Letter of intent

File number 175.2021.029
Grant 2021/2022

Applicant

Title
High-resolution infrastructure to dissect the cellular and sub-cellular distribution of molecules of life (SpatialOmics)

Abstract
Need: Comprehensive insights into the protein, metabolite, lipid and carbohydrate content of cells and subcellular structures in the context of tissues is needed to develop a molecular understanding of the processes of life in health and disease. Technology is lacking to resolve the molecular complexity and architecture at sufficient depth and resolution.

Research infrastructure:
Enabling technologies to resolve the molecular architecture of tissues at the cellular and subcellular level in a standardized and reproducible fashion are sorely needed. The SpatialOmics consortium will meet this need by developing and providing infrastructure and solutions for high-sensitivity, high resolution analysis of the proteomic, metabolomic, lipidomic and glycomic signatures of tissues. This facility will be centered around mass spectrometry imaging infrastructure to achieve on the one hand high spatial resolution for analyses at the (sub)-cellular level and, on the other hand, ultrahigh mass spectrometric resolution to resolve molecules at high sensitivity and analytical depth. For full structural elucidation, the infrastructure will tightly combine on-tissue and off-tissue mass spectrometric approaches, enriched by ion mobility dimensions.

Implementation: The Leiden University Medical Center and Maastricht University will jointly lead a consortium to provide research infrastructure to the Dutch scientific community.

Impact: The SpatialOmics infrastructure will be broadly used to study disease mechanisms, reveal drug targets, and develop precision medicine approaches, thereby achieving a broad impact on biomedical and biopharmaceutical innovation. Alignment with Group(s) in The SpatialOmics consortium aligns with the X-Omics Roadmap.

Organisation responsible for the application

☐ Confirm letter of intent