# The 18th International Symposium on Molecular and Neural Mechanisms of Taste and Olfactory Perception (ISMNTOP/YRUF/AISCRIB 2019)

**第18回国際シンポジウム“味覚嗅覚の分子神経機構”**

（併催：うま味若手フォーラム2019/

アジア国際シンポジウム“化学受容と摂食行動”2019）

**Organizer**： **Yuzo Ninomiya**
**Research and Development Center for Five-Sense Devices**
**Kyushu University**

# Program & Abstracts

**November 2-3, 2019**
**Kyushu University Station-I and II for Collaborative Research (Maidashi campus), Fukuoka, Japan**

## Hosted by

**Kyushu University, Research and Development Center for Five-Sense Devices**

九州大学・五感応用デバイス研究開発センター

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Keiko Yasumatsu (Tokyo Dental College, Tokyo, Japan)
Ryusuke Yoshida (Okayama University, Okayama, Japan)

## CONTACT

Secretary: Ryusuke Yoshida/Mayuko Inoue
**Division of Sensory Physiology,**
**Research and Development Center for Five-Sense Devices**
**Kyushu University**
**Collabo-station II, 307/308, 3-1-1 Maidashi, Higashi-ku,**
**Fukuoka 812-8582, Japan**
**Tel: +81-92-642-4620 (Mayuko Inoue), Fax: +81-92-642-4620**
**e-mail: yoshida.ryusuke@okayama-u.ac.jp**

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# The 18th International Symposium on Molecular and Neural Mechanisms of Taste and Olfactory Perception (ISMNTOP2019 /YRUF2019/AISCRIB2019)

## November 2nd, Saturday ----------

**■ Opening remarks 12:50 - 13:00** Yuzo Ninomiya (*Kyushu Univ*)

**■ Special lecture I 13:00 - 13:40 (Invited talk)**

[Chair: Satoshi Wakisaka (*Osaka Univ*)]

**The Search for the Neural Basis of Behavioral Responsiveness to Maltodextrin Taste and the Importance of Central Olfactory Bulb Connections in the Maintenance of Positive Affective Gustatory Function**

**Alan C. Spector**

*Department of Psychology and Program in Neuroscience, Florida State University, USA*

▶ Break **13:40 - 13:50**

**■ Session I 13:50 - 16:30**

**Asian International Symposium on Chemo-Reception and Ingestive Behavior 2019 (AISCRIB2019)**

[Chair: Mamiko Ozaki (*Kobe Univ*), Hiroo Imai (*Kyoto Univ*)]

**IS1-1 13:50 – 14:20 (Invited talk)**

**Cross-modal interactions initiate *Drosophila* feeding**

**Seok Jun Moon**

*Department of Oral Biology, Taste Research Center, Yonsei University College of Dentistry*

**IS1-2 14:20 – 14:50 (Invited talk)**

**Disinhibition of rewarding dopamine neurons causes cognitive bias**

Nobuhiro Yamagata, Takahiro Takahashi, Rino Ichikawa, **Hiromu Tanimoto**

*Graduate School of Life Sciences, Tohoku University, Japan*

**IS1-3 14:50 – 15:15**

**An evolutionary aspect of the chemical defense of plant: ER-body system in brassica plant decreases feeding motivation in insect via chemosensory system**

**Mamiko Ozaki**

*Department of Biology, Graduate School of Science, Kobe University, Nada, Kobe, Japan*

**IS1-4 15:15 – 15:40**

**A genetic tool to label almost all subpopulation of postsynaptic neurons directly-connected to sugar-responsive sensory neurons in *Drosophila***

**Takaaki Miyazaki**[1, 2, 3], Tzu-Yang Lin[1], Chi-hon Lee[1], Mark Stopfer[1], Kei Ito[2], Emiko Suzuki[3, 4]

*[1]NIH-NICHD, [2]IMCB, Univ. Tokyo, [3]National Institute of Genetics, Japan, [4]SOKENDAI*

