglobin 1 in Lotus japonicus contributes to plant-microbe symbioses

Mitsutaka Fukudome<sup>1</sup>, Manuel Becana<sup>2</sup>, Toshiki Uchiumi<sup>3</sup>

<sup>1</sup>Faculty of Agriculture, Kagawa University, <sup>2</sup>Departamento de Nutrición Vegetal, Estación Experimental de Aula Dei, Consejo Superior de Investigaciones Científicas (CSIC), <sup>3</sup>Graduate School of Science and Engineering, Kagoshima University

#### 17:34-17:58

### SN6-5 Nitric oxide (NO) and hydrogen sulfide (H<sub>2</sub>S) are twin molecules in higher plants?

#### Francisco J Corpas

Spanish National Research Council (CSIC)

♀: online presentation

# October 30 (Sun)

The 12th International NO Conference & The 22nd NOSJ

#### 9:00-9:45, October 30 (Sun)

### **Plenary Lecture PL3**

Chairperson: Hozumi Motohashi (Tohoku University, Japan)

# PL3 Pain and sulfuring in the immune response: Translating what we learned from slime mold to T cells

Beth Kelly, Erika L. Pearce

Bloomberg-Kimmel Institute for Cancer Immunotherapy, Johns Hopkins University School of Medicine, Baltimore, MD, USA

### 10:00-12:00, October 30 (Sun)

### Session N11

# "Nitrite Biology II" (TFC Session)

Chairpersons: Martin Feelisch (University of Southampton, UK) Miriam M Cortese-Krott (Heinrich Heine University Düsseldorf, Germany)

#### 10:00-10:30

# SN11-1 Nitrite regulates normoxic mitochondrial dynamics and function to confer cardiovascular protection

Danielle Guimeraes, Christopher Reyes, Yinna Wang, <u>Sruti Shiva</u> University of Pittsburgh

#### 10:30-11:00

### SN11-2 The role of red blood cells in regulation of vascular tone and blood pressure

#### Miriam M Cortese-Krott

Heinrich Heine University Düsseldorf

Venue A

Venue A

# October 30 (Sun)

# Redox Week 2022

#### 11:00-11:30

# SN11-3<sup>•</sup> The role of nitric oxide signaling in red blood cells in cardiac ischemia-reperfusion

John Pernow, Tong Jiao, Jon O Lundberg, Jiangning Yang Karolinska Institutet

#### 11:30-12:00

# SN11-4<sup>(2)</sup> Generation of dinitrosyl iron complexes by the gut microbiota

Jon O Lundberg

Karolinska Institutet

12:10-12:55, October 30 (Sun)

**Lunch Seminar** 

### Sponsored by: Mallinckradt Pharma K.K.

Chairperson: Yasuko Nagasaka (Tokyo Women's Medical University, Japan)

# LS1 Medical innovation with gases - Lessons learned from nitric oxide story -

### Fumito Ichinose

Massachusetts General Hospital, Harvard Medical School

奈 : online presentation

### 13:00-13:45, October 30 (Sun)

### **Plenary Lecture PL4**

Chairperson: Tomohiro Sawa (Kumamoto University, Japan)

### PL4 Chemical medicine: New cancer medical technology based on live fluorescence imaging

Yasuteru Urano The University of Tokyo

### 15:30-18:00, October 30 (Sun)

Venue A

Venue A

### **Session N7**

# "NO and Sulfur Metabolism in Cancer" (TFC Session)

Chairpersons: Hozumi Motohashi (Tohoku University, Japan) Thales Papagiannakopoulos (NYU Grossman School of Medicine, USA)

#### 15:30-15:45

### SN7-1 NRF2 addiction and sulfur metabolism in cancer cells

Hozumi Motohashi Tohoku University

#### 15:45-16:12

### SN7-2<sup></sup> In vivo stable isotope tracing in genetically engineered cancer models to evaluate the source and fate of cysteine

Gina M Denicola

H. Lee Moffitt Cancer Center

#### 16:12-16:39

### SN7-3 Uncovering metabolic bottlenecks in KRAS-driven lung cancer

#### Thales Papagiannakopoulos

NYU Grossman School of Medicine

#### 16:39-17:06

### SN7-4 A redox-dependent cancer therapy targeting peroxiredoxin 3 being tested in phase 1/2 clinical trials

<u>Brian Cunniff<sup>1</sup></u>, Terri Messier<sup>1</sup>, Kimberley Nelson<sup>2</sup>, Terrence Smalley<sup>2</sup>, Todd Lowther<sup>2</sup>

<sup>1</sup>University of Vermont Cancer Center, Larner College of Medicine, <sup>2</sup>Wake Forest University School of Medicine, Department of Biochemistry

#### 17:06-17:33

# SN7-5 Nitric oxide is a master regulator of the cellular methylome in cancer

Douglas D Thomas, Hannah Petraitis Kuschman, Marianne Palczewski University of Illinois at Chicago

#### 17:33-18:00

### SN7-6 NOS2 and COX2 powerly shape the immune profile in estrogen negative breast cancer. A new target for immune Therapy

David Anderson Wink<sup>1</sup>, Lisa A Ridnour<sup>1</sup>, Robert YS Cheng<sup>1</sup>, Stephen J Lockett<sup>2</sup> <sup>1</sup>National Cancer Insistute, <sup>2</sup>Liedos Biomedical

### 18:10-18:30, October 30 (Sun)

### **Closing Remarks**

Motohiro Nishida Kyushu University Venue A

 $\boldsymbol{\widehat{\gamma}}$  : online presentation

### 10:00-12:00, October 30 (Sun)

### Session N8

# "Zn in Relation with NO and Supersulfides"

Chairpersons: Yoshiro Saito (Tohoku University, Japan) Yu Ishima (Tokushima University, Japan)

#### 10:00-10:30

### SN8-1 Zinc regulates vascular tone via complementary relaxant mechanisms in sensory nerves, smooth muscle and endothelium

<u>Scott Ayton<sup>1, 2</sup></u>, Ashenafi H Betrie<sup>1, 2</sup>, James A Brock<sup>2</sup>, Osama F Harraz<sup>3</sup>, Ashley I Bush<sup>1, 2</sup>, Guo-Wei He<sup>4</sup>, Mark T Nelson<sup>3</sup>, James A Angus<sup>2</sup>, Christine E Wright<sup>2</sup>

Venue B

<sup>1</sup>Florey Institute of Neuroscience and Mental Health, <sup>2</sup>The University of Melbourne, <sup>3</sup>University of Vermont, Burlington, <sup>4</sup>TEDA International Cardiovascular Hospital

#### 10:30-10:53

# SN8-2 Zinc transporters and signaling as potential therapeutic targets

<u>Toshiyuki Fukada</u>, Takafumi Hara, Ayaka Noguchi, Yasuno Nakai, Emi Yoshigai, Takuto Ohashi

Tokushima Bunri University, Faculty of Pharmaceutical Sciences

#### 10:53-11:16

# SN8-3 Zinc metalation by ZNT5-ZNT6 heterodimers and ZNT7 homodimers in the early secretory pathway

#### Taiho Kambe

Division of Integrated Life Science, Graduate School of Biostudies, Kyoto University

#### 11:16-11:38

### SN8-4 Close linkage between redox and zinc homeostasis in the endoplasmic reticulum

<u>Yuta Amagai</u>, Chihiro Arai, Kenji Inaba

IMRAM, Tohoku Univ.

11:38-12:00

# SN8-5 Conditional proteomics approaches to identify proteins related to Zn and NO

### Tomonori Tamura<sup>1</sup>, Itaru Hamachi<sup>1, 2</sup>

<sup>1</sup>Department of Synthetic Chemistry and Biological Chemistry, Graduate School of Engineering, Kyoto University, <sup>2</sup>ERATO, Japan Science and Technology Agency

### 15:00-15:50, October 30 (Sun)

### Oral Session O4

Chairperson: Shohei Murakami (Tohoku University, Japan)

#### 15:00-15:15

# 04-1 Biomolecule-based nanostructures for tumor microenvironment targeting and regulation

### Guangjun Nie

National Center for Nanoscience and Technology

#### 15:15-15:30

### 04-2 Physiological roles of two cognate sulfurtransferases MPST and TST in the mouse

<u>Isao Ishii</u>, Maiko Tsushima, Kaho Masuda, Tihori Hashimoto, Maika Koizumi, Sayaka Ogawa, Moe Shimizu, Yuri Maruyama, Waka Kamichatani, Kento Rammitsu, Noriyuki Akahoshi

Showa Pharmaceutical University

#### 15:30-15:45

# 04-3 Mitochondrial glutathione peroxidase 4 is indispensable for photoreceptor development and survival in mice

<u>Hirotaka Imai</u><sup>1</sup>, Tomoko Koumura<sup>1</sup>, Kunihiro Azuma<sup>2</sup>, Ryo Iwamoto<sup>1</sup>, Masaki Matsuoka<sup>1</sup>, Ryo Terauchi<sup>3,4</sup>, Shu Yasuda<sup>1</sup>, Tomoyasu Shiraya<sup>2</sup>, Sumimoto Watanabe<sup>3</sup>, Makoto Aihara<sup>2</sup>, Takashi Ueta<sup>2</sup>

<sup>1</sup>School of pharmaceutical Sciences, Kitasato University, <sup>2</sup>Department of Ophthalmology, Graduate School of Medicine, The University of Tokyo, <sup>3</sup>Division of Molecular and Developmental Biology, Institute of Medical Science, The University of Tokyo, <sup>4</sup>Department of Ophthalmology, The Jikei University School of Medicine

Venue B

 $\boldsymbol{\widehat{\gamma}}$  : online presentation

### 16:00-18:00, October 30 (Sun)

### Session N13

# "NO and Supersulfides in Signal Transduction" (TFC Session)

Chairpersons: Hiroaki Miki (Osaka University, Japan) Yosuke Funato (Osaka University, Japan)

#### 16:00-16:24

# SN13-1 Regulation of oncogenic protein PRL by diverse chemical modifications of its active cysteine

Hiroaki Miki, Yosuke Funato

Research Institute for Microbial Diseases, Osaka University

#### 16:24-16:48

# SN13-2 Regulated spatial distribution of mitochondria reconciles invasiveness and redox homeostasis of cancer cells

Yasuhito Onodera Hokkaido University

#### 16:48-17:12

# SN13-3 Regulatory mechanisms of the novel cell death parthanatos induced by ROS signaling

#### Atsushi Matsuzawa

Laboratory of Health Chemistry, Graduate School of Pharmaceutical Sciences, Tohoku University

#### 17:12-17:36

### SN13-4 Cytochrome b5 reductase 3 and cGMP signaling in cardiovascular disease and stroke

### Adam Carl Straub

University of Pittsburgh School of Medicine

#### 17:36-18:00

# SN13-5 Reprogrammed transsulfuration promotes tumor progression via tumor specific mechanisms

### Péter Nagy<sup>1, 2, 3</sup>

<sup>1</sup>Department of Molecular Immunology and Toxicology and the National Tumor Biology Laboratory, National Institute of Oncology, <sup>2</sup>Department of Anatomy and Histology, Laboratory of Redox Biology, University of Veterinary Medicine, <sup>3</sup>Institute of Oncochemistry, University of Debrecen

### 10:00-12:00, October 30 (Sun)

### **Session N9**

Chairpersons: Hideshi Ihara (Osaka Metropolitan University, Japan) Takakazu Nakabayashi (Tohoku University, Japan)

