Image Mass Cytometry to characterize the tumor immune microenvironment

Maria Paola Serra, PhD, Astrazeneca DSM PATHOLOGY, UK

Stephanie Ling, PhD, Astrazeneca DSM PATHOLOGY, UK

Background

There is a growing understanding of cell heterogeneity and the impact of immune cells within tumor tissue; sophisticated tools are needed to provide quantitative information for many biomarkers while retaining spatial resolution of cells and tissue architecture.

Image Mass Cytometry (IMC) is a novel technique for tissue imaging that enables simultaneous quantification of more than 30 biomarkers with subcellular resolution, preserving cell morphology.

This large panel applied to cancer samples allows delineation of cell subpopulations, cell-cell interactions and the localization of immune cells infiltrates to evaluate host response. IMC analysis can be performed in parallel with conventional mass spectrometry imaging.

Methods

Metal-conjugated antibodies are used to perform qualitative and quantitative analyses of the expression of multiple proteins of interest on a single slide (5-10um thickness) that can be formalin-fixed, paraffin-embedded (FFPE) or frozen fixed.

All markers are validated by IHC first to select the optimal dilution and evaluate the specificity of the signal. Multitissue slides of normal and diseased/treated tissue are stained and imaged using the Hyperion System.

Results

A protocol to detect more than 30 biomarkers simultaneously in a single slide is optimised for FFPE and frozen tissue.

The application of this technology to pre-clinical and clinical samples enables increased understanding of the mechanisms underlying differential drug delivery, metabolism, response and to define novel biomarkers of efficacy.

Biography:

Dr Maria Paola Serra joined Astrazeneca, DSM Pathology as a senior scientist in 2017.

Her main focus is the characterization of the relationship between immune cells and cancer, and to understand the complexity of the tumor microenvironment she is using multiplex techniques.

She previously worked at King's College London as a Marie Curie post doc fellowship understanding how to improve the differentiation of human induced pluripotent stem stells into hepatocytes to treat liver disease.

She completed her PhD at the University of Cagliari, Italy, where her main focus was liver cancerogenesis and hepatocyte transplantation

Mariapaola.serra@astrazeneca.com