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DNA sequence of the site-specific recombination function *cin* of phage P7

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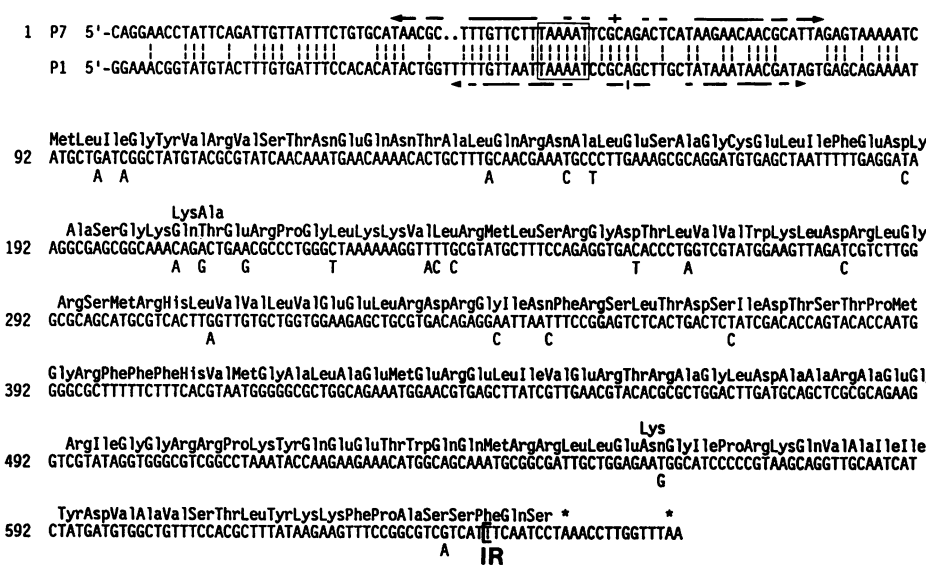
We have determined the nucleotide sequence of the cin gene of phage P7, which encodes a DNA inversion function with a predicted molecular weight of 21246 D. The sequence of one strand was determined by Maxam and Gilbert sequencing from SphI and KpnI sites in plasmid pWR1 (1,2) and is shown together with the derived aminoacid sequence of cin. As previously described (1,2,3), the location and orientation of the cin gene of P7 with respect to the adjacent invertible C segment are identical to that of the related phage P1, i.e. the COOH-terminal part overlaps the outer end of the inverted repeat (IR [ ) sequence, which is the substrate for the cin-promoted recombination. Comparison with the DNA sequence of P1 (4) shows that the cin genes are 96% identical, and only altered nucleotides in P1 are shown. Three exchanges with respect to the aminoacid sequence do not affect the consensus sequence of the family of DNA invertases (5), so that we assume that P7 Cin is structurally and functionally indistinguishable from P1 Cin. In contrast to the well conserved coding region, the 5' upstream sequence is more diverged except for a "-10" like sequence (boxed), which therefore could be part of the promoter used in both systems. These potential Pribnow boxes are located in the left arm of a symmetrical AT-rich sequence (<---+--->), which could well fit a recognition site for a regulatory protein of yet unknown origin and function.



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