

The technological advances in [tissue profiling](#) have also been applied to the study of [cell-free DNA](#), an area of increasing interest for [molecular pathology](#).

Matrix-assisted laser desorption ionization mass spectrometry (MALDI MS) has become a valuable tool to address a broad range of questions in many areas of biomedical research. One such application allows spectra to be obtained directly from intact tissues, termed “profiling” (low resolution) and “imaging” (high resolution). In light of the fact that MALDI tissue profiling allows over a thousand peptides and proteins to be rapidly detected from a variety of tissues, its application to disease processes is of special interest. For example, protein profiles from tumors may allow accurate prediction of tumor behavior, diagnosis, and prognosis and uncover etiologies underlying idiopathic diseases. MALDI MS, in conjunction with laser capture microdissection, is able to produce protein expression profiles from a relatively small number of cells from specific regions of heterogeneous tissue architectures. Imaging mass spectrometry enables the investigator to assess the spatial distribution of proteins, drugs, and their metabolites in intact tissues. This article provides an overview of several tissue profiling and imaging applications performed by MALDI MS, including sample preparation, matrix selection and application, histological staining prior to MALDI analysis, tissue profiling, imaging, and data analysis. Several applications represent direct translation of this technology to clinically relevant problem ¹⁾.

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Caldwell RL, Caprioli RM. Tissue profiling by mass spectrometry: a review of methodology and applications. *Mol Cell Proteomics*. 2005 Apr;4(4):394-401. doi: 10.1074/mcp.R500006-MCP200. Epub 2005 Jan 26. PMID: 15677390.

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