

Group II Intron Splicing Mechanisms - Ribozymes and Retrotransposons

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Group II introns and their encoded maturase proteins form ribonucleoprotein (RNP) complexes, which act as splicing machines and retroelements, capable of performing both forward and reverse splicing. The architectural features and active site organization of the RNA components of group II introns have been well-studied, but the details of how the protein promotes branching and retrotransposition and the mechanism of maturase mediated catalysis remained unclear. Using cryoEM, we solved a series of high resolution structures that reveal the mechanistic details of splicing, in addition to uncovering the role of the maturase protein in facilitating intron branching, exon ligation and intron integration. Our structures reveal the first complete mechanistic framework of branch-site recognition, intron excision, and subsequent insertion into novel DNA sites for group II intron RNPs. There are striking parallels with both the modern spliceosome and retroelements, providing novel insights into the molecular evolution of splicing machines and mobile genetic elements.

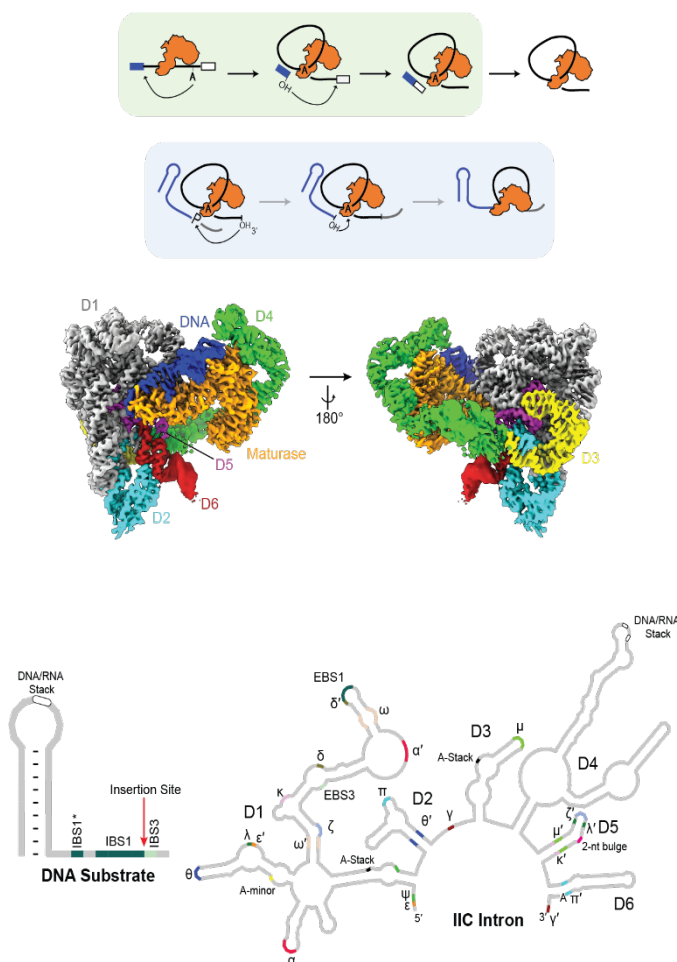


Figure 1