**IS1-5 15:40 – 16:05**

**The central mechanisms for mediating salt-induced hypertension**

**Kengo Nomura**[1], Takeshi Y. Hiyama[1,2], Masaharu Noda[1,2,3]

*[1]Division of Molecular Neurobiology, National Institute for Basic Biology, [2]School of Life Science, SOKENDAI (The Graduate University for Advanced Studies), [3]Research Center for Cell Biology, Institute of Innovative Research, Tokyo Institute of Technology*

**IS1-6 16:05 – 16:30 (Invited talk)**

**Constant-rate delivery of glucagon like peptide-1 receptor agonist alters sucrose within-meal licking behavior in male rats**

**Tadashi Inui**[1], Kellie Hyde[1], Ginger Blonde[1], Clare Mathes[2], Alan Spector[1]

*[1]Department of Psychology and Program in Neuroscience, Florida State University, Tallahassee, FL, USA, [2]Department of Psychology and Program in Neuroscience, Baldwin Wallace University, Berea, OH, USA*

▶ Break **16:30 - 16:50**

## ■ Session II　16:50 - 18:25

## Memorial Session for Dr. Takayuki Marui

[Chair: Yuzo Ninomiya (*Kyushu Univ*), Kumiko Sugimoto (*Tokyo Med Dent Univ*)]

**IS2-1+IS2-2　16:50 – 17:10**
**Session overview**
**Yuzo Ninomiya**
**IS2-2**
**In Memory of Dr. Takayuki Marui**
**John Caprio**
*(Lousiana State Univ. Baton Rouge, USA)*
[Narrated power point presentation with the help of **Noritaka Sako** (*Asahi Univ*)]

**IS2-3　17:10 – 17:25 (Invited talk)**
**Remembrance of Takayuki Marui**
**Takashi Yamamoto**
*Kio University, Nara, Japan*

**IS2-4　17:25 – 17:40 (Invited talk)**
**Universe of amino acid chemical senses in vertebrate including humans in collaboration with Dr. Takayuki Marui**
**Kunio Torii**
*Torii Nutrientstasis Institute, Inc. Japan*

**IS2-5　17:40 – 17:55 (Invited talk)**
**Remembering the late Dr. Takayuki Marui from over 40 years of joint research**
**Sadao Kiyohara**
*Emeritus Professor, Kagoshima University*

**IS2-6　17:55 – 18:25 (Invited talk)**
**A fish taste receptor opened the way for structural biology of taste perception**
**Atsuko Yamashita**
*Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Japan*

● **A silent prayer**

## ■ Poster Session & Social Gathering　18:35 – 21:00

**@ Collabo-Station II, 1F Communication lounge, Kyushu University**

## November 3rd, Sunday ----------

### ■ Session III 9:30 - 11:10

**Olfaction**

[Chair: Masahiro Yamaguchi *(Kochi Univ*), Takeshi Imai (*Kyushu Univ*)]

**IS3-1 9:30 – 9:55**

**Long-term modification of the olfactory circuit in *C. elegans* life span**

**Manabi Fujiwara**, Hiroshi Wada, Takeshi Ishihara

*Faculty of Science, Kyushu University, Japan*

**IS3-2 9:55 – 10:20**

**Cell-type-specific patterned activities specify gene expression patterns for olfactory circuit formation**

**Ai Nakashima**[1], Naoki Ihara[1], Yuji Ikegaya[1,2], Haruki Takeuchi[1]

*[1]Graduate School of Pharmaceutical Science, The University of Tokyo, Tokyo, Japan, [2]Center for Information and Neural Networks, National Institute of Information and Communications Technology, Osaka, Japan*

**IS3-3 10:20 – 10:45**

**Widespread inhibitory responses in the mouse olfactory sensory neurons *in vivo***

**Shigenori Inagaki**[1], Ryo Iwata[2], Takeshi Imai[1]

*[1]Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan, [2]RIKEN Center for Developmental Biology, Kobe, Japan.*

