FY 2024 Annual Report

Unit Name

Membrane Cooperativity Unit

Research Personnel

Taka-aki Tsunoyama, Staff Scientist

Saahil Acharya, Postdoctoral Scholar

Amine Betuel Nuriseria Aladag, Postdoctoral Scholar

Bo Tang, Postdoctoral Scholar

Maoji Wang, Postdoctoral Scholar

Jun-Seok Lee, Research Unit Technician

Irina Meshcheryakova, Research Unit Technician

Ryuto Shinozaki, Research Unit Technician

Juma Sayson, Research Assistant

Yasuyuki Shiroma, Research Assistant

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Kusumi, Akihiro, Peng Zhou, Taka A. Tsunoyama, Rinshi S. Kasai, Koichiro M. Hirosawa, Ziya Kalay, Amine Aladag, Takahiro K. Fujiwara, and Simone Pigolotti. 2024. "Single-Molecule Detection of Transient Dimerization of Opioid Receptors 1: Homodimers' Effect on Signaling and Internalization." BioRxiv, July.
   https://doi.org/10.1101/2024.07.25.605080
2. Kusumi, Akihiro, Taka A. Tsunoyama, Kenichi G N Suzuki, Takahiro K. Fujiwara, and Amine Aladag. 2024. "Transient, Nano-Scale, Liquid-like Molecular Assemblies Coming of Age." Current Opinion in Cell Biology 89:102394.
3. Kusumi, Akihiro, Peng Zhou, Rinshi S. Kasai, Wakako Fujita, Taka A. Tsunoyama, Hiroshi Ueda, Simone Pigolotti, and Takahiro K. Fujiwara. 2024. "Single-Molecule Detection of Transient Dimerization of Opioid Receptors 2: Heterodimer Blockage Reduces Morphine Tolerance." BioRxiv, August.
   https://doi.org/10.1101/2024.07.25.605109
4. Kusumi, Akihiro, Taka A. Tsunoyama, Christian Hoffmann, Bo Tang, Koichiro M. Hirosawa, Yuri L. Nemoto, Rinshi S. Kasai, Takahiro K. Fujiwara, Kenichi G. N. Suzuki, and Dragomir Milovanovic. 2024. "ITRVZ: Liquid Nano-Platform for Signal Integration on the Plasma Membrane." BioRxiv, September.
   https://doi.org/10.1101/2021.12.30.474523

Presentation at Conference

1. Kusumi, Akihiro. 2024a. "iTRVZ: A New Nano-Liquid Signal Integration Platform." Collaborative Research Center (CRC)-SFB1348 Symposium "Dynamic Cellular Interfaces: Formation and Function," May.

2. Kusumi, Akihiro. 2024c. “Receptor Turnover and SynGAP Condensate Formation in the Excitatory Synapse.” Gordon Research Conference on “Cell Biology of the Neuron: Intracellular and Intercellular Functions That Drive Neuronal Health and Disease,” June.
3. Kusumi, Akihiro. 2024b. “New Metastable Nano-Liquid Signal Integration Platform on the Cell Membrane, ITRVZ.” Gordon Research Conference on “Single Molecule Approaches to Biology: Illuminating the Physical Principles of Biological Systems Using Single Molecule Methods, July.

Seminars

1. Kusumi, Akihiro. 2024b. “Development of Ultrafast Super-Resolution Imaging and discovery of a Nano-Liquid Cancer-Promoting Signal Integration Platform.”
2. Kusumi, Akihiro. 2024a. “Development of Ultrafast Super Resolution Imaging and Discovery of a Signal Integration Platform on the Plasma Membrane.”
3. Kusumi, Akihiro. 2025. “Ultrafast Single Molecule Imaging and Discovery of Metastable Nano-Liquid Signaling Hub.”

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Publisher	Year Pub
Maoji Wang	Journal Article	Infrared nanosensors of piconewton to micronewton forces	Nature	Nature	2025-1/1
Amine Betuel Nuriseria Aladag	Journal Article	Transient, nano-scale, liquid-like molecular assemblies coming of age	Current Opinion in Cell Bioloogy	Elsevier	2024-8/1

Honors, Awards & Fellowships

Jan 2020 - Ongoing	Avanti Award in Lipids, 2020, Biophysical Society (U.S.A.)

Outreach Activities (For Unit Members Only)

2024	Taka-aki Tsunoyama, Staff Scientist