

Modelling of Microcirculatory Blood Flow - Transport Dynamics of Red Blood Cells

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Time: 10:30 am - 11:30 am



Venue: HKIAS Lecture Theatre,
LG/F, Academic Exchange Building, City University of Hong Kong

Registration

[https://cityuhk.questionpro.com/t/
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Abstract : Red blood cells (RBCs) are essential in delivering oxygen to tissues and organs across intricate networks of small vessels or narrow passages. Notwithstanding decades-long research, it remains elusive until recently how the transport dynamics of RBCs can mechanistically contribute to the pathophysiology of microcirculatory disorders, either through modulating the haematocrit distribution or wall shear stress patterning. This talk will introduce the key findings of our recent modelling works based on hamster capillaries [1], mouse retina [2] and human placenta [3], respectively. Through combining cell-resolved mesoscopic simulations with imaging data of animal models or biological tissues, we have qualitatively and quantitatively investigated the RBC behaviour in a range of vascular/extravascular environments including capillary-level bifurcations, microvascular networks and porous media. Our studies provide potential mechanisms for hindered microcirculatory blood flow under pathological conditions where the RBC stiffness or vascular morphology have markedly altered.

[1] Rashidi, Simionato, Zhou et al., *Biophysical Journal* 122: 2561-2573, 2023

[2] Zhou et al., *Journal of the Royal Society Interface* 18: 20210113, 2021

[3] Zhou et al., *Interface Focus* 12:20220037, 2022

