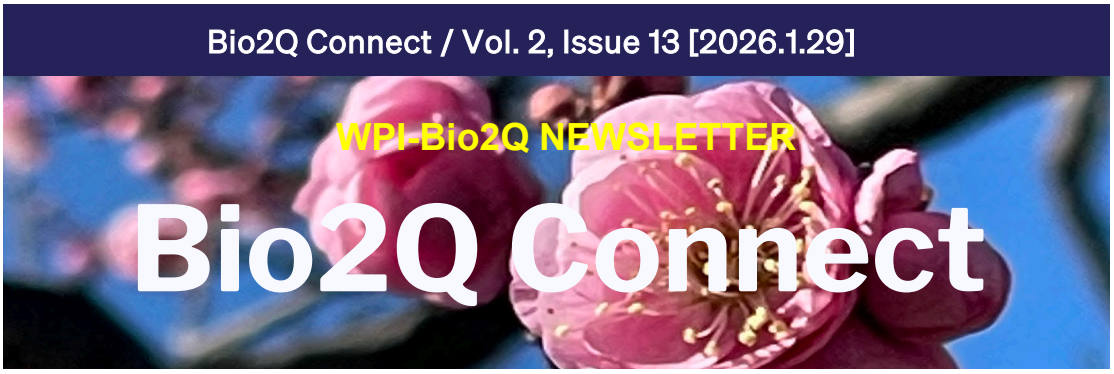
Bio2Q Connect / Vol. 2, Issue 13 [2026.1.29]




Keio University
Human Biology-Microbiome-Quantum Research Center (Bio2Q)
URL: https://bio2q.keio.ac.jp

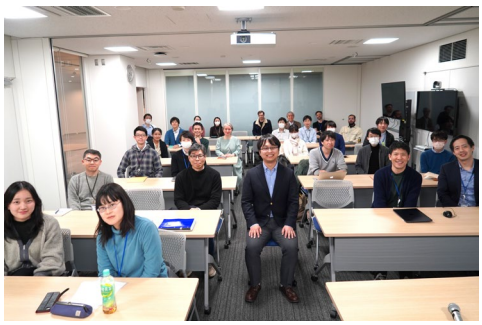
35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan
E-mail: sc-wpi-staff@adst.keio.ac.jp

## UNLOCKING DISEASE SECRET: DR. MASAHIRO KANAI'S SEMINAR ON SINGLE-CELL MULTI-OMICS


© Bio2Q 2026

On January 7, we invited Dr. Masahiro Kanai, a postdoctoral researcher in Dr. Ramnik Xavier's lab, one of the international collaborators of Bio2Q. Most disease-associated variants act through noncoding regulatory elements, yet their underlying mechanisms remain poorly understood. In the seminar, Dr. Kanai presented exciting findings from one of the largest single-cell multi-omics datasets generated from the FinnGen cohort. By jointly profiling chromatin accessibility and gene expression in 10 million immune cells from 1,108 individuals, the study maps multi-layered regulatory cascades linking genetic variants to disease. Variants with complete chromatin-to-expression pathways showed stronger disease relevance. This resource identifies causal variants, reveals regulatory buffering at evolutionarily constrained genes, and provides experimentally validated mechanisms for many immune disease loci. Notably, several findings offer new insights into the genetic etiology of inflammatory bowel disease, in which interactions between the microbiome and the host immune system play a critical role. Overall, the seminar was highly successful and significantly broadened our perspective on the genetic risk factors underlying human diseases.

(Kazuyoshi Ishigaki, PI)



© Bio2Q 2026

## STRATEGIC GROWTH: BIO2Q JOINS JAFSA TRAINING ON UNIVERSITY INTERNATIONALIZATION MANAGEMENT

On Saturday, December 20, Dr. Sampetrean, Administrative Director, Bio2Q and I attended the JAFSA University Internationalization Management Training Program at Ritsumeikan University.

In the morning session, participants received an overview of recent trends in university internationalization and attended a lecture on challenges in developing professionals responsible for internationalization management.

The session provided an opportunity to reaffirm the importance of human resource development in strategically advancing internationalization within universities.

In the afternoon, participants reviewed challenges related to internationalization and human resource development at their respective institutions and developed draft plans for the recruitment, development, and utilization of future internationalization management personnel. The Keio University group focused in particular on the need for changes in faculty and staff mindsets and identified differences in awareness toward internationalization as one of the key challenges. As immediately achievable action plans, we proposed multiple initiatives, including organizing informal opportunities for dialogue among individuals with diverse roles and backgrounds, as well as using assessment tools based on the Developmental Model of Intercultural Sensitivity (DMIS) to better understand faculty and staff self-awareness.