#### 10:00-10:25

# **SN9-1** Regulation of neuronal nitric oxide synthase by supersulfides

Yukihiro Tsuchiya, Shoma Araki, Yasuo Watanabe

Department of Pharmacology, Showa Pharmaceutical University

#### 10:25-10:55

# SN9-2 A mass spectrometry-based technology for exploration of endogenous persulfides/polysulfides

Shingo Kasamatsu, Hideshi Ihara

Osaka Metropolitan University

#### 10:55-11:25

### SN9-3 Stoichiometry conservation constraints in cells enable raman-spectroscopic proteomics

Yuichi Wakamoto The University of Tokyo

#### 11:25-12:00

### SN9-4 Cardiovascular imaging of zebrafish models

Ian Liau, I-Ju Lee, Yu-Cheng Chuang, Praveen Kumar, Yu-Kai Chao National Yang-Ming Chiao-Tung University (NYCU) Venue C

#### 15:00-15:50, October 30 (Sun)

### **Oral Session O5**

Chairperson: Kazuhiro Nishiyama (Kyushu University, Japan)

#### 15:00-15:15

#### **O5-1**

### Echinochrome enhances myocardial stress resistance by preserving reactive sulfur species

<u>Xiaokang Tang</u><sup>1, 2, 3</sup>, Akiyuki Nishimura<sup>1, 2, 3</sup>, Kazuhiro Nishiyama<sup>4</sup>, Yuri Kato<sup>4</sup>, Elena A Vasileva<sup>5</sup>, Natalia P. Mishchenko<sup>5</sup>, Sergey A. Fedoreyev<sup>5</sup>, Valentin A. Stonik<sup>5</sup>, Hyoung Kyu Kim<sup>6</sup>, Jin Han<sup>6</sup>, Motohiro Nishida<sup>1, 2, 3, 4</sup>

<sup>1</sup>Division of Cardiocirculatory Signaling, National Institute for Physiological Sciences (NIPS), National Institutes of Natural Sciences, <sup>2</sup>Exploratory Research Center on Life and Living Systems (ExCELLS), National Institutes of Natural Sciences, <sup>3</sup>Department of Physiological Sciences, SOKENDAI (School of Life Science, The Graduate University for Advanced Studies), <sup>4</sup>Department of Physiology, Graduate School of Pharmaceutical Sciences, Kyushu University, <sup>5</sup>G.B. Elyakov Pacific Institute of Bioorganic Chemistry, Far-Eastern Branch of the Russian Academy of Science, <sup>6</sup>Cardiovascular and Metabolic Disease Center (CMDC), Inje University

Venue C

#### 15:15-15:30

### 05-2 Synthesis of conformation-restricted analogues of amyloid persulfide toward their application to nucleic acid medicine

Kazuma Murakami<sup>1</sup>, Masayoshi Mochizuki<sup>2</sup>, Taku Yoshiya<sup>2,3</sup>, Naotaka Izuo<sup>4</sup>

<sup>1</sup>Graduate School of Agriculture, Kyoto University, <sup>2</sup>Peptide Institute, Inc., Osaka, Japan, <sup>3</sup>Institute for Protein Research, Osaka University, Osaka, Japan, <sup>4</sup>Faculty of Pharmaceutical Sciences, University of Toyama, Toyama, Japan

#### 15:30-15:45

### 05-3 Persulfide controls T cell response

<u>Shunichi Tayama</u><sup>1</sup>, Takeshi Kawabe<sup>1</sup>, Yuya Kitamura<sup>1</sup>, Kyoga Hiraide<sup>1</sup>, Jing Li<sup>1</sup>, Ziying Yang<sup>1</sup>, Kosuke Sato<sup>1</sup>, Akihisa Kawajiri<sup>1</sup>, Yuko Okuyama<sup>1</sup>, Mitsuhiro Yamada<sup>2</sup>, Masanobu Morita<sup>3</sup>, Takaaki Akaike<sup>3</sup>, Naoto Ishii<sup>1</sup>

<sup>1</sup>Department of Microbiology and Immunology, Tohoku University Graduate School of Medicine, <sup>2</sup>Department of Respiratory Medicine, Tohoku University Graduate School of Medicine, <sup>3</sup>Department of Environmental Medicine and Molecular Toxicology

### 16:00-18:00, October 30 (Sun)

# Session N14 (YIS)

# "Rising Star Session"

Chairpersons: Douglas Thomas (University of Illinois at Chicago, USA) Sruti Shiva (University of Pittsburgh School of Medicine, USA)

### 16:00-16:20

# SN14-1 Nitric oxide and DNA methylation: Epigenetic mechanisms of tumorigenesis

<u>Christopher Switzer</u>, Philip Eaton Queen Mary University of London

### 16:20-16:40

# SN14-2 Erythroid specific knock out of soluble guanylate cyclase leads to disrupted erythropoiesis, anemia and splenomegaly

<u>Sophia Katharina Heuser</u><sup>1</sup>, Anthea Lobue<sup>1</sup>, Junjie Li<sup>1</sup>, Ron-Patrick Cadeddu<sup>2</sup>, Jon O. Lundberg<sup>3</sup>, Evanthia Mergia<sup>4</sup>, Doris Koesling<sup>4</sup>, Ulrich Germing<sup>2</sup>, Miriam M. Cortese-Krott<sup>1, 3</sup>

<sup>1</sup>Myocardial Infarction Research Laboratory, Department of Cardiology, Pulmonology, and Angiology, Medical Faculty, Heinrich-Heine-University, Düsseldorf, Germany, <sup>2</sup>Department of Hematology, Oncology and Clinical Immunology, Medical Faculty, Heinrich-Heine-University, Düsseldorf, German, <sup>3</sup>Department of Physiology and Pharmacology, Karolinska Institutet, Stockholm, Sweden, <sup>4</sup>Department of Pharmacology, Ruhr-University Bochum, Bochum, Germany

### 16:40-17:00

# SN14-3 Thiol facilitated reductive nitrosylation reaction of NO and ferric heme form a labile iron-nitrosyl-heme and thiyl radical

<u>Anthony William Demartino<sup>1</sup></u>, Laxman Poudel<sup>2</sup>, Matthew R Dent<sup>3</sup>, Xiukai Chen<sup>3</sup>, Qinzi Xu<sup>3</sup>, Brendan Gladwin<sup>3</sup>, Jesus Tejero<sup>3, 4, 5, 6</sup>, Swati Basu<sup>2, 7</sup>, Elmira Alipour<sup>2</sup>, Mark T Gladwin<sup>1, 8</sup>, Daniel B Kim-Shapiro<sup>2, 7, 8</sup>

<sup>1</sup>Department of Medicine, University of Maryland School of Medicine, Baltimore, <sup>2</sup>Department of Physics, Wake Forest University, Winston-Salem, <sup>3</sup>Heart, Lung, Blood, and Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, <sup>4</sup>Division of Pulmonary, Allergy and Critical Care Medicine, University of Pittsburgh, Pittsburgh, <sup>5</sup>Department of Bioengineering, University of Pittsburgh, Pittsburgh, USA, <sup>6</sup>Department of Pharmacology and Chemical Biology, University of Pittsburgh, Pittsburgh, USA, <sup>7</sup>Translational Science Center, Wake Forest University, Winston-Salem, USA, <sup>8</sup>These authors share senior authorship

Venue C

 $\widehat{\boldsymbol{r}}$  : online presentation

#### 17:00-17:20

SN14-4

# 4 NOS inhibition reverses epithelial-to-mesenchymal transition and synergizes with alpelisib in metaplastic breast cancer

<u>Tejaswini Parlapalle Reddy</u><sup>1, 2, 3</sup>, Akshjot Puri<sup>1, 3</sup>, Liliana Guzman-Rojas<sup>1</sup>, Wei Qian<sup>1</sup>, Jianying Zhou<sup>1</sup>, Roberto Rosato<sup>1</sup>, Hong Zhao<sup>1</sup>, Christoforos Thomas<sup>1</sup>, Xiaoxian Li<sup>4</sup>, Bijan Mahboubi<sup>4</sup>, Adrian Oo<sup>4</sup>, Young-Jae Cho<sup>4</sup>, Baek Kim<sup>4</sup>, Jose Thaiparambil<sup>1</sup>, Camila Ayerbe<sup>1</sup>, Noah Giese<sup>1, 2</sup>, Stacy Moulder<sup>5</sup>, Helen Piwnica-Worms<sup>6</sup>, Funda Meric-Bernstam<sup>6</sup>, Jenny Chang<sup>1, 3</sup>

<sup>1</sup>Houston Methodist Research Institute, <sup>2</sup>Texas A&M Health Science Center, <sup>3</sup>Houston Methodist Cancer Center, <sup>4</sup>Emory University, <sup>5</sup>Lilly Oncology, <sup>6</sup>The University of Texas MD Anderson Cancer Center

#### 17:20-17:40

### SN14-5 Nck1 adaptor protein and vascular disease functions

Mabruka Alfaidi, Milla Reddick, Xinggui Shen, A. Wayne Orr LSU Health Shreveport

#### 17:40-18:00

### SN14-6 Effects of disturbed oral microbiota by chlorhexidine mouthwash on nitrate-nitrite-nitric oxide homeostasis and diet-induced obesity

Lucas R. Carvalho, Eddie Weitzberg, Jon O Lundberg, Mattias Carlström Department of Physiology and Pharmacology, Karolinska Institutet, Sweden

### 10:00-12:00, October 30 (Sun)

### Session N10

# "Oxidative & Nitrosative Stress in Respiratory Diseases"

Chairpersons: Kazuto Matsunaga (Yamaguchi University, Japan) Mitsuhiro Yamada (Tohoku University, Japan)

#### 10:00-10:24

# **\$N10-1** Genetic loci for fraction of exhaled nitric oxide levels in adults; their genetic correlation with asthma-related traits

### Mitsuhiro Yamada

Department of Respiratory Medicine, Tohoku University Graduate School of Medicine

#### 10:24-10:48

### **SN10-2** The role of FeNO in the diagnosis of asthma-COPD overlap

### Naoya Fujino

Department of Respiratory Medicine, Tohoku University Hospital

#### 10:48-11:12

### SN10-3 Concomitant use of hydrogen sulfide (H<sub>2</sub>S) and fractional exhaled nitric oxide (FeNO) as biomarkers of airway inflammation in asthma

Junpei Saito

Department of Pulmonary Medicine, Fukushima Medical University

### 11:12-11:36

### SN10-4<sup>©</sup> Current position and future prospects of FeNO measurements in respiratory diseases

#### Kazuto Matsunaga

Respiratory Department, Graduate School of Medicine, Yamaguchi University

#### 11:36-12:00

# **SN10-5** A functional role for DUOX1 in macrophages. Relevance for allergic airway inflammation and pulmonary fibrosis

<u>Albert van der Vliet</u><sup>1</sup>, Aida Habibovic<sup>1</sup>, Carolyn R. Morris<sup>1</sup>, Miao-Chong Joy Lin<sup>1</sup>, Litiele Cruz<sup>1</sup>, Yvonne M. Janssen-Heininger<sup>1</sup>, Olaf Utermohlen<sup>2</sup>, Martin Kronke<sup>2</sup>

<sup>1</sup>Department of Pathology and Laboratory Medicine, University of Vermont, <sup>2</sup>Institute for Medical Microbiology, University Hospital Cologne, Germany

### 15:00-15:50, October 30 (Sun)

Tohoku University Seiryo Campus, Sendai, Japan

### **Oral Session O6**

Chairperson: Keitaro Umezawa (Tokyo Institute of Gerontology, Japan)

#### 15:00-15:15

### 06-17 Sulfur-responsive elements and a WRKY transcription factor required for sulfur deficiency-induced expression of SULFATE TRANSPORTER 1;2 in Arabidopsis roots

