

Single Molecule Biology

Edited by

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Single molecule techniques are powerful tools for the dissection of biological function. They can be used to investigate the mechanisms of molecular machines, wind up single strands of DNA, or unravel individual proteins. They can detect the flickering open of an ion channel in a membrane or watch an enzyme turn over a molecule of substrate.

This book reveals how single molecule techniques have revolutionized our understanding of biology at the nanoscale—and it is the first book to be focused on the biology, rather than the techniques themselves. As such, it is targeted at biologists and a broad interdisciplinary readership.

Each chapter in this multicontributed book is written by an expert in the field, covering a key biological system studied by single molecule methods, and exploring what has been learnt from this new approach. Systems examined include molecular motors (kinesin, dynein, myosin, and the bacterial flagellar motor); nucleic acids (chromatin, DNA-based enzymes, and the ribosome); membranes and ion channels; and a look at applications to microarray technology.

Key Features:

- Provides an introduction to the key principles and concepts of the single molecule approach
- Covers single molecule techniques explicitly from a biological perspective
- Organized by biological system or molecule
- Discusses applications to microarrays and genomics

About the Author:

Alex E. Knight is a Senior Research Scientist at the UK's National Physical Laboratory, where he leads research on the development of biophysical measurement methods, including the spectroscopy and single molecule analysis of biomolecules. His PhD at the MRC Laboratory of Molecular Biology in Cambridge, UK, was followed by postdoctoral research at the Whitehead Institute in Cambridge, Massachusetts, and at the University of York in the UK. Most of his research has focused on single molecule studies of motor proteins, including optical tweezers and single molecule fluorescence methods.

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