Faculty and staff from eight universities participated, enabling the sharing of institutional challenges. Moving forward, Bio2Q aims to disseminate the international operations know-how gained through this training across the university.

(Yukari Sato, Administrative staff )

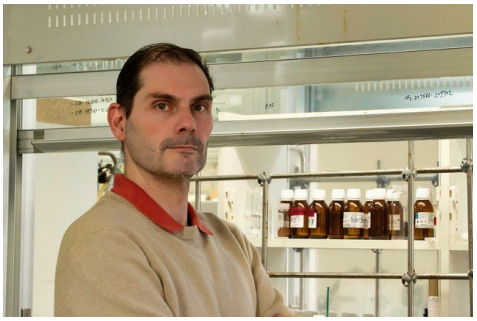
## INTRODUCTION TO Bio2Q RESEARCH

Series #11:
### Dr. Joaquim Caner
Postdoc, Bio-1 Core

#### ILLUMINATING THE 'DARK MATTER' OF THE GUT MICROBIOME

The human gut microbiota functions as a chemical factory, yet a vast majority remain "dark matter"—chemically uncharacterized and functionally mysterious. My research addresses this through the conceptual development of a robust chemical toolkit designed to illuminate this hidden landscape. The primary objective is the synthesis of potential gut microbiota-derived metabolites and their precursors, serving as the foundation for the definitive identification of these "unknowns" within complex biological systems. By developing these high-purity reference standards, we provide the essential framework required to map the microbiome's chemical diversity and understand its impact on human physiology.

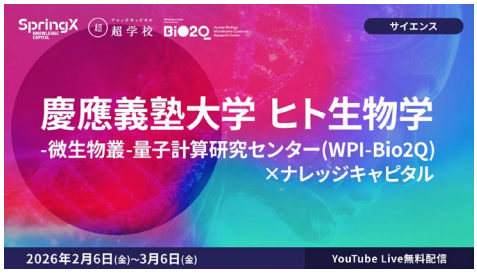
A secondary, integrated focus involves the development of stable isotope-labeled (SIL) analogs. These specialized probes empower high-resolution metabolic flux analysis and quantitative metabolomics, allowing us to trace the dynamic flow of biochemical transformations with precision. Ultimately, this developmental approach bridges synthetic chemistry and mechanistic biology, transforming elusive microbial signals into actionable knowledge for the benefit of health and well-being in today's society.



Joaquim Caner. Used with permission.

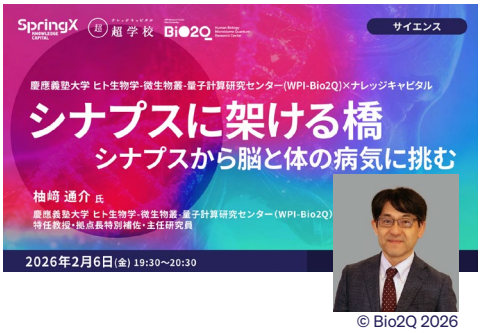
# EXPLORING THE FRONTIERS OF LIFE SCIENCE: A SPECIAL 3-PART ONLINE LECTURE SERIES

The Keio University Human Biology-Microbiome-Quantum Computing Research Center (WPI-Bio2Q), in collaboration with Knowledge Capital, will host a special three-part online lecture series starting this February. Titled "SpringX CHO School Series," this series will delve into the cutting-edge intersections of life science, technology, and medicine.



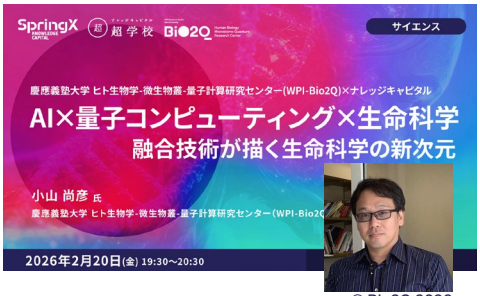

Knowledge Capital. Used with permission.

The first session, scheduled for February 6, features Prof. Michisuke Yuzaki, who will present "Bridging Synapses: Tackling Brain and Body Diseases from Synapses." Prof. Yuzaki will explore revolutionary treatments for neurological disorders by focusing on repairing "broken" synapses to restore fundamental brain and body functions.



