Preface

The importance of the stereochemistry of compounds is well recognized in chemistry and life sciences since Louis Pasteur discovered the phenomenon of chirality in 1848. The enantiomers of chiral compounds often differ in their biological, pharmacological, toxicological, and/or pharmacokinetic profile. This has become evident specifically in pharmaceutical sciences, but it also affects chemistry, biology, food chemistry, forensics, etc., and is reflected in the requirements for chiral compounds by regulatory authorities worldwide. For example, the Food and Drug Administration (FDA) and the European Medicines Agency (EMA) require the development of a single enantiomer of a drug candidate if the enantiomers differ in their pharmacological action, toxicological profile, etc. As a consequence, seven drugs of the top ten drugs (not counting biotechnological drugs) according to their sales in the USA in 2010 (www.drugs.com/top200.html, accessed February 21, 2012) are single enantiomer drugs, while two drugs are achiral compounds. One product is a combination of a chiral and a racemic drug. In fact, the top three products are single enantiomer drugs. However, the importance of chirality does not stop here but is important to any research in life sciences.

Generally, there is a great demand for analytical methods that are able to discriminate between enantiomers in order to analyze the enantiomeric purity of compounds from natural or chemical sources not only in pharmaceutical sciences but in any field of bioactive compounds including chemistry, biology, biochemistry, forensic and environmental sciences, and many others. Chromatographic techniques dominated the field of enantioseparations early on, but electrophoretic methods have gained increasing importance in recent years. While some compounds may be analyzed only with one technique based on their physicochemical properties, often the analyst can chose between two or more analytical techniques for a given analyte. This requires knowledge of the strengths and weaknesses of each technique in order to select the most appropriate method for the given problem.

The focus of *Chiral Separations: Methods and Protocols, 2nd edition* is clearly on analytical separation sciences by chromatographic and electrophoretic techniques although simulated moving bed chromatography has also been included, which is primarily used as a preparative method. The book does not claim to comprehensively cover each possible chiral separation mechanism but to give an overview and especially practically oriented applications of the most important analytical techniques in chiral separation sciences. Thus, the book follows the well-established scheme of the *Methods and Protocols* series. Some review chapters give an overview of the current state of art in the respective field. However, most chapters are devoted to the description of the typical analytical procedures providing reliable and established procedures for the user. Critical points are highlighted so that the user is enabled to transfer the described method to his/her actual separation problem.

Sixty-four authors from 34 research laboratories in 17 countries have contributed by sharing their insight and expert knowledge of the techniques. I would like to take the opportunity to thank all authors for their efforts and valuable contributions.

Chiral Separations: Methods and Protocols, 2nd edition should be helpful for analytical chemists working on stereochemical problems in fields of pharmacy, chemistry, biochemistry, food chemistry, molecular biology, forensics, environmental sciences, or cosmetics in academia, government, or industry.

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