

**Brown Bag Lunchtime Seminar**  
(Theme: Cognition and Neuroscience)

**Dose-Response Relationships between Physical Exercises and Youth Mental Health: A Perspective from Brain Architecture and Genetics**

12:30 p.m. – 1:30 p.m. | November 8, 2023 (Wednesday)  
Rm 813, 8/F, The Jockey Club Tower | Centennial Campus | The University of Hong Kong



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**Abstract**

Adolescence is a critical period marked by significant physical and neurocognitive development, as well as increased vulnerability to mental health issues. While the positive impact of physical exercise on adult mental health is well-established, dose-response relationships and the underlying neural and genetic mechanisms in adolescents remain elusive. We here investigated the relationships between physical exercise and mental health in over 11,000 pre-adolescents (9-10 years) from the ABCD study. We analyzed seven different measures of exercise dosage across fifteen exercises, and the underlying roles of brain structural and functional architecture and psychiatric genetic risks. Our findings demonstrated that five specific exercises - basketball, baseball/softball, soccer, football, and skiing - were associated with better mental health while the beneficial effects varied based on the exercise types, dosage measures, and dimensions of psychopathology. Interestingly, more exercise does not always translate to better mental health, and an earlier initiation of exercise may be particularly advantageous for mental well-being. Furthermore, we identified the mediating role of functional connectivity between the attention and default-mode networks in the positive effects of football on internalizing problems. Crucially, our study demonstrated that physical exercise mitigates the detrimental effects of psychiatric genetic risks on mental health. These findings offer a detailed understanding of the nuanced dose-response relationships between mental health and specific exercise types, while shedding light on the underlying neural pathways and providing evidence-based recommendations for personalized exercise-based interventions.

**About the speaker**

Gechang Yu achieved his MPhil degree in Biomedical Engineering in Institute of Science and Technology for Brain-inspired Intelligence (ISTBI), Fudan University, supervised by Prof. Jie Zhang. He is currently a second-year PhD student in Medical Sciences in Chinese University of Hong Kong, supervised by Prof. Ronald Ma and a joint PhD student in University of Exeter, co-supervised by Dr. Richard Oram. His main research interest focuses on integrating large-scale multi-omics data, multimodal data and environmental exposure data to study the mechanisms of complex diseases or phenotypes like mental disorders and type 2 diabetes during the life course for precision medicine.

**Zoom (For participants who couldn't attend the Seminar in person)**

<https://hku.zoom.us/j/3951550048?pwd=SncvL3RYakEycUtpL29vdDJEIdEwdz09>

Meeting ID: 395 155 0048 | Password: psyc



**~All are Welcome~**

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