

Mon 27. June 2022
Time: 14:00 h

Institute of Biochemistry
and Molecular Medicine
(IBMM)

Seminar Room
Gertrud-Woker-Str. 5,
3012 Bern

Everybody is welcome

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This lecture is hosted by
Prof. Wanda Kukulski
(IBMM).

NCCR TransCure Lecture in Biology

by Katelyn Cook

Human Viruses Rewire Membrane Contact Sites for Pro-Viral Organelle Remodeling

Membrane contact sites (MCSs) link organelles to coordinate cellular functions across space and time. Although viruses remodel organelles for their replication cycles, MCSs remain largely unexplored during infections. Here, we design a targeted proteomics platform for measuring MCS proteins at all organelles simultaneously and define functional virus-driven MCS alterations by the ancient beta-herpesvirus human cytomegalovirus (HCMV). Integration with super-resolution microscopy and comparisons to herpes simplex virus (HSV-1), influenza A, and beta-coronavirus HCoV-OC43 infections reveals time-sensitive contact regulation that allows switching anti-to pro-viral organelle functions. We uncover a stabilized mitochondria-ER encapsulation structure (MENC). As HCMV infection progresses, MENCs become the predominant mitochondria-ER contact phenotype and sequentially recruit the tethering partners VAP-B and PTPIP51, supporting virus production. However, premature ER-mitochondria tethering activates STING and interferon response, priming cells against infection. At peroxisomes, ACBD5-mediated ER contacts balance peroxisome proliferation versus membrane expansion, with ACBD5 impacting the titers of each virus tested.