Lab-on-a-Chip Technology (Vol. 2)

Biomolecular Separation and Analysis

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Lab-on-a-Chip (LOC) technology is a rapidly expanding area of science. It has applications in biotechnology, medicine, clinical diagnostics, chemical engineering, and pharmaceutics. As the lab-on-a-chip systems increase in importance and complexity it is important for scientists to become familiar not only with the technology but also with the potential applications.

The editors of this book have brought together expert authors from many countries to produce a comprehensive volume focusing on the applications of LOC technology in the biomedical and life sciences. The first section includes chapters on LOC biomolecule separation. Separation of biomolecules is an important element of various clinical laboratories and is required for many down stream analytical applications. Various electrophoresis and liquid chromatography applications for proteins and DNA are described as well as methods for cell separation, with an emphasis on blood cell separation, which have many important clinical applications. The second part includes chapters on analysis and manipulation technologies. Authors describe protein, genetic (mainly PCR) and transcriptome analysis with examples from research and clinical applications, as well as cell manipulation and analysis including cell viability analysis and microorganism capturing.

A skillful selection of topics of exceptional importance to current science ensures that this book will be of major value to a wide range of molecular biologists, clinical scientists, microbiologists, biochemists and anyone interested in LOC technology or developing applications for LOC devices.

Chapter 1. Two-Dimensional Electrophoresis in a Chip. *Z. Hugh Fan, Champak Das and Hong Chen*
Chapter 2. Liquid Chromatography in Microfluidic Chips. *Hernan V. Fuentes and Adam T. Woolley*
Chapter 3. Design and Fabrication of Microfluidic Devices for Flow-based Separation of Blood Cells. *Lance L. Munn and Abhishek Jain*
Chapter 4. Hydrophoretic Method for Continuous Blood Cell Separation. *Sungyoung Choi and Je-Kyun Park*
Chapter 5. Microchip Gel Electrophoresis of DNA with Integrated Whole-column Detection. *Roger C. Lo and Victor M. Ugaz*
Chapter 6. Microscale Blood Separation Technology. *Jeffrey D. Zahn, Sung Yang, Akif Undar and Pantelis Athanasiou*
Chapter 7. Microfluidic Drops as Microreactors. *Charles N. Baroud*
Chapter 8. Optical Sectioni. ng for Microfluidics. *Yeh-Chan Ahn and Zhongping Chen*
Chapter 9. Acquisition of Single Cell Data in an Optical Microscope. *Kristin Sott, Emma Eriksson and Mattias Goksör*
Chapter 10. Elaborating Lab-on-a-Chips for Single-cell Transcriptome Analysis. *Nathalie Bontoux, Luce Dauphinot and Marie-Claude Potier*
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Chapter 12. Microchip-based PCR Amplification Systems. *Nathaniel C. Cady*
Chapter 13. Cell Viability Measurement Using a Portable Photodiode Array Chip. *Joon Myong Song and Ho Taik Kwo*
Chapter 14. A Charge-coupled Device (CCD) Based Optical Detector for Lab-on-a-Chip. *Keith Herold and Avraham Rasooly*
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