

2020  
**NTU-UTokyo**  
Joint Virtual Conference

**HUMAN HEALTH & WELL BEING**

ORGANIZERS



National Taiwan University,  
College of Medicine



The University of Tokyo,  
Graduate School of Medicine

2020  
**NTU- UTokyo Joint Virtual Conference**  
**Human Health and Well Being**

Date : December 1, 2020 (Tuesday)

Time : 09:00-11:30 (Taiwan Time)

10:00-12:30 (Japan Time)

Time	Agenda
09:00-09:10 <sup>TW</sup> 10:00-10:10 <sup>JP</sup>	<b>Welcome and Opening Address</b> NTU: Dean Yen-Hsuan Ni UTokyo: Dean Nobuhito Saito
09:10-09:15 <sup>TW</sup> 10:10-10:15 <sup>JP</sup>	<b>*Group Photo</b>
	<b>Session I: Cutting-edge Science</b> Moderator: Prof. Chia-Hui Chen (NTU)/ Prof. Shinichi Sato (UTokyo)
09:15-09:50 <sup>TW</sup> 10:15-10:50 <sup>JP</sup>	NTU: Prof. Sung-Jan Lin Title: How hair follicle stem cells communicate with the external world
09:50-10:25 <sup>TW</sup> 10:50-11:25 <sup>JP</sup>	UTokyo: Prof. Masa Kikkawa Title: Establishing a cryo-electron microscopy facility for multidisciplinary research
	<b>Session II: How We Dealing with COVID-19</b> Moderator: Prof. Chia-Yu Chu (NTUH)/ A/Prof. Noriko Makita (UTokyo)
10:25-10:45 <sup>TW</sup> 11:25-11:45 <sup>JP</sup>	NTU: Prof. Shan-Chwen Chang Title: COVID-19: Taiwan Experience(TBC)
10:45-11:05 <sup>TW</sup> 11:45-12:05 <sup>JP</sup>	Utokyo: Prof. Yoshihiro Kawaoka Title: SARS-CoV-2: what we have learned so far
11:05-11:20 <sup>TW</sup> 12:05-12:20 <sup>JP</sup>	<b>Preparation for the next Joint Conference and future cooperation discussion</b>
11:20-11:30 <sup>TW</sup> 12:20-12:30 <sup>JP</sup>	<b>Closing Remark</b> NTUH: Superintendent Ming-Shiang Wu UTokyoH: Director Yasuyuki Seto

\* The NTU participants will stand in front of the video screen. For the UTokyo delegations, please face to your camera. Our photographer will take the group photo.

# SESSION I

## **Cutting-Edge Science**

# How Hair Follicle Stem Cells Communicate with the External World

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## Sung-Jan Lin

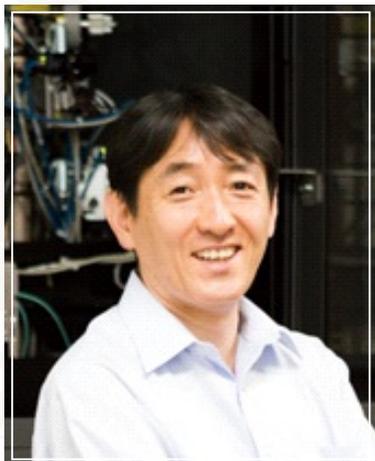
M.D., Ph.D.

Department of Biomedical Engineering &  
Department of Dermatology,  
National Taiwan University

Stem cell (SC) activity is subject to non-cell-autonomous regulation from the local microenvironment, or niche. In adaption to varying physiological conditions and the ever-changing external environment, the SC niche has evolved with multifunctionality that enables SCs to detect these changes and to communicate with remote cells/tissues to tailor their activity for organismal needs. The cyclic growth of hair follicles is powered by the activation of hair follicle stem cells (HFSCs). We categorize HFSC niche cells into 3 functional modules, including signaling, sensing and message-relaying. Signaling modules regulate HFSC activity through short-range cell-cell contact or paracrine effects. Sensing macules capacitate HFSC niche to detect tissue injury and mechanical cues while message-relaying modules transmit remote signals to HFSC niche. We use the pilosympathetic niche as an example to demonstrate how different component cells are integrated into a functional regulatory module to regulate HFSC activity and how such niche structures are maintained throughout the life. I will also highlight how such an internal niche is connected through the brain to the external environment, enabling HFSCs to communicate with and respond to the external environmental changes.

# Establishing a Cryo-Electron Microscopy Facility for Multidisciplinary Research

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## Masa Kikkawa

M.D., Ph.D.

