

X-ray Crystal Structure of a Locked Nucleic Acid (LNA) Duplex Composed of a Palindromic 10-mer DNA Strand Containing One LNA Thymine Monomer

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Abstract

Locked nucleic acid (LNA), a recently introduced nucleic acid analogue with a bicyclic 2'-O,4'-C-methylene linked furanose sugar, exhibits enhanced affinities for DNA and RNA relative to the corresponding oligodeoxyribonucleotides and oligoribonucleotides; we report the first crystal structure of an LNA unit incorporated in an oligonucleotide duplex. The structure at 1.4 Å resolution of the DNA-LNA decamer duplex with one LNA thymine monomer per strand provides a detailed view of the conformation and hydration of locked nucleic acid residues in an A-form double helical environment.

Methods and Materials

A crystal was mounted in a nylon loop and shock-frozen in liquid nitrogen. Diffraction data were collected on the insertion device beamline (5-ID) of the DuPont-Northwestern-Dow Collaborative Access Team at the Advanced Photon Source (APS). A total of 300 frames at high- and low-resolution ranges were recorded, and reflections were integrated and merged in the DENZO/SCALEPACK suite.

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Reference

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