LECTURE SERIES & WORKSHOPS 2023 / Hybrid

NEXT-GENERATION OF MULTI-OMICS RESEARCH: GOING TO THE SINGLE CELL

INFECTION & IMMUNITY

LUXEMBOURG INSTITUTE OF HEALTH

UNIVERSITÉ DU LUXEMBOURG

08 Mar 2023

Wednesday

LECTURE*

11 am - 12 noon

MEET & EAT*

Light lunch provided

12.15 - 1.15 pm

High-throughput phosphoproteomics to analyze cell signaling networks in health and disease

ABSTRACT

Mass spectrometry-based is emerging as an indispensable tool for analyzing perturbed cellular signaling networks on a systems-wide scale. In this presentation, I will go through recent technology developments in proteomics sample preparation, LC-MS/MS acquisition strategies and computational data analysis, which enabled us to analyze cellular rewiring of spatiotemporal phosphoprotein signaling as a function of growth factor stimuli and drug treatment. I will describe a spatial phosphoproteomics technology that is based on a simple chemical fraction method for high-throughput and reproducible analysis of subcellular phosphoproteomes by using short LC gradients in combination with data-independent acquisition (DIA) mass spectrometry. The subcellular analysis workflow is based on sequential cell fractionation to profile the global proteome and phosphoproteome dynamics across six distinct subcellular fractions. We applied the workflow to study spatio-temporal EGFR phospho-signaling dynamics in-vitro in HeLa cervix carcinoma cells and in-vivo in mouse tissues. We have also investigated the spatio-temporal stress signaling induced by osmotic shock in U20S osteosarcoma cells revealing cellular relocation of ribosomal proteins in response to hypertonicity and in muscle contraction. Most recent, we have used the workflow to study the impact of a cancer therapeutic drug on the subcellular (phospho)proteome in sensitive and resistant acute myeloid leukemia (AML) cells. Our spatial proteomics method is a powerful strategy for studying phospho-signaling dynamics at subcellular resolution.

SPEAKER

Prof Jesper Olsen

Novo Nordisk Foundation Center for Protein Research,
University of Copenhagen, Denmark

HOSTS:

Department of Infection and Immunity (LIH)
University of Luxembourg

RESPONSIBLE SCIENTISTS:

Gunnar Dittmar / (gunnar.dittmar@lih.lu)
Alexander Skupin / (alexander.skupin@uni.lu)

For any questions regarding the Lecture Series please email:
omics-lecture@lih.lu

***Please note that registration is mandatory by sending an email to michelle.roderes@lih.lu or carole.weis@lih.lu**

Location:
University of Luxembourg
CAMPUS BELVAL
Maison du Savoir
Room: 4.060
2, avenue de l'Université
L-4365 Esch-sur-Alzette

Meet & eat:
University of Luxembourg
Campus Belval
Coffee Lounge, 2nd floor, BT1
7, avenue des Hauts-Fourneaux
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