

Related transposons in *C.elegans* and *D.melanogaster*Steven Henikoff and Ronald H.A.Plasterk<sup>1</sup>

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We have found that the transposable element Tc1 in *Caenorhabditis elegans* (1) is strikingly similar to a translated sequence found within the *Drosophila melanogaster* element HB1, a member of the HB family of repeats (2). Tc1 and HB1 ORFs are identical at 24% of aligned amino acid residues, including the two COOH-terminal residues of both sequences. Alignment requires only a single amino acid insertion in Tc1 and a 4 bp deletion ( $\Delta$ ) in HB1. The frameshift and stop codons in the HB1 sequence indicate that this member of the HB family does not now encode an active protein.

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Tc1                               MDRNILRSAREDPHRTATDIQMISSPNEPVFSKR   35
                                : : : : :
HB1 MLILKLRKEGKTYKDIQKTLKCSAKMVSNAIKYKWKPENRGTKHKHTDIEDRRIVSYSKVYRFASFRIKSELNLGISDV
Tc1 TVRRRLQQAGLHGRKPKVKKPFISKKNRMARVAMAKAHLRWGRQEWAKHIWSDSKFNLFSGDGN-SWVRRPVGSRYSPKY  114
: : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : :
HB1 TIRRRLLNQNFARSAPRKVPLPSPRHIKARLSLAKTYLWVPSKWRNINLWTDGSKIMLFGGTGSLQYI*RPNTVEYHPKH
Tc1 QCPTVKKHGGGSMVHWGCFSTSMGPLRRIQSIMDRFQYENIFETTMPWALQNVGRGFVQQDNDPKHTSLHVRSWFQRR  194
: : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : :
HB1 PVKTFNHGGPKIMVWACFFYNGMSLWIMYIGIIDQNAVVNILSDVLLSYSE*NIPLKWTQQDNDQKRRCKSAKNRFTQN
Tc1 HVHLLDWPFSQSPDLNPIEHLWEELERRLLGGIRASNADAKFNQLENAWKAIPMSVIHKLIDSMPRRCQAVIDANGYATKY*  273
: : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : : :
HB1 RIDAMPWQAPPSHLNPIENLYGDIKQFVSKKSPSTKTQIWVQVQDTWAKIPPKPC*DLVDMPRGCKAVLANKGYPKY*

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If the Tc1 ORF and its HB homologue encode transposases, then it is possible that the target sequences for transposase also are similar. HB elements resemble Tc1-like transposons in having short inverted repeats at their ends, presumably target sequences for transposase. Unlike Tc1, the precise end of HB1 is not known, since HB elements have not been observed to transpose. Nevertheless, a comparison of the ends of the four HB elements that have been sequenced (2) suggests that the most distal position at which all eight ends agree is the terminal base pair. Alignment of this position with the precise end of Tc1 reveals that 16 of the 24 terminal base pairs are identical:

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Tc1 TACAGTGCTGGCCAAAAAGATATC
: : : : : : : : : : : : : : : :
HB1 TACAGCTGTGTTCAGAAAAATAGC

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We conclude that Tc1 and HB elements are related. Such a correspondence in two organisms as intensively studied as *D. melanogaster* and *C. elegans* is likely to lead to improved understanding of transposable elements in animals.

## References

- 1) Rosenzweig, B., Liao, L.W., Hirsh, D. (1983) Nucl. Acids Res. 11, 4201-09.
- 2) Brierley, H.L., Potter, S.S. (1985) Nucl. Acids Res. 13, 485-500.