
Preface

Studies of single molecules have risen exponentially during the last 15 years. We have witnessed the birth and maturation of many original methods and the development of protocols specific to single-molecule measurements and their analysis. A variety of new techniques have emerged, including optical imaging, electron microscopy, optical and magnetic trapping, and developments in atomic force microscopy.

Of the thousands of biologically important molecules, enzymes are the most exciting and yet most complicated proteins. These biomolecular “machines” dramatically increase the speed of chemical reactions. They are also involved in signaling and are capable of converting one form of energy into another. The investigation of these “machines” at the single-molecule level enables the extraction of detailed information about their work cycles, their static and kinetic properties, and provides information about their location and activity within cells.

Written by experts from Europe, America, and Japan, this book focuses on single-molecule investigations of enzymes. It is intended for use within the diverse community of molecular biologists, biochemists, and biophysicists studying enzymes in detail and can be used by researchers planning their first single-molecule study or to aid more experienced researchers in further developing their existing studies. It gives practical advice on many aspects of single-molecule enzymology and provides strategic overviews of interconnected methods involved in sample preparation, single-molecule measurements, and data analysis.

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