

MALDI-TOF Mass Spectrometry in Microbiology

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Preface

Microbiology is thought to be a very conservative area in science and medicine with clinical microbiology being its most conservative part. Still Gram-staining and microscopy are central tools in the microbiology laboratory like a century ago. But sometimes revolutions change the game. Such a revolution has taken place when MALDI-TOF mass spectrometry has entered microbiological practice. Less than a decade has passed since the first routine users started to express their excitement about the benefits they gained with the new technology, about increased accuracy for the broad spectrum of nearly all microorganisms appearing in daily practice, tremendously shortened time to get an identification result, and significantly lowered overall costs. While the technology started its success story in Europe, it quickly also entered the Americas as well as Asian countries and now is getting adapted there.

Clinical diagnostic was the first area where MALDI-TOF MS was introduced for broad spectrum microorganism identification in routine practice. Both direct impact on healthcare and economic advantages were powerful drivers helping to overcome conservative reservation. But other fields quickly followed, from scientific research in different areas to industrial quality control. The spectrum of organisms which were investigated using the technology permanently expanded. Today, MALDI-TOF MS is widely accepted as the new laboratory standard for microorganism identification, and further application fields are on the horizon. As nowadays the identification of organisms with lowest preparation efforts is daily business in many laboratories, many microbiologists are looking for more applications which might benefit from the capabilities of such a system. This is in fact supported by the technological development on instrument and software side. The instruments as well as analysis systems are becoming faster, thereby not only results are available even earlier but also time is freed for additional assays.

We both participated in the revolution in microbiology caused by MALDI-TOF MS, as technology developer and early adaptor in a routine laboratory. We have experienced the scientific wave which it has caused during the recent years but also the enormous impact on practice in clinical microbiology. Still we are excited about the impact of this technology but we also think there is no reason to stand still. In this book experts in the field describe the state-of-the-art and give an outlook on how MALDI-TOF MS may continue the revolution. This shall be a help for the unexperienced reader but also an inspiration for scientists and practitioners to participate.

Finally, we would like to commemorate the co-inventor of the MALDI technique, Franz Hillenkamp. In the late 1980s he 'saw the first ions fly' with his invention. We experienced

his great excitement when he got aware about the introduction of ‘his’ technology into a clinical field, some time after his retirement. He passed away before he could write the planned chapter for this book. Scientists with his brightness and enthusiasm are rare and urgently needed for revolutions as caused by MALDI-TOF MS in microbiology.

In memoriam Franz Hillenkamp
Markus Kostrzewa
Sören Schubert