
Next Generation Point-of-care Biomedical Sensors Technologies for Cancer Diagnosis

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Editors

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 Springer

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Department of Chemistry and Institute of Biophysio
Sensor Technology
Pusan National University, South Korea
on his
65th Birth Anniversary*

Preface

Cancer today is one of the leading causes of mortality across the globe that can affect humans in more than 100 diverse forms. Conventional diagnostic approaches, biopsy for instance, have been used for several decades, but their limitations of being invasive and less sensitive have rendered them to be anachronistic. Seeing the upsurge in the incidence of cancer cases, its early diagnosis with high sensitivity in onsite mode has become extremely important.

This book contains 16 chapters that exclusively focus on different tactics of cancer diagnosis and prognosis. It provides a comprehensive fundamental understanding of different tools for cancer detection based on different tumour biomarkers and cancer cells. A detailed account of state-of-the-art cancer diagnostic approaches starting from labelled biosensors, label-free biosensors, implantable biosensors, integrated microfluidics systems, lateral flow devices, and biosensors based on application of various nano-biomaterials has been well stated in this book. Furthermore, development procedures of these diagnostic approaches along with their benefits, shortcomings, and future prospects are described in detail. This volume encompasses several illustrations and writing style is pedagogical to enable better understanding. The book can be used not only in formal courses at senior graduate level but also for self-study as the writing is very simple, interesting, and informative. The approach of this book is to generate a meticulous outlook of available cancer biosensors with an insight of new prospects.

Necessary compromises have been made between depth and breadth of different topics to give away a book of reasonable size. However, no compromises have been made in terms of delivering relevant information so that readers get full advantage of being enlightened.

The authors have received help from their colleagues and friends in country and overseas throughout the process of editing this book. We are especially grateful to our laboratory students and post-doctoral fellows for their diligent assistance with myriad details of preparation and production. We also thank our families for giving

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Guwahati, Assam, India
Singapore, Singapore
New Delhi, Delhi, India

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About the Editors



Pranjal Chandra is currently employed as Assistant Professor and principal investigator at the Department of Biosciences and Bioengineering, Indian Institute of Technology Guwahati, Assam, India. He earned his Ph.D. from Pusan National University, South Korea, and did post-doctoral training at Technion-Israel Institute of Technology, Israel. He has published over 50 research articles in reputed journals and 1 book (IET, London). He is also a visiting scientist at IBST, South Korea. Pranjal's research contributions are highly interdisciplinary, spanning a wide range in nanobiotechnology, nanobiosensors,

lab-on-chip systems for biomedical diagnostics, and nanomedicine. His work has been highlighted in the World news of the Royal Society of Chemistry, Cambridge, as "A new system for cancer detection" and also featured as a key scientific article in the Global Medical Discovery news, Canada. He is recipient of many prestigious awards and fellowships such as Ramanujan fellowship (Government of India), BK-21 and NRF fellowship of South Korea, Technion post-doctoral fellowship, Israel, University of Montreal Post-doc fellowship, Canada, and NMS Young scientist Award (2016). He is also an editorial board member of a dozen international journals including *World Journal of Methodology*, USA; *Frontiers in Bioscience*, USA; and *Journal of Biosensors and Bioelectronics*, USA.



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Surinder P. Singh obtained his M.Sc. (1992) and Ph.D. (1998) degrees from G.B. Pant University of Agriculture & Tech., Pantnagar, India, in Physics. Currently he is working as a Sr. Scientist at National Physical Laboratory (CSIR), New Delhi, India. He served as Assistant Professor in Engineering Science and Materials Department at the University of Puerto Rico, Mayaguez, USA (2008–2011). His efforts at CSIR-NPL have initiated a national activity on biomedical instrument standardization. Dr. Singh is the project director of an Indo-US Joint centre on nanomedicine for Head and Neck Cancer in collaboration with Northeastern University and DFCI, Harvard

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