<u>Akiko Maruyama</u><sup>1, 2, 3</sup>, Miyuki Kusajima<sup>3</sup>, Wei Dong<sup>4</sup>, Yuki Kimura<sup>1</sup>, Makiko Takamune<sup>2</sup>, Yumiko Nakamura-Tsuchiya<sup>2</sup>, Eri Inoue<sup>2</sup>, Takuro Shinano<sup>5</sup>, Nobutaka Mitsuda<sup>6</sup>, Hideo Nakashita<sup>3</sup>, Kazuki Saito<sup>2</sup>, Hideki Takahashi<sup>2, 4</sup>

<sup>1</sup>Kyushu University, <sup>2</sup>RIKEN PSC, <sup>3</sup>Fukui Prefectural University, <sup>4</sup>Michigan State University, <sup>5</sup>Hokkaido University, <sup>6</sup>AIST

穼 : online presentation

#### 15:15-15:30

### O6-2

### Structural and functional analyses of the SUF system involved in de novo iron-sulfur cluster biosynthesis

Kei Wada<sup>1</sup>, Yoshikazu Tanaka<sup>2</sup>, Yasuhiro Takahashi<sup>3</sup>

<sup>1</sup>Department of Medical Sciences, University of Miyazaki, Japan, <sup>2</sup>Graduate School of Life Sciences, Tohoku University, Japan, <sup>3</sup>Graduate School of Science and Engineering, Saitama University, Japan

#### 15:30-15:45

### O6-3 Synthesis of oxalate dianions from CO2 for sustainable ironmaking system

Atsushi Tahara<sup>1</sup>, Aska Mori<sup>2</sup>, Jun-Ichiro Hayashi<sup>2</sup>, Shinji Kudo<sup>2</sup>

<sup>1</sup>Frontier Research Institute for Interdisciplinary Sciences / Tohoku University, <sup>2</sup>Institute for Materials Chemistry and Engineering / Kyushu University

### 16:00-16:45, October 30 (Sun)

### **NOSJ Plenary Lecture**

Chairperson: Motohiro Nishida (Kyushu University / National Institute for Physiological Sciences, Japan)

# NPL Development of whole-brain low-intensity pulsed ultrasound therapy for early stage of Alzheimer's disease: Crucial role of endothelial NO synthase

### Hiroaki Shimokawa<sup>1, 2</sup>

<sup>1</sup>International University of Health and Welfare, <sup>2</sup>Tohoku University

### 18:30-, October 30 (Sun)

### **Banquet Party (for Invited Only)**

### Award Ceremony

### Young Investigators' Award Winner

Lorenzo Catti (P53), Tianli Zhang (P45), Kazuhiro Nishiyama (O3-2), Zhen Li (O3-3), Eunkyu Sung (P4), Atsushi Tahara (O6-3), Naim Hassan (P17), Shunichi Tayama (O5-3), Waliul Islam (P40), Alisa Kamynina (O2-3), Haruna Takeda (P6)

### **Travel Award Winner**

Xiaoyan Li (P50), Waliul Islam (P40), Sota Honma (P69), Daisuke Saitoh (P54), Azizur Rahman (P47), Alisa Kamynina (O2-3) Venue D

# October 29 (Sat) / October 30 (Sun) The 12th International NO Conference & The 22nd NOSJ

14:00-14:50, October 29 (Sat) / October 30 (Sun)

1F and 2F, Seiryo Auditorium (Venue A)

### **Poster Session**

Supersulfide

# P1 S-nitrosyl L-cysteine acts as suicidal substrate of cystathionine gamma-lyase

<u>Shoma Araki</u><sup>1</sup>, Yukihiro Tsuchiya<sup>1</sup>, Shingo Kasamatsu<sup>2</sup>, Hideshi Ihara<sup>2</sup>, Hidehiko Nakagawa<sup>3</sup>, Takaaki Akaike<sup>4</sup>, Yasuo Watanabe<sup>1</sup>

<sup>1</sup>Department of Pharmacology, Showa Pharmaceutical University, <sup>2</sup>Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University, <sup>3</sup>Graduate School of Pharmaceutical Sciences, Nagoya City University, <sup>4</sup>Department of Environmental Health Sciences and Molecular Toxicology, Graduate School of Medicine, Tohoku University

# P2 Oligomer formation of peroxiredoxins by persulfidation

Osamu Hashizume, Yosuke Funato, Hiroaki Miki

Department of Cellular Regulation, Research Institute for Microbial Diseases, Osaka University

# P3 Biological roles of supersulfide in human hair

<u>Takeru Hirai</u>, Nanami Tasaka, Tarou Shimizu, Hidenori Ando, Tatsuhiro Ishida, Yu Ishima

Department of Pharmacokinetics and Biopharmaceutics, Institute of Biomedical Sciences, Tokushima University

# P4 Roles of sulfur metabolites in erythroid differentiation

<u>Eunkyu Sung</u><sup>1</sup>, Shohei Murakami<sup>1</sup>, Masanobu Morita<sup>2</sup>, Tomoaki Ida<sup>2</sup>, Takaaki Akaike<sup>2</sup>, Hozumi Motohashi<sup>1</sup>

<sup>1</sup>Department of Gene Expression Regulation, Institute of Development, Aging and Cancer, Tohoku University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

# P5 Physiological roles of CARS2-mediated cysteine persulfide formation in the central nervous system

<u>Takaaki Suzuki</u><sup>1</sup>, Shohei Murakami<sup>1</sup>, Masanobu Morita<sup>2</sup>, Tomoaki Ida<sup>2</sup>, Takaaki Akaike<sup>2</sup>, Hozumi Motohashi<sup>1</sup>

<sup>1</sup>Department of Gene Expression Regulation, Institute of Development, Aging and Cancer, Tohoku University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

奈 : online presentation

**P6** 

# Single cell multiomics reveals polysulfide-dependent regulation of hematopoietic stem cell differentiation

<u>Haruna Takeda</u><sup>1</sup>, Shohei Murakami<sup>1</sup>, Masanobu Morita<sup>2</sup>, Takaaki Akaike<sup>2</sup>, Hozumi Motohashi<sup>1</sup>

<sup>1</sup>Department of Gene Expression Regulation, IDAC, Tohoku University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

# P7 Analysis of changes in sulfur metabolism in the brown adipose tissue of hibernation-induced golden hamsters

Airi Nishida<sup>1</sup>, Shingo Kasamatsu<sup>1</sup>, Takaaki Akaike<sup>2</sup>, Hideshi Ihara<sup>1</sup>

<sup>1</sup>Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

# P8 Analysis of polysulfide profile changes in broccoli during germination

Takuma Owaki, Shingo Kasamatsu, Hideshi Ihara Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University

# P? The regulatory mechanism of photosynthetic activity by polysulfide

<u>Ayumu Kobayashi</u><sup>1</sup>, Masaru Tsujii<sup>1</sup>, Mio Yoshida<sup>1</sup>, Haruto Shimizukawa<sup>1</sup>, Minkyung Jung<sup>2</sup>, Tomoaki Ida<sup>2</sup>, Tsuyoshi Takata<sup>2</sup>, Takaaki Akaike<sup>2</sup>, Yasuhiro Ishimaru<sup>1</sup>, Nobuyuki Uozumi<sup>1</sup>

<sup>1</sup>Tohoku University Graduate School of Engineering, <sup>2</sup>Tohoku University Graduate School of Medicine

### P10 Identification of novel sulfur RNA modification and investigation of its possible functions in physiology and pathology

<u>Akiko Ogawa</u><sup>1</sup>, Raja Norazireen Raja Ahmad<sup>1</sup>, Tomohiro Sawa<sup>2</sup>, Fan-Yan Wei<sup>1</sup> <sup>1</sup>IDAC, Tohoku University, <sup>2</sup>Kumamoto University

# P11 Exploring the molecular basis of mitochondrial tRNA sulfur modification

### Haruna Tani, Fan-Yan Wei

Department of Modomics Biology and Medicine, Institute of Development, Aging and Cancer, Tohoku University

# P12 Analysis of the effects of germination on endogenous polysulfide production in soybean

Mahiro Kuryu, Shingo Kasamatsu, Hideshi Ihara Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University

# P13 Omics analysis of reactive sulfur species in the brain tissue of mouse model of Alzheimer's disease

Ayaka Kinno<sup>1</sup>, Shingo Kasamatsu<sup>1, 2</sup>, Takaaki Akaike<sup>3</sup>, Hideshi Ihara<sup>1, 2</sup>

<sup>1</sup>Department of Biological Chemistry, Graduate School of Science, Osaka Prefecture University, <sup>2</sup>Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University, <sup>3</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

### P14 Physiological functions of polysulfides produced by cysteinyl-tRNA synthetase 1 (CARS1) in skeletal muscle

<u>Yusuke Kusano</u><sup>1, 2</sup>, Shohei Murakami<sup>1</sup>, Takahiro Onoki<sup>3</sup>, Masanobu Morita<sup>4</sup>, Tomoaki Ida<sup>4</sup>, Yukio Katori<sup>2</sup>, Takaaki Akaike<sup>4</sup>, Hozumi Motohashi<sup>1</sup>

<sup>1</sup>Department of Gene Expression Regulation, Institute of Development, Aging and Cancer, Tohoku University, <sup>2</sup>Department of Otolaryngology-Head &Neck Surgery, Tohoku University Graduate School of Medicine, <sup>3</sup>Department of Orthopaedic Surgery, Tohoku University Graduate School of Medicine, <sup>4</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

# P15 tRNA thiolation by TtuA-TtuB using [4Fe-4S] cluster

Yoshikazu TANAKA

Tohoku University

# P16 Sulfur metabolism in cyclo-octasulfur S<sub>8</sub>-loaded 3T3-L1 adipocytes

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### P17 Longevity regulation via sulfide: quinone oxidoreductasedependent energy metabolism in fission yeast

<u>Naim Hassan</u><sup>1</sup>, Akira Nishimura<sup>2</sup>, Tomoaki Ida<sup>1</sup>, Masanobu Morita<sup>1</sup>, Tetsuro Matsunaga<sup>1</sup>, Hiroshi Takagi<sup>2</sup>, Hozumi Motohashi<sup>3</sup>, Takaaki Akaike<sup>1</sup>

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P18

### Sulfide: quinone oxidoreductase produces cyclo-octasulfur, S<sub>8</sub> that mediate sulfur respiration in mitochondria

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# P19 Discovery of new persulfide synthases that are expressed among all organisms during their evolution

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# P20 A novel mechanism of sulfur metabolism catalyzed by NOX and NOS

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# **P21**

# Reactive sulfur species metabolism regulated by sulfurtransferase, rhodanese

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# P22 Chronological aging is regulated by persulfide production via mitochondrial cysteinyl-tRNA synthetase in yeast

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### P23 Alternations of sulfur metabolism in sulfite oxidase deficiency

<u>Chun-Yu Fu<sup>1</sup>, Tamás Ditrói<sup>2</sup>, Max Mai<sup>1</sup>, Flávia Rezende<sup>3</sup>, Peter Nagy<sup>2</sup>, Günter Schwarz<sup>1</sup></u>

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### P24 Commonly used alkylating agents limit persulfide detection by converting protein persulfides into thioethers

Danny Schilling<sup>1, 2</sup>, Uladzimir Barayeu<sup>1, 2</sup>, Raphael R. Steimbach<sup>2, 3</sup>, Deepti Talwar<sup>1</sup>, Aubry K. Miller<sup>3</sup>, Tobias P. Dick<sup>1, 2</sup>

