Association of individual hnRNP proteins and snRNPs with nascent transcripts

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As they are transcribed, RNA polymerase II transcripts (hnRNAs or pre-mRNAs) associate with hnRNP proteins and snRNP particles, and the processing of pre-mRNA occurs within these ribonucleoprotein complexes. To better understand the relationship between hnRNP proteins and snRNP particles and their roles in mRNA formation, we have visualized them as they associate with nascent transcripts on the polytene chromosomes of Drosophila melanogaster salivary glands. Simultaneous pairwise detection of the abundant hnRNP proteins hrp36, hrp40, and hrp48 by direct double-label immunofluorescence microscopy reveals all of these proteins are bound to most transcripts, but their relative amounts on different transcripts are not fixed. Numerous differences in the relative amounts of snRNP particles and hnRNP proteins on nascent transcripts are also observed. These observations directly demonstrate that individual hnRNP proteins and snRNP particles are differentially associated with nascent transcripts and suggest that different pre-mRNAs bind different combinations of these factors to form transcript-specific, rather than a single type of, hnRNA-hnRNP-snRNP complexes. The distinct and specific constellation of hnRNP proteins and snRNP particles that assembles on different pre-mRNAs is likely to affect the fate and pathway of processing of these transcripts.