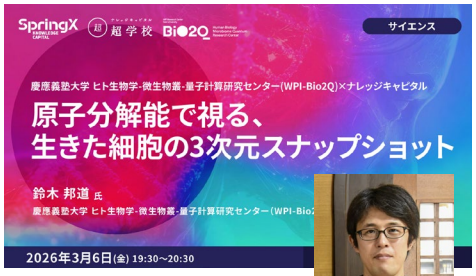

© Bio2Q 2026

On February 20, we welcome Prof. Takahiko Koyama for the second session: "AI × Quantum Computing × Life Science: New Dimensions via Integrated Technology." As computing technology undergoes a radical shift, Prof. Koyama will discuss how the fusion of artificial intelligence and quantum computing is opening new dimensions in life science research, potentially transforming our understanding of biological systems.




© Bio2Q 2026

The series concludes on March 6 with Associate Prof. Kunimichi Suzuki. His lecture, "3D Snapshots of Living Cells at Atomic Resolution," will showcase how advanced imaging allows us to observe living cells and molecules at an unprecedented scale. By visualizing the intricate connections within our bodies, we can gain deeper insights into the mechanisms of the mind and overall health.




© Bio2Q 2026

Each session will be held online from 19:30 to 20:30 JST. Participation is free, and we invite anyone curious about the future of medicine to join us. For more details and registration, please visit: https://kc-i.jp/activity/chogakko/keio2026/

# BIO2Q DEI SURVEY RESULTS: CELEBRATING STRENGTHS AND COMMITTED TO MEANINGFUL ACTION

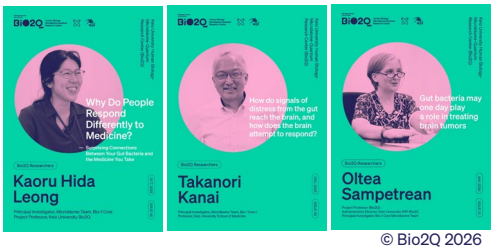
Bio2Q recently conducted a Diversity, Equity, and Inclusion (DEI) survey, receiving thoughtful feedback from 43 members on our organizational culture. The results indicated a positive momentum, with overall satisfaction in our inclusive environment averaging 4.0 out of 5. Members particularly highlighted our welcoming research culture and flexible work-style policies as key strengths that support belonging and productivity.

The survey also identified important opportunities for growth. To further promote fairness and clarity, we will continue prioritizing the development of transparent, written criteria for career progression. In response to high-priority member requests, we will also strengthen existing support by offering an additional confidential consultation window and implementing recurring bias-awareness training. Additionally, to help strengthen connections across teams, we will launch new networking opportunities designed to foster interdisciplinary collaboration.

We are grateful for the candid input from our members and remain committed to turning these insights into meaningful action.

(Oltea Sampetrean, Administrative Director )

# INSPIRING THE NEXT GENERATION: BIO2Q BOOKLET SERIES FOR YOUNG READERS




© Bio2Q 2026

At Bio2Q, we present the Booklet Series for Young Readers, which focuses on individual Principal Investigators and introduces their research in an accessible interview format for middle and high school students. Each booklet also includes messages from the Principal Investigators addressed to young readers. In the 2025 academic year, we featured the following three PIs in this series.

In Issue 08, Dr. Kaoru Hida Leong explains how our unique gut bacteria influence our individual responses to medicine. Issue 09 features Dr. Takanori Kanai, who explores the complex communication between the gut, liver, and brain to tackle inflammatory diseases. Finally, Issue 10 introduces Dr. Oltea Sampetrean, whose research investigates how gut bacteria metabolites might hold the key to treating brain tumors.

These booklets aim to inspire the next generation of scientists by showcasing the diverse paths and curiosity-driven journeys behind modern medical research.

# UPCOMING EVENTS

February 5 (Thu) 13:30-15:30
Tokyo Gakugei University Senior High School Students Visit Bio2Q and Tour the Labs@Shinanomachi

March 5 (Thu) 17:00-18:00
WPI-Bio2Q Open Seminar
by Dr. Ping-Chih Ho (Ludwig Institute for Cancer Research at University of Lausanne, Switzerland) Shinanomachi

March 12 (Thu) 17:00-18:00
WPI-Bio2Q Open Seminar
by Dr. Arjun S. Raman (University of Chicago, USA)@Shinanomachi

April 3 (Fri) 17:00-18:00
WPI-Bio2Q Open Seminar
by Dr. Damian Rafal Plichta (Broad Institute of MIT and Harvard, USA)@Shinanomachi

---

Science Meeting Series

---

February 25 (Wed) 14:00-15:00
#37: Takahiko Koyama, PI
@Shinanomachi and Zoom (Hybrid)

* * * * * * * * * * * * * *

The next “Bio2Q Connect” will be issued on March 29, 2026