

# METHODS IN MOLECULAR BIOLOGY

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# Clinical Metabolomics

## Methods and Protocols

Edited by

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## Preface

In recent years, metabolomics has become an inevitable tool in several clinical research fields, helping to discover new diagnostic markers and molecules and furthering our understanding of pathophysiological processes. Unlike the field of clinical chemistry which today is integrated into many clinical processes, clinical metabolomics is a much more “juvenile” discipline still on its way to become fully integrated into modern health care. Nevertheless, metabolomics is at the core of several very promising initiatives evolving around personalized health care and precision medicine.

Ideally, clinical metabolomics should be seen as a complimentary discipline to clinical chemistry. The much more hypothesis-driven exploratory nature of clinical metabolomics allows it to fill the pipelines of clinical chemistry with novel disease markers and diagnostic patterns. Besides this, clinical metabolomics is very well suited to help clinicians and biologists understand pathophysiological processes in detail, hopefully allowing us to design novel treatment strategies and therapies. Its multidisciplinary nature covering (analytical) chemistry, biology, bioinformatics, and pathology necessitates that scientists from various fields understand each other. Hence, a common fundament for communication is a mandatory prerequisite for the successful embedding of clinical metabolomics into modern disease-related research. When communicating with colleagues from various disciplines, it is of utmost importance to the planning of joint studies that every partner understands the needs and limitations of one another. In multidisciplinary projects, this particularly applies to the fact that each partner should be aware of practical requirements and limitations of the different methods and technologies used. Therefore, exchanging experimental protocols and making colleagues aware of critical practical considerations is of vital importance for a successful study outcome.

With this book, we hope to present a comprehensive compendium of clinical metabolomics protocols covering LC-MS-, GC-MS-, CE-MS-, and NMR-based clinical metabolomics as well as bioinformatics and study design considerations. We hope that this book will serve as the basis for the successful (practical) communication between scientists from several fields, including chemists, biologists, bioinformaticians, and clinicians, ultimately leading to successful study design and completion.

*Leiden, The Netherlands*

*Martin Giera*

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