Department of Cell Biology and Anatomy,  
Graduate School of Medicine,  
The University of Tokyo

Cryo-electron microscopy (cryo-EM) is becoming an essential tool to study complex biological systems. Since 2017, we (Masa Kikkawa, Osamu Nureki, and Radostin Danev) have built the most advanced shared cryo-EM facility in Japan and provides cryo-EM services to both academic and commercial researchers, with a grant support from Japan Agency for Medical Research and Development (AMED). The shared facility is now become the Collaborative Research Organization for Structural Biological Sciences at the University of Tokyo, serving as a central hub for structural studies at various scales, ranging from sub-Ångström-resolution chemistry to cell biology.

In this talk, I will talk about the recent results from the facility. For example, micro electron diffraction (microED) enabled obtaining 3D structures of organic molecules<sup>1,2</sup>. Single particle analysis/cryo-EM visualized the asymmetric pentameric structure of immunoglobulin M (IgM)<sup>3</sup>. Cryo-electron tomography visualized detailed structures of eukaryotic cilia/flagella<sup>4–6</sup>. Then, I will also discuss about how to enable those multidisciplinary research.

### References

- 1.Hamada, H. et al. Spiro-Conjugated Carbon/Heteroatom-Bridged p -Phenylenevinylenes: Synthesis, Properties, and Microcrystal Electron Crystallographic Analysis of Racemic Solid Solutions. *Bull. Chem. Soc. Jpn.* 93, 776–782 (2020).
- 2.Lu, H. et al. B/N-Doped p-Arylenevinylene Chromophores: Synthesis, Properties, and Microcrystal Electron Crystallographic Study. *J. Am. Chem. Soc.* 142, 18990–18996 (2020).
- 3.Hiramoto, E. et al. The IgM pentamer is an asymmetric pentagon with an open groove that binds the AIM protein. *Sci. Adv.* 4, eaau1199 (2018).
- 4.Oda, T., Yanagisawa, H., Kamiya, R. & Kikkawa, M. A molecular ruler determines the repeat length in eukaryotic cilia and flagella. *Science* 346, 857–860 (2014).
- 5.Owa, M. et al. Inner lumen proteins stabilize doublet microtubules in cilia and flagella. *Nat. Commun.* 10, 1143 (2019).
- 6.Yamaguchi, H., Oda, T., Kikkawa, M. & Takeda, H. Systematic studies of all PIH proteins in zebrafish reveal their distinct roles in axonemal dynein assembly. *eLife* 7, (2018).

## **SESSION II**

### **How We Dealing with COVID-19**

# COVID-19: Taiwan Experience

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## Shan-Chwen Chang

M.D., Ph.D.

Department of Internal Medicine  
National Taiwan University College of Medicine

### Current Position:

**Executive Vice President**, National Taiwan University, since 2019

**Professor**, Department of Internal Medicine, National Taiwan University College of Medicine

**Professor**, Department/Graduate Institute of Medical Education & Bioethics, National Taiwan University College of Medicine

**Professor**, Graduate Institute of Clinical Pharmacy, National Taiwan University College of Medicine

**Attending Physician**, Department of internal Medicine, National Taiwan University Hospital

### Professional Experiences:

- Commander, Infectious Disease Network, North Region of Taiwan, Department of Health, Taiwan (2003-2009, 2011- Now)
- Director, Department of General Medicine, College of Medicine, National Taiwan University (2006-2009)
- Director, Office of Medical Education, College of Medicine, National Taiwan University (2008-2009, 2011-2013)
- Associate Dean for Educational Affair, College of Medicine, National Taiwan University (2008-2009, 2011-2013)
- Deputy Minister, Department of Health, Taiwan (2009-2010)
- Chairman, School of Medicine, National Taiwan University (2011-2013)
- Dean, National Taiwan University College of Medicine (2013-2019)

### Publication:

1. Wang JT, Lin YY, Chang SY, Yeh SH, Hu BH, Chen PJ, **Chang SC\***: The role of phylogenetic analysis in clarifying the infection source of a COVID-19 patient. *J Infect*, 2020;81:147-178
2. Liu WD, Chang SY, Wang JT, Tsai MJ, Hung CC, Hsu CL, **Chang SC\***: Prolonged virus shedding even after seroconversion in a patient with COVID-19. *J Infect*, 2020;81:318-356
3. Wu WK, Chen CC, Panyod S, Chen RA, Wu MS, Sheen LY, **Chang SC\***: Optimization of fecal sample processing for microbiome study - The journey from bathroom to bench. *J Formos Med Assoc*, 2019;118:545-555.

# **SARS-CoV-2: What We Have Learned So Far**

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## **Yoshihiro Kawaoka**

DVM, Ph.D.

University of Tokyo;  
University of Wisconsin-Madison

Late in 2019, a new coronavirus emerged in Wuhan, China and spread worldwide. The causative virus, SARS-CoV-2, continues to have a devastating impact on human lives. In an effort to develop therapeutics and preventive measures, we are performing numerous research projects with this virus. In this presentation, I will discuss our findings regarding animal models and vaccine development.