

Selected Contributions from Bioanalytical Reviews

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Preface

This book publication presents selected contributions from the Springer journal *Bioanalytical Reviews* which will be continued as a book series from 2013 onwards. Thus, the present book can be seen as a bridge between both forms of publication media.

The mission of *Frontiers of Bioanalytical Chemistry* is to reflect on the progress of important research within the rapidly growing and diverse area of bioanalytical sciences. Methodical developments in bioanalytical chemistry have an enormous impact on almost all areas in life sciences. The reviews covered in this publication represent an overview of cutting-edge tools used in modern bioanalytical research. In addition, new approaches to solve bioanalytical challenges using complementary, advanced analytical instrumentation are presented.

The following contributions are representative for ongoing developments in the field of bioanalytical chemistry. Sweedler and co-workers discuss a variety of analytical methods for diastereomeric separation and detection of D-amino acid-containing peptides. Robelek summarizes the progress made in surface plasmon resonance in the context of cellular interactions and reactions to extra- and intracellular stimuli. New developments of biosensor arrays and corresponding applications for food quality control are reviewed by Moises and Schäferling. The increasing importance of aptamer-based sensors is represented by reviews contributed by the groups of Marty and Wang. The former is focussed on state-of-the-art of electrochemical aptamer-based sensors while the latter is concerned with biosensors implementing gold nanoparticles and functional aptamers as molecular recognition elements. Holzgrabe and co-workers illustrate the potential of quantitative NMR which has emerged as a promising tool in drug analysis. Recent trends in structure elucidation of small molecules by advanced mass spectrometry are discussed by Kind and Fiehn. Immunoassay-based sensing concepts are covered by contributions by Mascini and co-workers as well as by Pääkilä and Soukka. Alternatives to cytochrome P450 in the context of recognition elements in biosensors are discussed by Scheller and co-workers. Scriba summarizes recent developments in the field of chiral electromigration techniques in pharmaceutical and biomedical analysis. The groups of Brett/Oliveira-Brett and Fatibello-Filho present a comprehensive overview of the role of bioelectroanalysis for the determination of pharmaceutical compounds. Last but not least Cadet's group contributes an authoritative discussion of "facts and artifacts" in the area of investigation of oxidatively generated base damage to nucleic acids in cells.

We are very much indebted to Joan Oefner who has been indispensable for the editorial work associated with the handling of comprehensive review articles. Finally, we would like to thank all authors who have contributed high-quality review articles to the journal *Bioanalytical Reviews*, Vol. 1-4 (2009-2012); however, only a few representative reviews could be selected for this book publication to illustrate current frontiers of bioanalytical chemistry.

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