Characterization and primary structure of the poly(C)-binding heterogeneous nuclear ribonucleoprotein complex K protein

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At least 20 major proteins make up the ribonucleoprotein (RNP) complexes of heterogeneous nuclear RNA (hnRNA) in mammalian cells. Many of these proteins have distinct RNA-binding specificities. The abundant, acidic heterogeneous nuclear RNP (hnRNP) K and J proteins (66 and 64 kDa, respectively, by sodium dodecyl sulfate-polyacrylamide gel electrophoresis) are unique among the hnRNP proteins in their binding preference: they bind tenaciously to poly(C), and they are the major oligo(C)- and poly(C)-binding proteins in human HeLa cells. We purified K and J from HeLa cells by affinity chromatography and produced monoclonal antibodies to them. K and J are immunologically related and conserved among various vertebrates. Immunofluorescence microscopy with antibodies shows that K and J are located in the nucleoplasm. cDNA clones for K were isolated, and their sequences were determined. The predicted amino acid sequence of K does not contain an RNP consensus sequence found in many characterized hnRNP proteins and shows no extensive homology to sequences of any known proteins. The K protein contains two internal repeats not found in other known proteins, as well as GlyArgGlyGly and GlyArgGlyGlyPhe sequences, which occur frequently in many RNA-binding proteins. Overall, K represents a novel type of hnRNA-binding protein. It is likely that K and J play a role in the nuclear metabolism of hnRNAs, particularly for pre-mRNAs that contain cytidine-rich sequences.