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KEYWORDS – Mass Spectrometry, Imaging, Single-cell Omics

MAIN FIELDS OF RESEARCH; ABSTRACT

My research project aims to develop an imaging method for highly-multiplexed, single-cell multiomics cancer research. The method is based on Imaging Mass Spectrometry and Imaging Mass Cytometry, and it shall allow the spontaneous visualisation of hundreds of biomarkers, along with the ability to achieve untargeted spatial profiling of small molecules, for instance, metabolites. Once established, I want apply this method to study breast cancer patient cohorts, gaining information based on the biomarkers- as well as metabolomics-profiling from tumours and their microenvironments. As the method shall allow enormously enriched post-genomics data generation, more comprehensive views of tumour heterogeneity, as well as tumour-microenvironment relationship can be revealed, in a disease-relevant manner. These will facilitate patient stratification, improve clinical decision-making, and eventually contribute to the development of precision medicine.

SPECIAL TECHNIQUES AND EQUIPMENT

Special techniques applied throughout my project are various applications of Mass Spectrometry, including Imaging Mass Spectrometry such as Matrix Assisted Laser Desorption Ionization (MALDI) Mass Spectrometry-Imaging, as well as the classic Liquid Chromatography tandem Mass Spectrometry (LC-MS/MS), and so forth. Another essential technique applied in my project is Imaging Mass Cytometry.