**SPECIFIC FEATURES OF X-LINKED PROMOTER SEQUENCES IN DROSOPHILA.**

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Keywords: X chromosome, Drosophila promoters, dosage compensation

The promoter regions of X-linked genes in Drosophila melanogaster differ from those of autosomal genes at the level of nucleotide sequence. While no conventional consensus can be deduced for X-specific elements, correlation analysis reveals significant over-representation for several classes of relatively simple sequence motifs in certain positions in the X-linked but not autosomal subsets of the aligned promoter database. These elements are broadly distributed over a distance of several hundred base pairs, extending from the 5' upstream flanking region far downstream into the transcribed region. In addition, TATA- containing promoters are strongly under-represented in the X chromosome subset. Taking into account the strand-specificity and positional distribution of X chromosome-specific sequences, it appears likely that the combined action of these multiple motifs could provide the cis-acting elements necessary and/or sufficient for creating the unique chromatin structure of the male X chromosome in Drosophila and mediating the dosage compensation response. This is the first report of specific sequence motifs in a set of diverse genes connected only by their linkage relationship.