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# P25 Biological persulfides inhibit lipid peroxidation and ferroptosis by scavenging free radicals

<u>Uladzimir Barayeu</u><sup>1, 2</sup>, Danny Schilling<sup>1, 2</sup>, Mohammad Eid<sup>1, 2</sup>, Thamara Nishida Xavier Da Silva<sup>3</sup>, Lisa Schlicker<sup>4</sup>, Nikolina Mitreska<sup>5</sup>, Christopher Zapp<sup>6</sup>, Frauke Gräter<sup>6</sup>, Aubry K. Miller<sup>7</sup>, Reinhard Kappl<sup>5</sup>, Almut Schulze<sup>4</sup>, José Pedro Friedmann Angeli<sup>3</sup>, Tobias P. Dick<sup>1, 2</sup>

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# P26 Supramolecular solubilization of elemental sulfur in water by cucurbiturils: Activation by thiols and reduction of S<sub>8</sub> into H<sub>2</sub>S

<u>Arman Cuauhtemoc Garcia</u>, Lev N. Zakharov, Michael D. Pluth University of Oregon

# Oxidative\_Stress

### P27 Role of oxidative stress-induced stress granules and autophagy defects in a mouse model of neurodegenerative disorder

Rashmi Parihar, <u>Subramaniam Ganesh</u> Indian Institute of Technology Kanpur

### P28 Indoxyl sulfate induces oxidative stress and metabolic changes in hippocampal neurons, and ketone bodies suppress the uremic toxin induced-neuronal damage

<u>Emiko Sato<sup>1, 2</sup>, Mayu Watanabe<sup>1</sup>, Eikan Mishima<sup>2</sup>, Yukina Iwamoto<sup>1</sup>, Takaaki Abe<sup>2</sup>, Nobuyuki Takahashi<sup>1, 2</sup></u>

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### P29 Exploring the role of mitochondrial dynamics in tracheal basal stem cells

Masafumi Noguchi<sup>1, 2, 3</sup>, Keiko Iwata<sup>1</sup>, Norihito Shintani<sup>1</sup>, Luca Scorrano<sup>2, 3</sup>

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### P30 Investigation of the antioxidant mechanism of 2-oxoimidazole containing dipeptides

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# P31 Analysis of the inhibitory activity of 2-oxo-imidazole containing dipeptides against peroxynitrite-dependent nitration

<u>Kana Matsukura</u><sup>1</sup>, Shingo Kasamatsu<sup>1, 2</sup>, Some Komae<sup>1</sup>, Yuki Kakihana<sup>3</sup>, Koji Uchida<sup>4</sup>, Hideshi Ihara<sup>1, 2</sup>

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### P32 Nrf2 hyperactivation in Keap1 knockout zebrafish

Lixuan Bian, Makoto Kobayashi, Junya Tamaoki Department of Molecular and Developmental Biology, Faculty of Medicine, University of Tsukuba

# P33 Iron metabolism in the ER-mitochondrial contact site regulated by redox condition

<u>Isshin Shiiba</u><sup>1, 2</sup>, Hijiri Oshio<sup>1</sup>, Naoki Ito<sup>1</sup>, Shigeru Yanagi<sup>1</sup> <sup>1</sup>Gakushuin University, <sup>2</sup>Tokyo university of pharmacy and life sciences

### P34 Ameliorating effects of nitrate-rich beetroot juice supplementation on monocrotaline-induced pulmonary hypertension in rats

<u>Masashi Tawa</u>, Junya Nagano, Junpei Kitama, Shunto Abe, Ako Fujita, Keisuke Nakagawa, Mamoru Ohkita

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### P35 Antioxidative activity of human serum albumin via supersulfides

<u>Mayumi Ikeda<sup>1, 2</sup></u>, Maki Sakai<sup>2</sup>, Keitaro Umezawa<sup>3</sup>, Hidehiko Nakagawa<sup>4</sup>, Toru Maruyama<sup>5</sup>, Masaki Otagiri<sup>6</sup>, Takaaki Akaike<sup>7</sup>, Tomohiro Sawa<sup>5</sup>, Ming Xian<sup>8</sup>, Tatsuhiro Ishida<sup>2</sup>, Yu Ishima<sup>2</sup>

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奈 : online presentation

P36

# A non-canonical vitamin K cycle is a potent ferroptosis suppressor

Eikan Mishima<sup>1, 2</sup>, Junya Ito<sup>3</sup>, Kiyotaka Nakagawa<sup>3</sup>, Takaaki Abe<sup>2</sup>, Marcus Conrad<sup>1</sup> <sup>1</sup>Helmholtz Zentrum München, <sup>2</sup>Tohoku University Graduate School of Medicine, <sup>3</sup>Tohoku University Graduate School of Aaricultural Science

# NO-H2S

# P37 Toward an analysis of the effects of hydrogen sulfide on the voltage-gated potassium channel

<u>Akira Kawanabe</u>, Yuichiro Fujiwara Kagawa University

# P38 N-Sulfur-substituted imines as a stable precursor for asymmetric synthesis of α-amino phosphonic acid

Tsubasa Inokuma, Takuya Sakakibara, Ken-Ichi Yamada

Graduate School of Pharmaceutical Sciences / Tokushima University

# P39 The effect of inhibiting hydrogen sulfide synthesis in the medullary respiratory center on the respiratory pattern generation

Tadachika Koganezawa<sup>1, 2</sup>, Yuka Yamada<sup>1, 3</sup>, Chikako Kotani<sup>1, 4</sup>, Minako Okazaki<sup>1, 5</sup>

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# P40 Enhancement of tumor drug delivery using nitric oxide donors in advanced cancer

<u>Waliul Islam<sup>1, 2</sup>, Jun Fang<sup>3</sup>, Hiroyasu Tsutsuki<sup>1</sup>, Takuro Niidome<sup>1</sup>, Tomohiro Sawa<sup>1</sup></u> <sup>1</sup>Kumamoto University, <sup>2</sup>Biodynamics Research Foundation, <sup>3</sup>Sojo University

# P41 Effects of peroxynitrite on the fucosylation and phosphorylation of c-Met in HepG2 cells

<u>Hironobu Eguchi</u>, Shigeaki Hamazaki, Haruhiko Sakiyama, Daisaku Yoshihara, Noriko Fujiwara, Keiichiro Suzuki

Department of Biochemistry, School of Medicine, Hyogo Medical University

# P42 Hydralazine therapy attenuates nitrosative stress in heart failure with preserved ejection fraction

<u>Zhen Li</u>, Kyle B. Lapenna, Huijing Xia, Thomas E. Sharp, John S. Wang, Karl Moles, Traci T. Goodchild, David J. Lefer

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### P43 Nitrosothiol signaling dysfunction is driven by GSNOR in the pathogenesis of heart failure with preserved ejection fraction

<u>Zhen Li,</u> Kyle B. Lapenna, Huijing Xia, Thomas E. Sharp, Jake E. Doiron, Traci T. Goodchild, David J. Lefer

Cardiovascular Center of Excellence, Louisiana State University Health Sciences Center, New Orleans, LA

### P44 Endothelium-derived hydrogen sulfide inhibits endothelialmesenchymal transition in heart failure via modulating nitric oxide bioavailability

Zhen Li<sup>1</sup>, Huijing Xia<sup>1</sup>, Thomas E. Sharp<sup>1</sup>, Kyle B. Lapenna<sup>1</sup>, John W. Elrod<sup>2</sup>, Josef Pfeilschifter<sup>3</sup>, Karl-Friedrich Beck<sup>3</sup>, Traci T. Goodchild<sup>1</sup>, David J. Lefer<sup>1</sup>

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# Host Defence

# P45 Regulatory mechanism of NLRP3 inflammasome activation via protein S-sulfhydration

<u>Tianli Zhang</u><sup>1</sup>, Hiroyasu Tsutsuki<sup>1</sup>, Touya Toyomoto<sup>1</sup>, Akiyuki Nishimura<sup>2</sup>, Motohiro Nishida<sup>2,3</sup>, Takaaki Akaike<sup>4</sup>, Tomohiro Sawa<sup>1</sup>

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# P46 Host redox regulatory mechanisms involved in the pathogenicity of enterohemorrhagic *Escherichia coli* toxin SubAB

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奈 : online presentation

P48

## Polysulfide donor enhances bacteria killing by immune cells

<u>Azizur Rahman<sup>1</sup>, Tianli Zhang<sup>1</sup>, Hiroyasu Tsutsuki<sup>1</sup>, Kei Miyano<sup>2</sup>, Akira Yamauchi<sup>2</sup>, Takaaki Akaike<sup>3</sup>, Tomohiro Sawa<sup>1</sup></u>

<sup>1</sup>Kumamoto University, <sup>2</sup>Kawasaki Medical School, <sup>3</sup>Tohoku University Graduate School of Medicine

# Cooperation between CYB5R3 and NOX4 via coenzyme Q mitigates endothelial inflammation

<u>Shuai Yuan</u><sup>1</sup>, Scott Hahn<sup>1</sup>, Megan Miller<sup>1</sup>, Subramaniam Sanker<sup>1</sup>, Michael Calderon<sup>1</sup>, Mara Sullivan<sup>1</sup>, Atinuke Dosunmu-Ogunbi<sup>1</sup>, Marco Fazzari<sup>1</sup>, Yao Li<sup>1</sup>, Michael Reynolds<sup>1</sup>, Katherine Wood<sup>1</sup>, Claudette St. Croix<sup>1</sup>, Donna Stolz<sup>1</sup>, Eugenia Cifuentes-Pagano<sup>1</sup>, Placido Navas<sup>2</sup>, Sruti Shiva<sup>1</sup>, Francisco Schopfer<sup>1</sup>, Patrick Pagano<sup>1</sup>, Adam Straub<sup>1</sup>

<sup>1</sup>University of Pittsburgh, <sup>2</sup>Universidad Pablo de Olavide-CSIC-JA

### P49 Inhibition of xCT,cystine/glutamate transporter, supresses chronic inflammation in a mouse model of inflammatory bowel disease

<u>Hideya Iwaki<sup>1, 2</sup></u>, Hiroki Sekine<sup>1</sup>, Shohei Murakami<sup>1</sup>, Nobufumi Kato<sup>3</sup>, Hiroshi Kitamura<sup>4</sup>, Fanyan Wei<sup>5</sup>, Shinji Fukuda<sup>6</sup>, Tomonoshi Soga<sup>6</sup>, Yoichi Kakuta<sup>2</sup>, Atsushi Masamune<sup>6</sup>, Hozumi Motohashi<sup>1</sup>

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# P50 Supersulfides negatively regulate type I interferon signaling

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# P51 Reactive sulfur species regulate immune response via T cell receptor signaling

<u>Masanobu Morita</u><sup>1</sup>, Mitsuhiro Yamada<sup>2</sup>, Yusaku Sasaki<sup>2</sup>, Tadahisa Numakura<sup>2</sup>, Tomoaki Ida<sup>1</sup>, Tetsuro Matsunaga<sup>1</sup>, Tsuyoshi Takata<sup>1</sup>, Satoshi Watanabe<sup>3</sup>, Kenji Inaba<sup>3</sup>, Naoto Ishii<sup>4</sup>, Hisatoshi Sugiura<sup>2</sup>, Hozumi Motohashi<sup>5</sup>, Takaaki Akaike<sup>1</sup>

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# P52 Reactive sulfur species protect against SARS-CoV-2 infection via suppression of the viral thiol proteases

<u>Minkyung Jung</u>, Tetsuro Matsunaga, Tomoaki Ida, Seiryo Ogata, Sunghyeon Yoon, Tsuyoshi Takata, Yuka Unno, Masanobu Morita, Takaaki Akaike