**IS3-4 10:45 – 11:10**

**Association of Odor Signals with Subsequent Behavioral Scene Signals in Piriform Cortex**

**Yuta Tanisumi**[1,2], Kazuki Shiotani[1,2], Keiji Miura[3], Junya Hirokawa[1], Yoshio Sakurai[1], Kensaku Mori[4], Hiroyuki Manabe[1]

*[1]Laboratory of Neural Information, Graduate School of Brain Science, Doshisha University, Kyoto, Japan, [2]Research Fellow of the Japan Society for the Promotion of Science, Tokyo, Japan, [3]School of Science and Technology, Kwansei Gakuin University, Hyogo, Japan, [4]The University of Tokyo, Tokyo, Japan*

▶ Break **11:10 - 11:25**

### ■ Special lecture II 11:25 - 12:05 (Invited talk)

[Chair: Masahiro Yamaguchi *(Kochi Univ*), Takeshi Imai (*Kyushu Univ*)]

**New strategies for understanding the organization and dynamics of glomerular odor maps**

**Matt Wachowiak**

*Department of Neurobiology and Anatomy, University of Utah School of Medicine*

▶ Lunch **12:05-13:00**

### ■ Special lecture III 13:00 - 13:40 (Invited talk)

[Chair: Ken Iwatsuki (*Tokyo Univ Agri*)]

**Gingival solitary chemosensory cells serve as immune sentinels to protect against periodontitis**

Xin Zheng[1,2], Marco Tizzano[1], Kevin Redding[1], Jinzhi He[2], Xian Peng[2], Peihua Jiang[1], Xin Xu[2], Xuedong Zhou[2], **Robert Margolskee**[1]

*[1]Monell Chemical Senses Center, Philadelphia, PA, USA, [2]State Key Laboratory of Oral Diseases & National Clinical Research Center for Oral Diseases & Department of Cariology and Endodontics, West China Hospital of Stomatology, Sichuan University, Chengdu, China*

▶ Break **13:40 – 13:50**

## ■ Session IV 13:50 – 16:50

## Chemosensory signaling

[Chair: Mizuho Kido (*Saga Univ*), Akiyuki Taruno (*Kyoto Pref Univ Med*)]

**IS4-1 13:50 – 14:20 (Invited talk)**

**Functional interaction between TRPV3 and anoctamin 1 in keratinocytes**

**Makoto Tominaga**[1,2]

*[1]Division of Cell Signaling, National Institute for Physiological Sciences, [2]Thermal Biology Group, Exploratory Research Center on Life and Living Systems*

**IS4-2 14:20 – 14:40**

**Changes of TRPV4 distribution in labial mucosa of Xerostomia Patients with unpleasant burning sensation**

Reiko U. Yoshimoto[1,2,3], Reona Aijima[4], Yukiko Oyama[5], Junko Yoshizumi[5], Tomoko Kitsuki[5], Yasuyoshi Ohsaki[1], Atsushi Danjo[4], Yoshio Yamashita[4], Tamotsu Kiyoshima[2], **Mizuho A. Kido**[1]

*[1]Division of Histology and Neuroanatomy, Dept. of Anatomy and Physiology, Fac. Med., Saga Univ., [2]Laboratory of Oral Pathology, Division of Maxillofacial Diagnostic and Surgical Sciences, Faculty of Dental Science, Kyushu University, Fukuoka, Japan, [3]Dept. of Periodontology, Grad. Sch. of Dent. Sci., Kyushu Univ., [4]Dept. of Oral and Maxillofacial Surgery, Fac. Med., Saga Univ., [5]Dept. of Oral and Maxillofacial Surgery, Grad. Sch. of Dent. Sci., Kyushu Univ.*

