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Characterization of the major hnRNP proteins from Drosophila melanogaster

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To better understand the role(s) of hnRNP proteins in the process of mRNA formation, we have identified and characterized the major nuclear proteins that interact with hnRNAs in Drosophila melanogaster. cDNA clones of several D. melanogaster hnRNP proteins have been isolated and sequenced, and the genes encoding these proteins have been mapped cytologically on polytene chromosomes. These include the hnRNP proteins hrp36, hrp40, and hrp48, which together account for the major proteins of hnRNP complexes in D. melanogaster (Matunis et al., 1992, accompanying paper). All of the proteins described here contain two amino-terminal RNP consensus sequence RNA-binding domains and a carboxyl-terminal glycine-rich domain. We refer to this configuration, which is also found in the hnRNP A/B proteins of vertebrates, as 2 x RBD-Gly. The sequences of the D. melanogaster hnRNP proteins help define both highly conserved and variable amino acids within each RBD and support the suggestion that each RBD in multiple RBD-containing proteins has been conserved independently and has a different function. Although 2 x RBD-Gly proteins from evolutionarily distant organisms are conserved in their general structure, we find a surprising diversity among the members of this family of proteins. A mAb to the hrp40 proteins crossreacts with the human A/B and G hnRNP proteins and detects immunologically related proteins in divergent organisms from yeast to man. These data establish 2 x RBD-Gly as a prevalent hnRNP protein structure across eukaryotes. This information about the composition of hnRNP complexes and about the structure of hnRNA-binding proteins will facilitate studies of the functions of these proteins.