A novel heterogeneous nuclear RNP protein with a unique distribution on nascent transcripts

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Immediately after the initiation of transcription in eukaryotes, nascent RNA polymerase II transcripts are bound by nuclear proteins resulting in the formation of heterogeneous nuclear ribonucleoprotein (hnRNP) complexes. hnRNP complexes from HeLa cell nuclei contain greater than 20 major proteins in the molecular mass range of 34,000-120,000 D. Among these are the previously described A, B, and C groups of proteins (34,000-43,000 D) and several larger, and as yet uncharacterized, proteins. Here we describe the isolation and characterization of a novel hnRNP protein termed the L protein (64-68 kD by mobility in SDS-polyacrylamide gels). Although L is a bona fide component of hnRNP complexes, it also appears to be a different type of hnRNP protein from those previously characterized. A considerable amount of L is found outside hnRNP complexes, and monoclonal antibodies to the L protein also strongly stain unidentified discrete nonnucleolar structures, in addition to nucleoplasm, in HeLa cell nuclei. Interestingly, the same antibodies stain the majority of nonnucleolar nascent transcripts from the loops of lampbrush chromosomes in the newt, but the most intense staining is localized to the landmark giant loops. The L protein is the first protein of giant loops identified so far, and antibodies to it thus provide a useful tool with which to study these unique RNAs. In addition, isolation and sequencing of cDNA clones for the L protein from human cells predicts a glycine- and proline-rich protein of 60,187 D, which contains two 80 amino acid segments only distantly related to the RNP consensus sequence-type RNA-binding domain. The L protein, therefore, is a new type of hnRNP protein.