Preface

The wide availability of formalin-fixed, paraffin-embedded tissues (FFPET) makes them an attractive source of material to study and classify diseases at molecular level. It is now inconceivable to offer a diagnostic report without the application of modern techniques to FFPET. The application of state-of-the-art molecular techniques has revolutionized not only diagnostic skills of pathologists, but also allowed them to be more active members in tailored disease treatment and prognostication than ever before. However, working with FFPET remains a great challenge, especially when the aim is to decipher diseases at molecular level.

The purpose of *Formalin-Fixed, Paraffin-Embedded Tissues: Methods and Protocols* is to provide an up-to-date methodological information pertaining to the utilization of genomic, transcriptomic, and proteomic data in diagnosis, prognosis, and tailored therapy. Many molecular-flavored protocols dealing with FFPET exist, and some offer conflicting advice. This book brings forward to scientists and clinicians working with FFPET, well-established and tested protocols focused on genomics, epigenetics, proteomics, and cellular biology.

The book starts with a chapter on Ethics. This, I believe is appropriate given the importance of the topic to any study and the lack of single regulatory or bioethical standard that covers research with FFPET, which introduces another complexity in the design and execution of studies requiring such specimens. There is scanty information in the scientific literature that covers this subject, and this chapter, I hope, fills this niche.

The remaining chapters are closely interconnected, yet at the same time, they cluster into well-organized themes. Chapter 2 deals with the construction and uses of tissue arrays, a technique that brought not only much needed power in the number of patients that can be analyzed at once, but also introduced substantial cost-savings to laboratories. This theme that deals with cellular structures and content continues in Chapters 3–6, which describe detailed protocols in immunohistochemistry, immunofluorescence, fluorescent, and chromogenic in situ hybridization. The next theme, introduces well-established protocols for FFPET microdissection and nucleic acids extraction for their utilization in advanced techniques such as microarray CGH, DNA methylation, and pyrosequencing. Chapters 14–18 describe methods that unlock expression-related information stored as RNA, miRNA, and proteins in FFPET. The book ends with a thought provoking chapter, which describes a novel tissue fixative. The decision to use such a fixative, of course, will be left to you.

The book is aimed at the pathologist, molecular pathologist, geneticist, and the clinician who, today more than ever, is required to understand how technology is impacting health care. Also, the book is aimed at the more experienced molecular biologist who wishes to apply sophisticated techniques to FFPET in order to decipher disease-associated molecules. Students working with FFPET may find this book a valuable source of practical and theoretical information that can save them both time and effort throughout their

journey of optimization because the protocols came directly from people who invented them and use them on a daily bases for patients' care.

As always, an Editor has a lot of people to thank. I would like to thank the authors, who contributed to this work. I thank them for their enthusiasm, effort, and patience. I am indeed very grateful for all the staff at the pathology Department at Kuwait University for their support during the preparation of this book. They had to tolerate my grumpiness and few days! of absence to complete this book. To them I apologize. Also, I am very grateful for Milad Bitar for his support during the write-up of the project. Of course, the price of success in something is a failure in another. A saying that my family repeatedly hears from me! I thank them all, my mother, wife, sons, and siblings for tolerating my long hours at work.

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