



**UNIVERSITÉ
DE GENÈVE**

FACULTÉ DES SCIENCES

LE DEPARTEMENT DE CHIMIE PHYSIQUE

a le plaisir de vous inviter à la

CONFERENCE

intitulée

**IN SITU STRUCTURES OF MUSCLE SARCOMERE
AND SARCOMERIC PROTEINS**

donnée par

Prof. Stefan RAUNSER

DEPARTMENT OF STRUCTURAL BIOCHEMISTRY

Max Planck Institute of Molecular Physiology

**MAX PLANCK INSTITUTE OF MOLECULAR PHYSIOLOGY,
DORTMUND (GERMANY)**

1e MARDI 23 AVRIL 2024 à 16h30

SALLE A150

Sciences II

30 quai Ernest-Ansermet ou 4 bld d'Yvoy

Responsable : Prof. Enrica BORDIGNON

In situ structures of muscle sarcomere and sarcomeric proteins

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Abstract

Sarcomeres are force-generating and load-bearing devices of muscles. A precise molecular picture of how sarcomeres are built underpins understanding their role in health and diseases. We determined the molecular architecture of native skeletal and cardiac sarcomeres and structures of sarcomeric proteins using cryo-focused-ion-beam milling (cryo-FIB) and electron cryo-tomography (cryo-ET). Our three-dimensional reconstruction of the sarcomere reveals molecular details in the A-band, I-band and Z-disc and demonstrates the organisation of the thin and thick filaments and their cross-links [1,2]. Our reconstruction of the thick filament reveals the three-dimensional organization of myosin heads and tails, myosin-binding protein C (MyBP-C) and titin, elucidating the structural basis for their interaction during muscle contraction [2]. Using sub-tomogram averaging, we determined an in situ structure of a nebulous thin-filament-binding protein, nebulin, at 4.5 Å and demonstrated the molecular mechanism underlying its role as a "molecular ruler", in stabilising thin filament and in regulating myosin binding [3]. We also characterised the structure of a unique double-head myosin conformation, highlighting the inherent structural variability of myosin in muscle [1].

References

- [1] Wang, Z, Grange M et al. (2021), Cell. 184, 2135-2150.613
- [2] Tamborrini, D et al. (2023), Nature, 623(7988):863-871
- [3] Wang, Z, Grange M et al. (2022), Science. 375, eabn1934