

Series Editor: John M. Walker

Peptide Nucleic Acids

Methods and Protocols

Edited by

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Peptide nucleic acid (PNA) technology continues to grow in importance throughout molecular biology, genetic diagnostics, and molecular medicine. In *Peptide Nucleic Acids: Methods and Protocols*, Peter Eigil Nielsen has assembled a critically evaluated collection of PNA protocols that are either already well established around the world, such as PCR-clamping and *in situ* hybridization, or that display promise of significant future impact. Basic methods for PNA oligomer synthesis and analysis have also been included. Written by experts with hands-on experience in the methods they describe, these readily reproducible protocols contain detailed step-by-step instructions, tips on avoiding pitfalls and on extending the method to other situations, and introductory material explaining the theory behind the process.

Up-to-date and highly practical, *Peptide Nucleic Acids: Methods and Protocols* provides for both novice and experienced researchers a thorough and easy introduction to the optimal use of today's PNA technology across a wide variety of fields, including molecular biology, medicinal chemistry, genetic diagnostics, and drug development.

FEATURES

- PNA technology for *in situ* hybridization, antisense gene regulation, and PCR analyses
- Time-saving techniques even highly skilled researchers will find useful
- Ancillary notes that explain troubleshooting techniques and possible sources of error
- A level of detail critical for experimental success but usually absent from journal articles

CONTENTS

I Introduction. PNA Technology. **II Chemistry.** Solid Phase Synthesis of PNA Oligomers. Synthesis of PNA-Peptide Conjugates. Parallel Synthesis of PNA-Peptide Conjugate Libraries. Thermodynamics of PNA Interactions with DNA and RNA. **III PNA Technology.** Measurement of PNA Binding to Double-Stranded DNA. PNA-Mediated Immobilization of Supercoiled DNA. PNA Openers and Their Applications. Colorimetric Detection of PNA-DNA Hybridization Using Cyanine Dyes. **IV Diagnostics.** PNA-Mediated PCR Clamping: *Applications and Methods*. PNA Clamping Techniques for the Determination of Oncogene Mutations. PNA

Fluorescent *In Situ* Hybridization for Rapid Microbiology and Cytogenetic Analysis. Detection of Point Mutations Using PNA-Containing Electrophoresis Matrices. **V Antisense and Antigenic.** Lipid-Mediated Introduction of Peptide Nucleic Acids Into Cells. Synthesis of Cell-Penetrating Peptide-PNA Constructs. Antisense Inhibition of Bacterial Gene Expression and Cell Growth. *In Vitro* Transcription from Peptide Nucleic Acid/DNA Strand Displacement Loops. **VI Animal Studies.** *In Vitro* and *In Vivo* Studies on Pharmacokinetics and Metabolism of PNA Constructs in Rodents. Index.

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