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Crystal Structure of the Catalytic Domain of Intron-Encoded Endonuclease I-TevI

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Beamline(s): X12C

Introduction: The intron-encoded endonuclease I-TevI recognizes and cleaves an intron-minus allele of its cognate gene, initiating a replicative gene conversion event that results in the recipient allele also becoming intron-plus. The enzyme consists of a N-terminal catalytic domain and a C-terminal DNA-recognition domain, connected by a flexible linker.

Methods and Materials: The N-terminal domain of I-TevI crystallized in space group $P2_12_12$ with cell parameters $a = 123 \text{ \AA}$, $b = 57 \text{ \AA}$ and $c = 36 \text{ \AA}$ and with two molecules in the asymmetric unit. The crystal structure was determined by SIRAS methods. X-ray diffraction data were measured at a wavelength of 1.0 \AA for a native crystal and a crystal that was soaked in 2 mM ethyl mercury phosphate. Patterson maps revealed the presence of three heavy atom sites. The structure was determined using the program SOLVE and is being refined using the program CNS at 2.0 \AA resolution.

Results: The structure of the N-terminal domain of I-TevI has an $\beta\beta\alpha\alpha\beta\alpha$ -topology in which the three β -strands form an antiparallel β -sheet, flanked by the helices on one surface.

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