

# BDR SEMINAR via Zoom

## Kengo Watanabe

The Hood-Price Lab for Systems Biomedicine, Institute for Systems Biology

**Thursday, August 10, 2023**

9:30-10:30

Meeting URL will be announced on the event day by e-mail.

※This seminar is open only to BDR members.

## Beyond the Scale with Biological BMI: Integrated Multiomic Measures of Metabolic Health

### Summary

Obesity is a condition characterized by abnormal or excessive fat accumulation and is a risk factor for multiple chronic diseases. While obesity is primarily diagnosed using body mass index (BMI) cutoffs, it is known that BMI misclassifies ~30% of individuals. With recent advancements in omics technology, blood multiomic profile has emerged as a valuable source of information relevant to a wide range of human health and disease states.

We have recently developed machine learning models to predict BMI from blood multiomics (metabolomics, proteomics, and clinical laboratory tests) data, mainly using a deeply phenotyped cohort of 1,277 individuals enrolled in a wellness program. While retaining the clinical utility of BMI as a summative measure, the omics-inferred BMI (biological BMI) captured heterogenous phenotypic states of host metabolism and gut microbiome composition better than actual BMI. Moreover, longitudinal analyses revealed that the metabolomics-inferred BMI exhibited a stronger (and/or earlier) response to healthy lifestyle coaching compared to BMI, while the proteomics-inferred BMI showed a weaker (and/or delayed) response.

Our findings highlight the usefulness of blood multiomic profiling in characterizing metabolic health. Owing to the high interpretability and intuitiveness, biological BMI holds great promise for future applications in predictive and preventive medicine, particularly against obesity.

### Reference:

- [Watanabe, K.](#) et al. *Nat. Med.* 29(4), 996–1008 (2023).
- Rappaport, N. & [Watanabe, K.](#) *Nat. Med.* 29(4), 801–802 (2023). [Research Briefing]



**RIKEN Center for Biosystems Dynamics Research (BDR)**

**Host: Ichiro Hiratani**  
Laboratory for Developmental Epigenetics, BDR  
Contact: [bdr-mtg@ml.riken.jp](mailto:bdr-mtg@ml.riken.jp)