

Using MALDI Imaging Mass Spectrometry for Biomarker Discovery

Michelle L. Reyzer and Richard M. Caprioli

Mass Spectrometry Research Center, Vanderbilt University, Nashville, TN 37232

Over the past decade, MALDI mass spectrometry has become a powerful analytical tool for the spatial analysis of molecules directly from tissue sections. MALDI produces primarily singly protonated molecular ions and is capable of producing ions of over 150 kDa, making it an ideal tool to analyze high molecular weight proteins directly from their native biological environment. The large mass range, excellent sensitivity, simple sample preparation, and molecular specificity make MALDI analysis a good choice for biomarker discovery. The fundamentals of using MALDI MS for biomolecular tissue imaging will be presented, along with applications to real-world samples. Biomarker discovery utilizing high-resolution imaging and histology-directed protein profiling will be illustrated via studies of human glioma, colorectal cancer, and breast cancer samples as well as animal studies of drug toxicity.