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# Biotechnology

### P53 Development of supramolecular capsule-based tools for supersulfide analysis

### Lorenzo Catti, Michito Yoshizawa

Tokyo Institute of Technology, Institute of Innovative Research, Laboratory for Chemistry and Life Science

# P54 Development and application of a visible-light-responsive NO releaser containing tellurorhodamine as an antenna

<u>Daisuke Saitoh</u><sup>1</sup>, Naoya Ieda<sup>1</sup>, Kyoya Oyama<sup>2</sup>, Yuji Hotta<sup>1</sup>, Mitsuyasu Kawaguchi<sup>1</sup>, Kazunori Kimura<sup>1</sup>, Hidehiko Nakagawa<sup>1</sup>

<sup>1</sup>Graduate School of Pharmaceutical Sciences, Nagoya City University, <sup>2</sup>Faculty of Pharmaceutical Sciences, Nagoya City University

### P55 Development of 3-mercaptopyruvate sulfurtransferase (3MST) selective inhibitors and their inhibitory mechanism

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### P56 Development of single-molecule enzyme activity-based protein profiling (SEAP) strategy for the detection of diseaserelated enzyme activities in blood samples

<u>Toru Komatsu</u><sup>1</sup>, Shingo Sakamoto<sup>1</sup>, Yu Kagami<sup>1</sup>, Tadahaya Mizuno<sup>1</sup>, Rikiya Watanabe<sup>3</sup>, Kazufumi Honda<sup>4</sup>, Yasuteru Urano<sup>1, 2</sup>

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 $\widehat{\boldsymbol{\gamma}}$  : online presentation

P57

### Development of ionization-coupled cleavage of oxidized polysulfide structure (iCOPS): a novel detection method for oxidized polysulfide modifications on proteins

<u>Kae Okamura<sup>1</sup>, Shingo Kasamatsu<sup>1</sup>, Takayuki Shimizu<sup>2</sup>, Shinji Masuda<sup>3</sup>,</u> Hideshi Ihara<sup>1</sup>

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### P58 Development of metabolomic diagnostics in mouse exhaled breath condensates

<u>Kenji Hamada<sup>1, 2</sup>,</u> Shohei Murakami<sup>1</sup>, Tomoaki Ida<sup>3</sup>, Fanyan Wei<sup>4</sup>, Kazuki Hayasaka<sup>5</sup>, Yoshinori Okada<sup>5</sup>, Takashi Kamei<sup>2</sup>, Takaaki Akaike<sup>3</sup>, Hozumi Motohashi<sup>1</sup>

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# **P59** Phosphoproteomic analysis of nitrosative stress-responsive phosphoproteins in *E.coli*

Silviya Raykova Stateva, Miguel Teixeira

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# P60 Development of chemical tools for comprehensive analysis of supersulfidated biomolecules

<u>Keitaro Umezawa</u><sup>1</sup>, Hiroki Tsumoto<sup>1</sup>, Kyojiro Kawakami<sup>1</sup>, Mako Kamiya<sup>2</sup>, Yasuteru Urano<sup>3,4</sup>, Yuri Miura<sup>1</sup>

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# P61 Breath omics technology developed for a hamster model of SARS-CoV-2 infection

<u>Seiryo Ogata<sup>1</sup></u>, Masanobu Morita<sup>1</sup>, Tetsuro Matsunaga<sup>1</sup>, Tomoaki Ida<sup>1</sup>, Shohei Murakami<sup>2</sup>, Fan-Yan Wei<sup>3</sup>, Hozumi Motohashi<sup>2</sup>, Takaaki Akaike<sup>1</sup>

<sup>1</sup>Dept. Environ. Med. Mol. Toxicol., Tohoku Univ. Grad. Sch. Med., <sup>2</sup>Dept. Gene Exp. Regul., IDAC, Tohoku Univ., <sup>3</sup>Dept. Modomics Biol. Med., IDAC, Tohoku Univ.

# P62 Breath omics analysis for the COVID-19: Viral PCR analysis and sulfur metabolome

<u>Seji Asamitsu</u><sup>1, 2</sup>, Seiryo Ogata<sup>2</sup>, Tomoaki Ida<sup>2</sup>, Tetsuro Matsunaga<sup>2</sup>, Minkyung Jung<sup>2</sup>, Tsuyoshi Takata<sup>2</sup>, Masanobu Morita<sup>2</sup>, Hozumi Motohashi<sup>3</sup>, Takaaki Akaike<sup>2</sup>

<sup>1</sup>Dept. Surg., Tohoku Univ. Grad. Sch. Med., <sup>2</sup>Dept. Environ. Med. Mol. Toxicol., Tohoku Univ. Grad. Sch. Med., <sup>3</sup>Dept. Gene Exp. Reg., IDAC, Tohoku Univ.

# P63 Shining a light on SSP4: A comprehensive analysis and biological applications for the detection of sulfane sulfurs

<u>Meg Shieh</u><sup>1</sup>, Xiang Ni<sup>1</sup>, Stephen Lindahl<sup>1</sup>, Shi Xu<sup>1</sup>, Moua Yang<sup>2</sup>, Tetsuro Matsunaga<sup>3</sup>, Robert Flaumenhaft<sup>2</sup>, Takaaki Akaike<sup>3</sup>, Ming Xian<sup>1</sup>

<sup>1</sup>Department of Chemistry, Brown University, Providence, <sup>2</sup>Division of Hemostasis and Thrombosis, Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, <sup>3</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine, Sendai, Japan

# P64 Understanding the persulfide-sensing specificity in transcriptional regulators for its application in cell free biosensors

<u>Matias Villarruel Dujovne<sup>1</sup>, Giuliano T. Antelo<sup>1</sup>, Sofia Liuboschitz<sup>1</sup>,</u> Maria Juliana Juncos<sup>1</sup>, Julius B. Lucks<sup>3, 4</sup>, David P. Giedroc<sup>2</sup>, Daiana A. Capdevila<sup>1</sup>

<sup>1</sup>Fundación Instituto Leloir, Buenos Aires, Argentina, <sup>2</sup>Department of Chemistry and Department of Molecular and Cellular Biochemistry, Indiana University, Bloomington, USA, <sup>3</sup>Department of Chemical and Biological Engineering, Northwestern University, Evanston, USA, <sup>4</sup>Center for Synthetic Biology, Northwestern University, Evanston, USA

# Bacterial Biology

 P65 YgaV, a sulfide-responsive transcription factor SqrR/ BigR homolog of *Escherichia coli*, controls expression of anaerobic respiratory genes and antibiotic tolerance

Rajalakshmi Balasubramanian, Shinji Masuda

Tokyo Institute of Technology

### P66 Structural basis for an efficient sulfur transfer via an E. coli sulfur transfer protein TusE as elucidated by solution NMR spectroscopy

Yuji Tokunaga<sup>1, 2</sup>, Naoki Shigi<sup>2</sup>, Ichio Shimada<sup>3</sup>, Koh Takeuchi<sup>1, 2</sup>

<sup>1</sup>Graduate School of Pharmaceutical Scineces, the University of Tokyo, <sup>2</sup>Celluar and Molecular Biotechnology Research Institute, National Institute of Advanced Industrial Science and Technology, <sup>3</sup>Center for Biosystems Dynamics Research, RIKEN

P67

# Sulfane sulfur mediates anaerobic photoinhibition in the green sulfur bacterium chlorobaculum tepidum

<u>Masahiko Higashiguchi</u>, Kazuki Terauchi, Chihiro Azai Graduate School of Life Sciences, Ritsumeikan University

# P68 Structural and functional analysis of a thiosulfate transporter complex

<u>Mai Ikei</u><sup>1</sup>, Azusa Takeuchi<sup>1</sup>, Yusuke Naito<sup>1</sup>, Muneyoshi Ichikawa<sup>1, 2, 3</sup>, Ryoji Miyazaki<sup>1</sup>, Tomoya Tsukazaki<sup>1</sup>

<sup>1</sup>Nara Institute of Science and Technology, <sup>2</sup>Fudan University, <sup>3</sup>PRESTO, JST

### P69 Nitric oxide signaling for aerial mycelium formation in Streptomyces coelicolor A3(2) M145

<u>Sota Honma</u>, Shinsaku Ito, Shunsuke Yajima, Yasuyuki Sasaki From Faculty of Life Sciences, Department of Bioscience, Tokyo University of Agriculture

### P70 Identification and quantification of β-lactam ring opened carbothioic S-acids mediated by cysteine hydropersulfide in bacteria

Katsuhiko Ono<sup>1</sup>, Hiroyasu Tsutsuki<sup>1</sup>, Tianli Zhang<sup>1</sup>, Takaaki Akaike<sup>2</sup>, Tomohiro Sawa<sup>1</sup>

<sup>1</sup>Department of Microbiology, Graduate School of Life Sciences, Kumamoto University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

### P71 Novel antibiotics adjuvant targeting bacterial cysteine synthase through enhancing oxidative stress

<u>Touya Toyomoto</u><sup>1</sup>, Katsuhiko Ono<sup>1</sup>, Hiroyasu Tsutsuski<sup>1</sup>, Tianli Zhang<sup>1</sup>, Takaaki Akaike<sup>2</sup>, Tomohiro Sawa<sup>1</sup>

<sup>1</sup>Department of Microbiology, Graduate School of Medical Sciences of Kumamoto University, Japan, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine, Japan

# October 31 (Mon)

4th International Conference on Persulfide and Sulfur Metabolism in Biology and Medicine / Tohoku Forum of Creativity, Thematic Program

8:45-, October 31 (Mon)

# **Opening Remarks**

### Motoko Kotani

Exective Vice President for Research, Tohoku University

### 9:00-9:45, October 31 (Mon)

### Plenary Lecture PL5

Chairperson: Yoshiro Saito (Tohoku University, Japan)

# PL5 Elucidation of molecular basis of oxidative stress response utilizing mouse, human and space biology

Masayuki Yamamoto Tohoku University

# 10:00-12:00, October 31 (Mon)

# Session T1

# "Metabolism of Metal, Sulfur and Selenium in Redox Biology and Medicine"

Chairpersons: Yoshiro Saito (Tohoku University, Japan) Yasumitsu Ogura (Chiba University, Japan)

### 10:00-10:30

# 10 years of ferroptosis: New mechanisms and therapeutic applications

Brent Stockwell Columbia University Venue A

Venue A

穼 : online presentation

#### 10:30-11:00

# ST1-2 Ferroptosis: From basic mechanisms to therapeutic opportunities

Marcus Conrad

Helmholtz Munich

#### 11:00-11:20

# STI-3 Selenoprotein P as a critical regulator of selenium metabolism- Implication to iron metabolism

Yoshiro Saito

Graduate School of Pharmaceutical Sciences, Tohoku University

#### 11:20-11:40

### STI-4 Metabolism of selenium for urinary excretion

Yasumitsu Ogra

Graduate School of Pharmaceutical Sciences, Chiba University

#### 11:40-12:00

### ST1-5 Oxidative stress defense in cancer

Nobuaki Takahashi Kyoto University

### 12:10-12:55, October 31 (Mon)

### **Lunch Seminar**

Sponsored by: Shimadzu Corporation

Venue A

Chairperson: Péter Nagy (National Institute of Oncology, Hungary)

### LS2 Productization of the LC/MS/MS method for the profiling of reactive sulfur species with emphasis on inter-laboratory reproducibility and standardization

Atsuhiko Toyama MSBU, Shimadzu Corporation

### 13:00-15:30, October 31 (Mon)

### Session S1

"Sulfur and Oxygen Redox Biology and Medicine"

