

DNA Nanotechnology

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Editor

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From Structure to Function

 Springer

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Preface

DNA is a fascinating biomolecule that is well known for its genetic role in living systems. The emerging area of DNA nanotechnology provides an alternative view that exploits unparalleled self-assembly ability of DNA molecules for material use of DNA. Since the pioneering work by Professor Nadrian Seeman of New York University in the 1980s, we have seen rapid growth of this area, which has intrigued researchers from various other areas. After nearly three decades of research efforts, the meaning of DNA nanotechnology has evolved from toylike beautiful nanoscale structures to really useful building blocks for a variety of applications.

This book of *DNA Nanotechnology: From Structure to Function* aims to present an overview of many facets of DNA nanotechnology, with the particular attention on their promising applications. We introduce recent advances in the area of DNA nanotechnology to provide readers, including postgraduates, postdoctoral researchers, and research scientists, an impression of new things that are happening. In the spirit of this goal, we have invited active scientists in this area to describe, mostly in a tutorial style, interesting things that occurred during the past decade and to point out, in their own view, promising directions in the future.

This book is composed of three parts. In Part I, Elements of DNA Nanotechnology, we provide, extensively, basic knowledge of DNA nanotechnology. It starts from a brief introduction to the history of DNA nanotechnology, followed by introduction of key elements that are involved in DNA nanotechnology including functional nucleic acids, toolboxes for DNA manipulation, and new materials for DNA assembly. In Part II, Static and Dynamic DNA Nanotechnology, we describe the design and fabrication of static and dynamic DNA nanostructures. Recent advances of DNA origami, DNA walkers, and DNA nanodevices are covered in this part. In Part III, Applications of DNA Nanotechnology, we introduce a variety of applications of DNA nanotechnology, including biosensing, computation, and drug delivery. Together these provide a comprehensive overview of this emerging area and its broad impact on biological and medical sciences.

I am very grateful to all contributing authors and my colleagues, who kindly accepted to undertake such a time-consuming task of writing a chapter. Many thanks to these contributors for their excellent work! Last but not least, the excellent organizational support from Springer, and particularly warm editorial help from Ms. June Tang, is greatly acknowledged.

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Di Li

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