

Dong, a non-long terminal repeat (non-LTR) retrotransposable element from *Bombyx mori*

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We have identified a new retrotransposable element inserted in the non transcribed spacer region of a ribosomal DNA (rDNA) repeat of *Bombyx mori*. Genomic clone, B12 (Figure 1), was isolated from a collection of lambda charon 4 clones containing atypical rDNA repeats (i.e. repeats with putative mobile element insertions) (1). The 4.1 kilobase pair element was inserted within an AT-rich region approximately 80 bp upstream of the transcription initiation site for the rDNA unit (2). Probing genomic blots with internal segments of the element revealed 7–10 additional copies of the element, most located outside the rDNA units. The element has been named *Dong* which is a Chinese word for 'moving'.

The complete sequence of the 4,126 bp *Dong* element in B12 indicated that the *Dong* element had a single open-reading frame (ORF) 1,233 amino acids in length which encompassed most of the element (nucleotide position 302–4,001). A centrally located region of the ORF contains sequence similarity to reverse transcriptase. Highest sequence similarity was detected to members of the non-LTR group of retrotransposable elements (3). Located downstream of the reverse transcriptase domain was a nucleic acid-binding motif (Figure 1). The spacing of cysteine (C) and histidine (H) residues within this motif ($C\text{-}X_2\text{-}C\text{-}X_8\text{-}H\text{-}X_4\text{-}C$) was similar to the nucleic-binding motifs previously identified in a number of non-LTR retrotransposable elements (4). The *Dong* element in B12 contained no direct or inverted terminal repeats. We have also cloned and sequenced the junction regions from a *Dong* element (D101) located outside the rDNA repeats. Comparison of the junction sequences (Figure 2) again indicated no terminal duplications. The absence of terminal duplications and amino acid sequence similarity indicate that *Dong* is a member of the non-LTR class of retrotransposable elements.

Both cloned copies of *Dong* (B12 and D101) have inserted into tandem arrays of TAA nucleotides repeats (Figure 2). A number of other retrotransposable elements are known to prefer to insert into AT-rich sequences (reviewed in 5). It is not known whether the additional TAA repeats in B12 compared to an uninserted rDNA unit is due to variation between rDNA units, a target site duplication, or whether *Dong* elements are similar to I elements (6) and contain TAA repeats at their 3′ end.

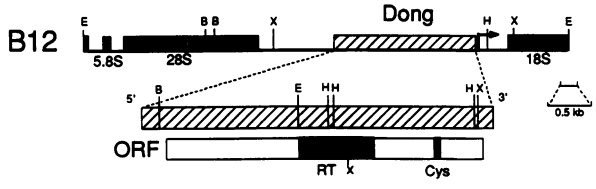

Figure 1. *Dong* element of *B.mori*. Top: map of lambda clone B12 containing a *Dong* element within an rDNA unit. The positions of *Eco*RI (E), *Hin*dIII (H), *Bam*HI (B) and *Xba*I (X) restriction sites are indicated. The horizontal arrow indicates the rDNA transcription start site. Bottom: restriction map of *Dong* and location of its ORF. The sequenced element is presumably inactive since it contains a mutation which changes the frame within the middle of the reverse transcriptase domain (identified by X). RT, reverse transcriptase; Cys, putative nucleic acid-binding motif.

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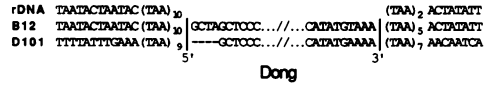

Figure 2. Insertion of *Dong* elements into TAA repeats. The junction sequences of the B12 Dong element is compared to the uninserted site from a rDNA unit (2) and an independent copy of *Dong* (clone D101). The precise 3′ ends of the *Dong* elements are unknown due to the possibility of target site duplications and the uncertainty in the number of TAA repeats present in the target sequence before integration.

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