Chairpersons: Chris Kevil (LSU Health Shreveport, USA) Péter Nagy (National Institute of Oncology, Hungary)

#### 13:00-13:30

# SS1-1 Redox regulation of N-glycans: Implications for red and vascular cell inflammation

Rakesh P Patel

University of Alabama at Birmingham

#### 13:30-14:00

# **SS1-2** Tissue specific roles of cystathionine gamma lyase in regulating vascular function and growth

<u>Chris Kevil</u>, Gopi Kolluru, Xinggui Shen, Shaufil Alam, Takashi Yagi, Sibile Pardue, John Glawe

LSU Health Shreveport

#### 14:00-14:30

### SS1-3 Stress signalling and redox balance – From origin of life chemistry to where we are now

Martin Feelisch

Clinical & Experimental Sciences, Faculty of Medicine, Southampton General Hospital and Institute for Life Sciences, University of Southampton

#### 14:30-15:00

# SS1-4 H<sub>2</sub>S therapy improves diastolic dysfunction and exercise capacity in heart failure with preserved ejection fraction

David J. Lefer<sup>1</sup>, Zhen Li<sup>1</sup>, Jianming Kang<sup>2</sup>, Ming Xian<sup>2</sup>

<sup>1</sup>Smidt Heart Institute, Cedars-Sinai Medical Center, Los Angeles, CA, <sup>2</sup>Department of Chemistry, Brown University, Providence, RI

#### 15:00-15:30

# SS1-5 Protective roles of hydrogen sulfide in neurodegenerative diseases

#### Bindu D. Paul<sup>1,2,3,4</sup>

<sup>1</sup>Department of Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine, Baltimore, MD 21205, USA, <sup>2</sup>Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD 21205, USA, <sup>3</sup>The Solomon H. Snyder Department of Neuroscience, Johns Hopkins University School of Medicine, Baltimore, MD 21205, USA, <sup>4</sup>Lieber Institute for Brain Development, Baltimore, MD 21205, USA

Venue A

奈 : online presentation

### 15:40-18:40, October 31 (Mon)

### Session S2

# "Redox Biology in Reactive Sulfur, Oxygen, and Chalcogens"

Chairpersons: Jon M Fukuto (Sonoma State University / Johns Hopkins University, USA) Ming Xian (Brown University, USA)

#### 15:40-16:10

# \$\$2-1 The chemical biology of hydropersulfides and related species

#### Jon M Fukuto<sup>1, 2</sup>

<sup>1</sup>Department of Chemistry, Sonoma State University, <sup>2</sup>Department of Chemistry, Johns Hopkins University

#### 16:10-16:25

### SS2-2 Vasorelaxant properties of hydropersulfides: Interaction with S-nitrosothiols

<u>Adrian J Hobbs</u><sup>1</sup>, Cristina Perez-Ternero<sup>1</sup>, Christopher Mcginity<sup>1</sup>, Anthony W Demartino<sup>2</sup>, Jessica Zarenkiewicz<sup>3</sup>, Vinayak S Khodade<sup>3</sup>, Joseph Lin<sup>4</sup>, Peter C Ford<sup>2</sup>, John P Toscano<sup>3</sup>, Jon M Fukuto<sup>5</sup>

<sup>1</sup>William Harvey Research Institute, Queen Mary University of London, <sup>2</sup>Department of Chemistry & Biochemistry, University of California, Santa Barbara, <sup>3</sup>Department of Chemistry, Johns Hopkins University, <sup>4</sup>Department of Biology, Sonoma State University, <sup>5</sup>Department of Chemistry, Sonoma State University

#### 16:25-16:55

# SS2-3 Age-induced persulfide remodelling predisposes brain for neurodegenerative diseases

### Milos R. Filipovic

Leibniz Institute for Analytical Sciences, ISAS e.V., Dortmund, Germany

#### 16:55-17:25

# SS2-4 New approaches to investigate small molecule reactive sulfur species and related compounds

#### Michael Pluth

University of Oregon

#### 17:25-17:55

# **\$\$2-5** Sulfur metabolism by antioxidant nutraceuticals and related compounds: An alternative pathway to redox homeostasis

### Kenneth R Olson<sup>1, 2</sup>

<sup>1</sup>Indiana University School of Medicine South Bend, <sup>2</sup>Dept of Biological Sciences University of Notre Dame

#### 17:55-18:25

# **SS2-6** Sulfite oxidase in health and disease: The intimate interplay between sulfite and hydrogen sulfide

### Guenter Schwarz

Institute of Biochemistry, Department of Chemistry & Center for Molecular Medicine, Cologne University, Germany

#### 18:25-18:40

### \$\$2-7 The roles of sulfides in bone resorption

<u>Yoichi Miyamoto<sup>1,2</sup>,</u> Risa Sugisaki<sup>1,3</sup>, Takaaki Akaike<sup>4</sup>, Daichi Chikazu<sup>3</sup>, Ryutaro Kamijo<sup>1</sup>

<sup>1</sup>Department of Biochemistry, Showa University School of Dentistry, <sup>2</sup>Division of Physiology and Biochemistry, Faculty of Arts and Sciences at Fujiyoshida, Showa University, <sup>3</sup>Department of Oral Surgery, Tokyo Medical University, <sup>4</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

### 10:00-12:00, October 31 (Mon)

### Session T2

# "Young Investigator Session"

Chairpersons: Takaaki Akaike (Tohoku Univeristy, Japan) Albert van der Vliet (University of Vermont, USA)

#### 10:00-10:20

### ST2-1 Commonly used alkylating agents limit persulfide detection by converting protein persulfides into thioethers

<u>Danny Schilling<sup>1, 2</sup></u>, Uladzimir Barayeu<sup>1, 2</sup>, Raphael R. Steimbach<sup>2, 3</sup>, Deepti Talwar<sup>1</sup>, Aubry K. Miller<sup>3</sup>, Tobias P. Dick<sup>1, 2</sup>

<sup>1</sup>Division of Redox Regulation, German Cancer Research Center (DKFZ), Heidelberg, Germany, <sup>2</sup>Faculty of Biosciences, Heidelberg University, Heidelberg, Germany, <sup>3</sup>Cancer Drug Development DKFZ, Heidelberg, Germany

Venue C

 $\widehat{\boldsymbol{r}}$  : online presentation

#### 10:20-10:40

# Biological persulfides inhibit lipid peroxidation and ferroptosis by scavenging free radicals

<u>Uladzimir Barayeu</u><sup>1,2</sup>, Danny Schilling<sup>1,2</sup>, Mohammad Eid<sup>1,2</sup>, Thamara Nishida Xavier Da Silva<sup>3</sup>, Lisa Schlicker<sup>4</sup>, Nikolina Mitreska<sup>5</sup>, Christopher Zapp<sup>6</sup>, Frauke Gräter<sup>6</sup>, Aubry K. Miller<sup>7</sup>, Reinhard Kappl<sup>5</sup>, Almut Schulze<sup>4</sup>, José Pedro Friedmann Angeli<sup>3</sup>, Tobias P. Dick<sup>1,2</sup>

<sup>1</sup>Division of Redox Regulation, German Cancer Research Center (DKF2), Heidelberg, Germany, <sup>2</sup>Faculty of Biosciences, Heidelberg University, Heidelberg, Germany, <sup>3</sup>Rudolf-Virchow-Zentrum - Center for Integrative and Translational Bioimaging, University of Würzburg, Würzburg, Germany, <sup>1</sup>Division of Tumor Metabolism and Microenvironment, German Cancer Research Center (DKF2), Heidelberg, Germany, <sup>5</sup>Department of Biophysics, Faculty of Medicine, Center for Integrative Physiology and Molecular Medicine (CIPMM), Saarland University, Homburg, Germany, <sup>7</sup>Nolecular Biomechanics, Heidelberg Institute for Theoretical Studies (HITS), Heidelberg, Germany, Tesearch Group Cancer Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center Note, Center Drug Development, German Cancer Research Center (DKF2), Heidelberg, Germany, Center Note, Center (DKF2), Heidelberg, Germany, Center Center (DKF2), Heidelberg, Germany, Center Note, Center (DKF2), Heidelberg, Germany, Center Note, Center (DKF2), Heidelberg, Germany, Center Center (DKF2), Heidelberg, Germany, Center (DKF2), Heidelberg, Germany, Center Center (DKF2), Heidelberg, Germany, Center (DKF2), Heidelberg, Germany, Center (DKF2), Heidelberg, Germany, Center (DKF2), Heidelberg, Germany, Center (Center (DKF2), Heidelb

#### 10:40-11:00

# **ST2-3** Shining a light on SSP4: A comprehensive analysis and biological applications for the detection of sulfane sulfurs

<u>Meg Shieh</u><sup>1</sup>, Xiang Ni<sup>1</sup>, Stephen Lindahl<sup>1</sup>, Shi Xu<sup>1</sup>, Moua Yang<sup>2</sup>, Tetsuro Matsunaga<sup>3</sup>, Robert Flaumenhaft<sup>2</sup>, Takaaki Akaike<sup>3</sup>, Ming Xian<sup>1</sup>

<sup>1</sup>Department of Chemistry, Brown University, Providence, <sup>2</sup>Division of Hemostasis and Thrombosis, Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, <sup>3</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine, Sendai, Japan

#### 11:00-11:20

# S12-4 Supramolecular solubilization of elemental sulfur in water by cucurbiturils: Activation by thiols and reduction of S<sub>8</sub> into H<sub>2</sub>S

Arman Cuauhtemoc Garcia, Lev N. Zakharov, Michael D. Pluth

University of Oregon

#### 11:20-11:40

# ST2-5 Understanding the persulfide-sensing specificity in transcriptional regulators for its application in cell free biosensors

<u>Matias Villarruel Dujovne</u><sup>1</sup>, Giuliano T. Antelo<sup>1</sup>, Sofia Liuboschitz<sup>1</sup>, Maria Juliana Juncos<sup>1</sup>, Julius B. Lucks<sup>3,4</sup>, David P. Giedroc<sup>2</sup>, Daiana A. Capdevila<sup>1</sup>

<sup>1</sup>Fundación Instituto Leloir, Buenos Aires, Argentina, <sup>2</sup>Department of Chemistry and Department of Molecular and Cellular Biochemistry, Indiana University, Bloomington, IN, USA, <sup>3</sup>Department of Chemical and Biological Engineering, Northwestern University, Evanston, IL, USA., <sup>4</sup>Center for Synthetic Biology, Northwestern University, Evanston, IL, USA

### 11:40-12:00

# ST2-6 A non-canonical vitamin K cycle is a potent ferroptosis suppressor

### Eikan Mishima<sup>1, 2</sup>, Junya Ito<sup>3</sup>, Kiyotaka Nakagawa<sup>3</sup>, Takaaki Abe<sup>2</sup>, Marcus Conrad<sup>1</sup>

<sup>1</sup>Helmholtz Zentrum München, <sup>2</sup>Tohoku University Graduate School of Medicine, <sup>3</sup>Tohoku University Graduate School of Agricultural Science

# 13:00-15:30, October 31 (Mon)

### Session S3

# "Supersulfide in Development and Aging" (IDAC-CERA Session)

Chairpersons: Shinpei Kawaoka (Tohoku University, Japan) Andrew Pieper (Case Western Reserve University, USA)

### 13:00-13:23

### SS3-1 Physiological function of mitochondrial sulfur metabolism in hematopoietic stem cells

<u>Shohei Murakami</u><sup>1</sup>, Zhao Mingyue<sup>1</sup>, Masanobu Morita<sup>2</sup>, Tomoaki Ida<sup>2</sup>, Takaaki Akaike<sup>2</sup>, Hozumi Motohashi<sup>1</sup>