**IS4-3 14:40 – 15:05**

**Decreased sensitivity of the bitter taste receptor TAS2R16 to β-glucosides in the dietary specialized bamboo lemurs**

**Akihiro Itoigawa**[1], Febrizio Fierro[2], Morgan E. Chaney[3], Takashi Hayakawa[4], Anthony J. Tosi[3], Masha Y. Niv[2], Hiroo Imai[1]

*[1]Primate Research Institute, Kyoto University, Japan, [2]The Hebrew University, Israel, [3]Department of Anthropology, Kent State University, USA, [4]Faculty of Environmental Earth Science, Hokkaido University, Japan*

▶ Break 10min

**IS4-4 15:15 – 15:40**

**Generation of endocrine cells using organoid culture system**

**Ken Iwatsuki**

*Dept. Nutritional Science and Food Safety, Tokyo Univ. Agriculture, Tokyo, Japan*

**IS4-5 15:40 – 16:10 (Invited talk)**

**Cells and transduction of sodium taste at the periphery**

**Akiyuki Taruno**[1,2], Kengo Nomura[1]

*[1]Department of Molecular Cell Physiology, Kyoto Prefectural University of Medicine, Kyoto, Japan. [2]PRESTO, JST, Kawaguchi, Saitama, Japan.*

**IS4-6 16:10 - 16:30**

**Contribution of SGLTs to sugar sensing as T1R-independent mechanisms in mouse gustatory tissues**

**Keiko Yasumatsu**[1, 2], Tadahiro Ohkuri[3], Shusuke Iwata[2, 3], Robert. F. Margolskee[4], Yuzo Ninomiya[2, 3, 4]

*[1]Oral Health Science Center, Tokyo Dental College, [2]Div. Sensory Physiology・Medical Application Sensing, Research and Development Center for Five-Sense Devices, Kyushu Univ., [3]Sect. Oral Neuroscience, Grad. Sch. of Dent., Kyushu Univ., [4]Monell Chemical Senses Center*

**IS4-7 16:30 – 16:50**

**Signaling cascade for the sweet suppressive effect of leptin**

**Ryusuke Yoshida**[1], Robert F. Margolskee[2], Yuzo Ninomiya[2,3]

*[1]Department of Oral Physiology, Graduate School of Medicine, Dentistry and Pharmaceutical Science, Okayama University, Japan, [2]Monell Chemical Senses Center, PA, USA, [3]Division of Sensory Physiology, Research and Development Center for Five-Sense Device, Kyushu University, Japan*

## ■ Closing remarks 16:50 - Satoshi Wakisaka (*Osaka Univ*)

[Discussants:
Alan C. Spector (Florida State Univ), Robert F. Margolskee (Monell Chem Senses Center), Matt Wachowiak (Univ Uta), Seok Jun Moon (Yonsei Univ), Yamamoto T (Kio Univ), Sugimoto K (Tokyo Med Dent Univ), Kiyohara S (Kagoshima Univ), Tominaga M (Okazaki Inst for Integ Biosci), Torii K (Torii Nutrient-stasis Inst Inc), Wakisaka S (Osaka Univ), Inui T (Florida State Univ), Inui C (Osaka Univ), Ozaki M (Kobe Univ), Tanimoto H (Tohoku Univ), Taruno A (Kyoto Pref Univ of Med), Nomura K (Kyoto Pref Univ of Med), Toyono T (Kyushu Dent Coll), Iwatsuki K (Tokyo Univ Agricul), Imai H (Kyoto Univ), Kido M (Saga Univ), Goto T (Tokyo Dent Coll), Sako N (Asahi Univ), Yasuo T (Asahi Univ), Yamashita A (Okayama Univ), Kawai T (NARO), Sakai N (Tohoku Univ), Alexandre R (Tohoku Univ), Miyazaki T (NIH-NICHD), Matsumoto K (Kyoto Pharm Univ), Hashimoto K (Kumamoto Univ), Matsui T (Kyushu Univ), Toko K (Kyushu Univ), Imai T (Kyushu Univ), Yamaguchi M (Kochi Univ), Fujiwara M (Kyushu Univ), Nakashima A (Univ Tokyo), Inagaki S (Kyushu Univ), Tanisumi Y (Doshisha Univ), Kohmura M (Ajinomoto Co Inc), Ogiwara Y (Ajinomoto Co Inc), Maruyama Y (Ajinomoto Co Inc), Masuzawa Y (Ajinomoto Co Inc), Taruno E (Suntory Global Innovation Center Ltd), Jyotaki M (JT), Nagai H (Zensho Holdings)]

