

LC-MS in Drug Bioanalysis

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Editors

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 Springer

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Preface

The analysis of drugs in complex biological matrices plays a very important role in drug development, the conduct of clinical trials, and in therapeutic drug monitoring. Numerous analytical techniques have been developed to perform bioanalysis, which include immunoassays, gas chromatography-flame ionization detection (GC-FID), gas chromatography-mass spectrometry (GC-MS), high performance liquid chromatography-ultraviolet (HPLC-UV), high performance liquid chromatography-mass spectrometry (HPLC-MS or LC-MS), and high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS or LC-MS/MS). A huge selection of analytical columns and mobile phases provides for chromatographic analysis having extreme separation power, while the addition of tandem mass spectrometry as a detection and quantification methodology provides a high degree of selectivity and sensitivity. In addition, the combination of liquid chromatography and tandem mass spectrometry (LC-MS/MS) can provide high-throughput analysis for complex biological samples. LC-MS/MS is increasingly becoming the method of choice for the determination of drug(s) in drug development, clinical pharmacology, toxicology, and therapeutic drug monitoring.

However, LC-MS methods can be quite expensive and require highly skilled and well-trained personnel, and the LC-MS/MS technique is also prone to some pitfalls. It is our hope that *LC-MS in Drug Bioanalysis* will help readers to improve their technical skills in LC-MS/MS method development, validation, and application to the analysis of drugs and drug metabolites. First, this book presents discussions on the application of internal standardization, method development and validation for regulated quantitative bioanalysis, and associated pitfalls of LC-MS/MS, such as ion suppression or signal enhancement from matrix. It also includes information on newer sampling techniques which are becoming increasingly popular—dried blood spots (DBS) and microflow liquid chromatography-mass spectrometry. Second, this book provides detailed information on the applications of LC-MS/MS in bioanalysis, including the analysis of antipsychotic drugs, antidepressants, illicit drugs, steroid hormones, and tropane alkaloids in human biological samples. Matrix-assisted laser desorption/ionization imaging mass spectrometry is briefly introduced.

The planar integrated micro mass spectrometer—one of the new mass spectrometers under development—is also introduced here. Such a portable handheld micro mass spectrometer would be very useful for bedside therapeutic drug monitoring.

We believe this book will be a great aid for college students and academics, clinical pharmacologists and toxicologists, and pharmaceutical scientists. We sincerely hope that readers will find this book useful.

We would like to acknowledge all of the authors who found time in their busy schedule to contribute the thoughtful chapters. Our task of compiling this book was made easy by their high-quality efforts. We would also like to thank Mr. Kenneth Howell and Christopher Balmes at Springer for their much valued assistance throughout the preparation of this book.

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