<sup>1</sup>Department of Gene Expression Regulation, Institute of Development, Aging and Cancer, Tohoku University, <sup>2</sup>Department of Environmental Medicine and Molecular Toxicology, Tohoku University Graduate School of Medicine

#### 13:23-13:46

### SS3-2 Metabolic resilience common to stem cells in aging hematopoiesis and leukemia

#### Keiyo Takubo

National Center for Global Health and Medicine Research Institute (NCGM-RI)

#### 13:46-14:15

# SS3-3 Redox regulation in stress resistance, metabolic homeostasis, and longevity

### Keith Blackwell<sup>1, 2</sup>

<sup>1</sup>Joslin Diabetes Center, <sup>2</sup>Harvard Medical School Department of Genetics

Venue C

穼 : online presentation

#### 14:15-14:38

SS3-4

### 4 Novel approach for cancer therapy by simultaneous targeting of xCT-dependent cystine transport and aldehyde dehydrogenase activity

#### <u>Osamu Nagano</u>

Keio University School of Medicine, IAMR, Division of Gene Regulation

#### 14:38-15:01

### **SS3-5** Enhancer regulation of hepatic aerobic respiration

### Shinpei Kawaoka

Institute of Development, Aging and Cancer, Tohoku University

#### 15:01-15:30

# SS3-6 Discovery of an NAD<sup>+</sup>-stabilizing agent with protective efficacy in neurodegenerative disease

### Andrew A. Pieper<sup>1, 2, 3</sup>

<sup>1</sup>Department of Psychiatry, Case Western Reserve University, Cleveland, OH, USA, <sup>2</sup>Geriatric Psychiatry, Geriatric Research Education and Clinical Center, Louis Stokes Cleveland VA Medical Center; Cleveland, OH, USA, <sup>3</sup>Harrington Discovery Institute, University Hospitals Cleveland Medical Center, Cleveland, OH, USA

#### 15:40-17:40, October 31 (Mon)

### **Session T5**

# "Mitochondria Biology and Human Disease I"

Chairpersons: Shigeru Yanagi (Gakushuin University, Japan) Atsushi Tanaka (Yamagata University, Japan)

#### 15:40-16:09

# **ST5-1** Characterizing the correlation of mitochondria dynamics and oxidative stress

Ping-Chung Liang<sup>1</sup>, Chang-Lin Chen<sup>2</sup>, Zi-Jie Zhou<sup>1</sup>, Wei-Ling Huang<sup>1</sup>, Chuang-Rung Chang<sup>1</sup>

<sup>1</sup>National Tsing Hua University, <sup>2</sup>Osaka University

#### 16:09-16:38

# ST5-2 Mitochondrial ferritin functions as a beacon for sensing mitochondrial integrity and cellular iron metabolism

### Atsushi Tanaka<sup>1, 2</sup>

<sup>1</sup>Research Institute of Medical Sciences, Yamagata University, <sup>2</sup>Graduate School of Medical Science, Yamagata University

### 16:38-17:07

# ST5-3 Iron metabolism in the ER-mitochondrial contact site regulated by redox condition

<u>Shigeru Yanagi</u>, Isshin Shiiba, Hijiri Oshio, Naoki Ito Gakushuin University

### 17:07-17:36

# **ST5-4** Mitochondrial event as an ultimate step in ferroptosis Myung-Shik Lee<sup>1,2</sup>, Soo-Jin Oh<sup>1,3</sup>, Masataka Ikeda<sup>4</sup>, Tomomi Ide<sup>4</sup>

<sup>1</sup>Soonchunhyang University (SIMS), <sup>2</sup>Yonsei University, <sup>3</sup>Sungkyunkwan University , <sup>4</sup>Kyushu University

### 13:00-15:30, October 31 (Mon)

### Session T4

# Protein Quality Control through Redox Regulation

Chairperson: Ryo Ushioda (Kyoto Sangyo University, Japan)

### 13:00-13:25

# ST4-1 Molecular basis of redox- and zinc-dependent protein quality control at the ER-Golgi interface

<u>Kenji Inaba</u><sup>1</sup>, Satoshi Watanabe<sup>1</sup>, Yuta Amagai<sup>1</sup>, Bui Ba Han<sup>1</sup>, Toshiyuki Kowada<sup>1</sup>, Shin Mizukami<sup>1</sup>, Roberto Sitia<sup>2</sup>

<sup>1</sup>Tohoku University, <sup>2</sup>San Raffaele Scientific Institute

### 13:25-13:42

# ST4-2 EDEM2 forms a stable disulfide bond with TXNDC11 in the endoplasmic reticulum and exerts enzymatic activity

<u>Satoshi Ninagawa</u><sup>1, 2</sup>, Kazutoshi Mori<sup>2</sup>

<sup>1</sup>Biosignal Research center, Kobe University, <sup>2</sup>Department of Biophysics, Graduate School of Science, Kyoto University,

### 13:42-14:12

# ST4-3 Redox regulation of Golgi glycosyltransferases by the enzyme QSOX1 maintains the gut mucosal barrier

Deborah Fass, Tal Ilani

Weizmann Institute of Science

穼 : online presentation

#### 14:12-14:42

# ST4-4

# Structural and functional characterisation of ER-localised methionine sulfoxide reductase

Neil John Bulleid<sup>1</sup>, Zhenbo Cao<sup>1</sup>, Claudia Chieruzzi<sup>1</sup>, Deborah Fass<sup>2</sup>

<sup>1</sup>University of Glasgow, <sup>2</sup>Weizmann Institute

#### 14:42-14:59

# ST4-5 Protein disulfide isomerase family; their molecular actions and functions

Masaki Okumura

Frontier Research Institute for Interdisciplinary Sciences, Tohoku University

#### 14:59-15:29

# ST4-6 Multistep redox quality control in the biogenesis of complex secretory proteins

Roberto Sitia

Università Vita-Salute San Raffaele Hospital

### 15:40-17:40, October 31 (Mon)

Venue D

### Session T3

# "Structural Biology for Deciphering Supersulfide Function"

Chairpersons: Kei Wada (University of Miyazaki, Japan) Yoshikazu Tanaka (Tohoku University, Japan)

#### 15:40-16:10

# ST3-1 A collaborative study on the discovery of novel chemotypes against dengue RNA polymerase

<u>Sarin Chimnaronk<sup>1</sup>, Lakkana Thaveepornkul<sup>1</sup>, Nami Hosoi<sup>2</sup>, Tomonosuke Sumiya<sup>3</sup>, Ryuichi Sakai<sup>3</sup>, Yoshikazu Tanaka<sup>2</sup></u>

<sup>1</sup>Institute of Molecular Biosciences, Mahidol University, Thailand, <sup>2</sup>Graduate School of Life Sciences, Tohoku University, Japan, <sup>3</sup>Faculty and Graduate School of Fisheries Science, Hokkaido University, Japan

#### 16:10-16:40

# ST3-2 Mechanism of biological nitric oxide reduction proved by time-resolved structural analysis

Takehiko Tosha RIKEN SPring-8

#### 16:40-17:10

### \$13-3 Neutron structural analysis and computational chemistry reveal the control mechanism of the redox potential of 4Fe-4S type ferredoxin from Bacillus thermoproteolyticus

Masaki Unno<sup>1, 2</sup>, Kenji Kobayashi<sup>1</sup>, Iori Era<sup>3</sup>, Yasutaka Kitagawa<sup>3</sup>, Kei Wada<sup>4, 5</sup>

<sup>1</sup>Graduate School of Science and Engineering, Ibaraki University, <sup>2</sup>Frontier Research Center for Applied Atomic Sciences, Ibaraki University, <sup>3</sup>Graduate School of Engineering Science, Osaka University, <sup>4</sup>Department of Medical Sciences, University of Miyazaki, <sup>5</sup>Frontier Science Research Center, University of Miyazaki

#### 17:10-17:40

# ST3-4 Good things come to those who bait: structural insights into peroxisomal receptor import and recycling

### Christos Gatsogiannis<sup>1, 2</sup>

<sup>1</sup>Center for Soft Nanoscience, University of Muenster, Germany, <sup>2</sup>Institut for Medical Physics and Biophysics, University of Muenster, Germany

: online presentation

November 1 (Tue)

# November 1 (Tue)

4th International Conference on Persulfide and Sulfur Metabolism in Biology and Medicine / Tohoku Forum of Creativity, Thematic Program

9:00-9:45, November 1 (Tue)

**Plenary Lecture PL6** 

Chairperson: Fanyan Wei (Tohoku University, Japan)

#### PL6 Self-renewal and expansion of hematopoietic stem cells Toshio Suda<sup>1, 2</sup>

<sup>1</sup>IRCMS, Kumamoto University, <sup>2</sup>CSI, National University of Singapore

### 10:00-12:00, November 1 (Tue)

Session T7

# "Dr. Maeda Memorial Session"

Chairpersons: Takaaki Akaike (Tohoku University, Japan) Tomohiro Sawa (Kumamoto University, Japan)

### 10:00-10:10

Introduction

### 10:10-10:30

ST7-1 Nitric oxide and other gaseous vascular mediators as EPR effect enhancers to improve the therapeutic effect of nanomedicine

Jun Fang<sup>1</sup>, Waliul Islam<sup>2</sup>, Rayhanul Islam<sup>1</sup>, Vladimir Subr<sup>3</sup>, Tomas Etrych<sup>3</sup>

<sup>1</sup>Faculty of Pharmaceutical Sciences, Soio University, <sup>2</sup>Kumamoto University School of Medicine, <sup>3</sup>Institute of Macromolecular Chemistry, Czech Academy of Sciences

Venue A

Venue A

### 10:30-10:50

# ST7-2 The EPR effect and beyond: Drug delivery for refractory cancer therapy via an endogenous albumin transport system

### Yu Ishima<sup>1</sup>, Toru Maruyama<sup>2</sup>, Takaaki Akaike<sup>3</sup>, Masaki Otagiri<sup>4</sup>, Tatsuhiro Ishida<sup>1</sup>

<sup>1</sup>Institute of Biomedical Sciences, Tokushima University, <sup>2</sup>Graduate School of Pharmaceutical Sciences, Kumamoto University, <sup>3</sup>Tohoku University Graduate School of Medicine, <sup>4</sup>Faculty of Pharmaceutical Sciences, Sojo University

### 10:50-11:10

# ST7-3 Conversion of colonic adenoma cells by chronic inflammation and NO

### Futoshi Okada

Division of Experimental Pathology, Tottori University Faculty of Medicine

### 11:10-11:30

## ST7-4 The EPR effect: Dr. Hiroshi Maeda's legacy and inspiration for cancer therapy

Jun Wu

Beckman Research Institute of the City of Hope

#### 11:30-11:50

### ST7-5 Memories of Kumamoto

### Yoichi Miyamoto

Division of Physiology and Biochemistry, Faculty of Arts and Sciences at Fujiyoshida, Showa University

#### 11:50-12:00

### Greeting from Dr. Maeda's Son

### 12:10-12:55, November 1 (Tue)

### NOSJ Dr. Maeda Memorial Lunch Seminar

Supported by: Nitric Oxide Society of Japan (NOSJ)

Chairperson: Takaaki Akaike (Tohoku University, Japan)

### LS3 35 years of discussions with Prof. Maeda on the EPR effect and future directions

### Yasuhiro Matsumura<sup>1, 2</sup>

<sup>1</sup>National Cancer Center Research Institute, <sup>2</sup>RIN Institute Inc