## ■ Poster Session

**ISP01**
**Correlation analysis of sister mitral and tufted cells**
**Yusuke Tsuno**[1, 2], Matt Wachowiak[1]
*[1]Department of Neurobiology and Anatomy, University of Utah, Salt Lake City, USA,[2]Department of Integrative Neurophysiology, Graduate School of Medical Science, Kanazawa University, Kanazawa, Japan*

**ISP02**
**Feeding-related neuromodulator expression and the role of appetite regulating signals on olfactory feeding behavior in mice**
**Md Monjurul Ahasan**[1], Yasuko Nogi[2], Yoshihiro Murata[1], Mutsuo Taniguchi[1], Chiori Ijichi[2], Masahiro Yamaguchi[1]
*[1]Department of Physiology, Kochi Medical School, Kochi University, Kochi, Japan, [2]Institute of Food Sciences and Technologies, Ajinomoto Co., Japan*

**ISP03**
**Role of olfactory tubercle in the weaning process of neonatal mice**
**Masahiro Yamaguchi,** Yasutaka Chikuda
*Department of Physiology, Kochi Medical School, Kochi University, Kochi, Japan*

**ISP04**
**BMP signaling via LIMK regulates developmental remodeling of mitral cells dendrites**
**Shuhei Aihara**, Satoshi Fujimoto, Takeshi Imai
*Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan*

**ISP05**
**Spontaneous activity generated within the olfactory bulb establishes the discrete wiring of mitral cell dendrites**
**Satoshi Fujimoto**, Marcus Leiwe, Takeshi Imai
*Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan*

**ISP06**
**Spontaneous and evoked activity in the awake neonatal mouse olfactory bulb**
**Marcus Leiwe**[1], Satoshi Fujimoto[1], Marlieke Van Erp[1, 2], Takeshi Imai[1]
*[1]Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan, [2]School for Mental Health and Neurosciences, Maastricht University, Netherlands*

**ISP07**
**Comparing the effects of color and shape on olfactory perception in humans**
**Jiang Yinan**[1], Ikuhiro Kida[2], Shuta Maekawa[1], Nobuyuki Sakai[1]
*[1]Tohoku University, [2]NICT*

**ISP08**
**Transient receptor potential vanilloid 4 in type IV basal cells mediates sour taste sensing via type III taste cell differentiation**
**Kenjiro Matsumoto**[1], Ken Iwatsuki[2], Makoto Tominaga[3], Kazuki Nagasawa[4], Shinichi Kato[1]
*[1]Department of Pharmacology and Experimental Therapeutics, Kyoto Pharmaceutical University, [2]Department of Nutritional Science and Food Safety, Tokyo University of Agriculture, [3]Division of Cell Signaling, Okazaki Institute for Integrative Bioscience, [4]Department of Environmental Biochemistry, Kyoto Pharmaceutical University*

**ISP09**
**Sour suppressing effects by experienced flavors**
**Takayuki Kawai**, Yuko Kusakabe, Yukino Ogawa
*Food Research Institute, NARO, Tsukuba, Japan*

**ISP10**

**Expression of umami taste receptors in the taste bud cells of chickens, and behavioral responses to umami taste in chickens**

**Yuta Yoshida**[1,2], Zhonghou Wang[2], Kayvan F. Tehrani[2], Emily G. Pendleton[2], Luke J Mortensen[2], Shotaro Nishimura[1], Shoji Tabata[1], Hong-Xiang Liu[2], Fuminori Kawabata[3]