### 13:00-16:30, November 1 (Tue)

### Session T8

Venue A

Chairpersons: Ken Itoh (Hirosaki University, Japan) Des R Richardson (Griffith University, Australia)

### 13:00-14:00

### ST8-1 Hidden networks of redox reactions in the brain: Transnitrosylated proteins underlie synaptic damage in Alzheimer's disease

Stuart A. Lipton<sup>1, 2, 3</sup>

<sup>1</sup>Neurodegeneration New Medicines Center and Department of Molecular Medicine, The Scripps Research Institute, La Jolla, USA, <sup>2</sup>Department of Neurosciences, University of California, San Diego, School of Medicine, La Jolla, USA, <sup>3</sup>Department of Neurology, Yale School of Medicine, New Haven, USA

### 14:00-14:10

### Break Time (10min)

#### 14:10-14:45

### ST8-2 A nitric oxide storage and transport system that protects activated macrophages from endogenous nitric oxide cytotoxicity

Des R Richardson<sup>1, 2</sup>

<sup>1</sup>Griffith University, <sup>2</sup>Department of Pathology and Biological Responses, Nagoya University Graduate School of Medicine, Nagoya, Japan

#### 14:45-15:20

### ST8-3 Emerging role of GCN1 in the redox- and ribosomemediated stress response

Ken Itoh

Hirosaki University

#### 15:20-15:55

### ST8-4 Negative feedback system to maintain cell ROS homeostasis: KEAP1/PGAM5 complex as a ROS sensor for inducing mitophagy

<u>Allen Kaasik</u><sup>1</sup>, Akbar Zeb<sup>1</sup>, Vinay Choubey<sup>1</sup>, Ruby Gupta<sup>1</sup>, Malle Kuum<sup>1</sup>, Dzamilja Safiulina<sup>1</sup>, Annika Vaarmann<sup>1</sup>, Nana Gogichaishvili<sup>1</sup>, Mailis Liiv<sup>1</sup>, Ivar Ilves<sup>1</sup>, Kaido Tamm<sup>1</sup>, Vladimir Veksler<sup>2</sup>

<sup>1</sup>University of Tartu, Estonia, <sup>2</sup>University Paris-Saclay, France

### 15:55-16:30

# **ST8-5** Cardiac metabolism and redox regulation as therapeutic targets of heart failure

<u>Satoaki Matoba</u>, Masahiro Nishi, Makoto Ariyoshi, Motoki Uchihashi, Satoshi Kaimoto, Yusuke Higuchi, Atsushi Hoshino

Department of Cardiovascular Medicine, Graduate School of Medical Science Kyoto Prefectural University of Medicine

### 17:30-, November 1 (Tue)

### **Closing Remarks**

Takaaki Akaike

Tohoku University

### 10:00-12:00, November 1 (Tue)

### Session T6

# "Mitochondria Biology and Human Disease II" (IDAC-CERA Session)

Chairperson: Fanyan Wei (Tohoku University, Japan)

### 10:00-10:25

# ST6-1 Metformin targets mitochondrial complex I

### Navdeep Chandel

Northwestern University

### 10:25-10:50

# ST6-2<sup></sup> → Hypoxia as a therapy for mitochondrial disease

Vamsi Mootha

Harvard Medical School

### 10:50-11:15

# **ST6-3 Ceeping mitochondria in shape: a matter of life and death**

University of Padua

### 11:15-11:40

# ST6-4 Mitochondria originated redox signalling regulates longevity-assurance programs

Aleksandra Trifunovic

University of Cologne

Venue C

Venue A

 $\widehat{\boldsymbol{r}}$  : online presentation

#### 11:40-12:00

### ST6-5

# Sulfur modification in human mitochondrial tRNAs and the pathophysiological roles

### Fanyan Wei

Tohoku University, Institute of Development, Aging and Cancer, Department of Modomics Biology and Medicine

### 13:00-15:30, November 1 (Tue)

Venue C

### Session S4

# "NO and Supersulfide in Prokaryotes" (MEXT "Sulfur Biology" Session)

Chairperson: Shinji Masuda (Tokyo Institute of Technology, Japan)

#### 13:00-13:25

### SS4-1 Bacteria utilize sulfide in the air

Hiromi Kato

Graduate School of Life Sciences, Tohoku University

#### 13:25-13:50

### **SS4-2** Metabolic and structural insights into hydrogen sulfide misregulation in *Enterococcus faecalis*

David P Giedroc

Indiana University

#### 13:50-14:15

### \$\$4-3 Persulfide and polysulfide are common cellular components and play important physiological functions in microorganisms

Luying Xun Washington State University

#### 14:15-14:40

### \$\$4-4 Reactive sulfur species (RSS) metabolizing enzymes influence RSS sensing by impacting intracellular persulfide dynamics in bacteria

#### Takayuki Shimizu

Graduate School of Arts and Sciences, The University of Tokyo

### 14:40-15:05

### SS4-5? Rhodanese domain proteins, persulfides and their role with ubiquitin-like proteins in sulfur mobilization and protein conjugation in Archaea

Julie A. Maupin-Furlow<sup>1</sup>, Paul Wassel, lii<sup>1</sup>, Oscar Vargas-Rodriguez<sup>2,3</sup>, Ivy Kioutchoukova<sup>1</sup>, Dieter Söll<sup>2</sup>

<sup>1</sup>University of Florida, Department of Microbiology and Cell Science, Gainesville Florida, USA, <sup>2</sup>Yale University, Department of Molecular Biophysics and Biochemistry, New Haven, Connecticut, USA, <sup>3</sup>University of Connecticut, Department of Molecular Biology and Biophysics, Farmington, Connecticut, USA

### 15:05-15:30

# SS4-6 A novel mechanism for nitrosative stress tolerance dependent on GTP cyclohydrolase II activity involved in riboflavin synthesis of yeast

### Hiroshi Takagi, Ryo Nasuno

Nara Institue of Science and Technology

### 10:00-12:00, November 1 (Tue)

### Session T9

# "Redox Biology in Cancer and Carcinogenesis"

Chairpersons: Shinya Toyokuni (Nagoya University, Japan) Young-Joon Surh (Seoul National University, Korea)

### 10:00-10:24

# ST9-1 Peciphering the role of organelles redox metabolism

Kivanc Birsoy

Rockefeller University

### 10:24-10:48

### ST9-2 An oncogenic alliance between NRF2 and other redoxsensitive transcription factors

Su-Jung Kim<sup>1</sup>, Jie Zheng<sup>2</sup>, Soma Saeidi<sup>1</sup>, Xizhu Fang<sup>2</sup>, Seong Hoon Kim<sup>2</sup>, Hye-Kyung Na<sup>3</sup>, <u>Young-Joon Surh<sup>2</sup></u>

<sup>1</sup>Department of Molecular Medicine and Biopharmaceutical Science, Graduate School of Convergence Science and Technology, Seoul National University, <sup>2</sup>College of Pharmacy, Seoul National University, <sup>3</sup>Department of Food Science and Biotechnology, College of Knowledge Based Services Engineering, Sungshin Women's University

穼 : online presentation

10:48-11:12

### ST9-3 🔶

# 🕆 Redox conundrum in cancer cell fate signaling

### Shazib Pervaiz<sup>1, 2, 3, 4</sup>

<sup>1</sup>Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore, <sup>2</sup>NUS Centre for Cancer Research, National University of Singapore, <sup>3</sup>ISEP, NUS Graduate School, National University of Singapore, <sup>4</sup>National University Cancer Institute, NUHS, Singapore

#### 11:12-11:36

# ST9-4 Biomolecule-based nanostructures for tumor microenvironment targeting and regulation

### Guangjun Nie

National Center for Nanoscience and Technology

#### 11:36-12:00

# \$19-5 Significance of ferroptosis susceptibility and resistance in various neoplastic contexts

### Shinya Toyokuni

Department of Pathology and Biological Responses, Nagoya University Graduate School of Medicine

### 13:00-15:00, November 1 (Tue)

Venue D

### **Session S5**

# "Redox and Environmental Science"

Chairpersons: Hideo Yamasaki (University of the Ryukyus, Japan) Takashi Toyama (Tohoku University, Japan)

### 13:00-13:29

# SS5-1 Escaping troubled waters: An animal-like stimulus-response behavior in a model plant

Michael F Cohen<sup>1</sup>, Hideo Yamasaki<sup>2</sup>

<sup>1</sup>Sonoma State University, Department of Biology, <sup>2</sup>University of the Ryukyus, Faculty of Science

### 13:29-13:58

# SS5-2 Growth inhibitory factor/metallothionein-3 is a sulfane sulfurbinding protein

<u>Yasuhiro Shinkai</u>, Yoshito Kumagai <sup>University</sup> of Tsukuba

### 13:58-14:27

### **SS5-3** The role of reactive sulfur species produced by gut bacteria Masahiro Akiyama

Research Center for Drug Discovery, Faculty of Pharmacy and Graduate School of Pharmaceutical Sciences, Keio University

### 14:27-14:56

### SS5-4 Environmental stress-induced aberrant mitochondrial fission underlies cardiac vulnerability to mechanical load through Drp1 depolysulfidation

<u>Akiyuki Nishimura<sup>1, 2</sup>, Kakeru Shimoda<sup>1, 2</sup>, Xiaokang Tang<sup>1, 2</sup>, Kazuhiro Nishiyama<sup>3</sup>,</u> Yuri Kato<sup>3</sup>, Yuko Ibuki<sup>4</sup>, Takaaki Akaike<sup>5</sup>, Yoshito Kumagai<sup>6</sup>, Motohiro Nishida<sup>1, 2, 3</sup>

<sup>1</sup>Division of Cardiocirculatory Signaling, National Institute for Physiological Sciences, <sup>2</sup>Cardiocirculatory Dynamism Research Group, Exploratory Research Center on Life and Living Systems, <sup>3</sup>Graduate School of Pharmaceutical Sciences, Kyushu University, <sup>4</sup>Graduate Division of Nutritional and Environmental Sciences, University of Shizuoka, <sup>5</sup>Graduate School of Medicine, Tohoku University, <sup>6</sup>Faculty of Medicine, University of Tsukuba

### 15:10-17:10, November 1 (Tue)

### Session T10

# Chemical Biology Utilizing NO and Supersulfides"

Chairpersons: Hidehiko Nakagawa (Nagoya City University, Japan) Kenjiro Hanaoka (Keio University, Japan)

### 15:10-15:35

### ST10-1<sup></sup><sup>¬</sup> Near-infrared photorelease. How far can we go with onephoton absorption?

Petr Klan<sup>1, 2</sup>

<sup>1</sup>Department of Chemistry, Faculty of Science, Masaryk University, <sup>2</sup>RECETOX, Faculty of Science, Masaryk University

### 15:35-15:55

# ST10-2 Spatiotemporal control of NO release with caged NOs and their biological applications

### <u>Hidehiko Nakagawa</u>, Naoya leda

Graduate School of Pharmaceutical Sciences, Nagoya City University

### 15:55-16:20

# **ST10-3** Chemical tools for understanding reactive sulfur species

Ming Xian

Brown University

 $\widehat{\boldsymbol{r}}$  : online presentation

#### 16:20-16:40

# ST10-4

# -4 Development of fluorogenic probes for H<sub>2</sub>S and sulfane sulfur and their application to inhibitor screening

### Kenjiro Hanaoka

Faculty of Pharmacy and Graduate School of Pharmaceutical Sciences, Keio University

### 16:40-17:05

# **ST10-5** Development of polyaromatic receptors for biomolecules with high selectivity

Michito Yoshizawa

Tokyo Institute of Technology