*[1]Laboratory of Functional Anatomy, Faculty of Agriculture, Kyushu University, Fukuoka, Japan, [2]Regenerative Bioscience Center, Department of Animal and Dairy Science, University of Georgia, Georgia, USA, [3]Physiology of Domestic Animals, Faculty of Agriculture and Life Science, Hirosaki University, Hirosaki, Japan*

**ISP11**

**Analysis of expression of GLP-1R after daily intake of sweet solution in chickens**

**Yuki Matsui**, Fuminori Kawabata, Momoko Higashida, Shotaro Nishimura, Shoji Tabata

*Laboratory of Functional Anatomy, Faculty of Agriculture, Kyushu University, Fukuoka, Japan*

**ISP12**

**The effect of Adrenomedullin on chorda tympani nerve responses to sugars via T1rs-independent pathway in mice**

**Shusuke Iwata**[1,2], Mayuko Inoue[3], Ryusuke Yoshida[4], Yuzo Ninomiya[2,5]

*[1]Sect Oral Neurosci, Grad Sch Dent Sci, Kyushu Univ., [2]Div of Sensory Physiology ・medical application sensing, R&D Cent for Five-Sense Device, Kyushu Univ., [3]OBT Res Cent, Grad Sch Dent Sci, Kyushu Univ., [4]Dept. of Oral Physiol., Grad. Sch. of Med., Dent., and Pharm. Sci., Okayama Univ., [5]Monell Chemical Senses Center*

**ISP13**

**Insulin - mTOR signaling regulate taste bud organoid growth**

**Shingo Takai**[1], Robert F. Margolskee[2], Peihua Jiang[2], Yuzo Ninomiya[2, 3], Noriatsu Shigemura[1, 3]

*[1]Section of Oral Neuroscience, Graduate School of Dental Science, Kyushu University, [2]Monell Chemical Senses Center, [3]R and D Center for Five-Sense Devices, Kyushu University*

**ISP14**

**A natural point mutation in the bitter taste receptor TAS2R16 causes inverse agonism of arbutin in lemurs**

**Akihiro Itoigawa**[1], Takashi Hayakawa[2], Nami Suzuki-Hashido[3], Hiroo Imai[1]

*[1]Primate Research Institute, Kyoto University, Japan, [2]Faculty of Environmental Earth Science, Hokkaido University, Japan, [3]Chubu University Academy of Emerging Sciences, Japan*

**ISP15**

**Functional analysis of Myod1 in the transcriptional regulation of mouse *Tas1r1* gene**

**Takashi Toyono**[1], Yui Obikane[2], Kae Matsuyama[1], Shinji Kataoka[1], Mitsushiro Nakatomi[1], Ryuji Hosokawa[2], Yuji Seta[2]

*[1]Division of Anatomy, Kyushu Dental University, [2]Division of Oral Reconstruction and Rehabilitation, Kyushu Dental University*

**ISP16**

**Histological identification of the range of primary gustatory cortex in using the fluorescent retrograde neuronal tracer in rats**

**Koji Hashimoto**[1], Alan C. Spector[2]

*[1]Kumamoto University, Faculty of Life Sciences, Kumamoto, Japan, [2]Florida State University, Department of Psychology and Program in Neuroscience, Tallahassee, FL, USA*

**ISP17**

**Surgical Removal of Olfactory Bulb-Brain Connections Blunts Licking Behavior to Preferred, But Not Avoided Solutions**

**Inui-Yamamoto C**[1,2], Blonde GD[2], Schmid F[2], Inui T[2], Schier LA[3], Spector AC[2]

*[1]Department of Oral Anatomy & Development Biology, Osaka University Graduate School of Dentistry, Japan, [2]Department of Psychology and Program in Neuroscience, Florida State University, Tallahassee, FL, USA., [3]Department of Biological Sciences, University of Southern California, Los Angeles, CA, USA*