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An improved in situ hybridization method for the detection of cellular RNAs in Drosophila tissue sections and its application for localizing transcripts of the homeotic Antennapedia gene complex

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An improved method for the detection of cellular RNAs in tissue sections has been developed. It involves in situ hybridization of tritium-labeled cloned DNA probes to tissue sections and autoradiography. The method was calibrated by using a cloned DNA probe complementary to transcripts abundant in the midgut cells of Drosophila larvae. The improved method also permitted the detection of these transcripts in sectioned embryos where they are much less abundant. The sensitivity of the method can be approximated by quantifying the signal intensities over the hybridizing embryonic midgut cells relative to the larval midgut cells for which the number of transcripts has been estimated. Based on these calculations we estimate that the method is sensitive enough to detect 100 complementary RNA molecules per cell after 3 days of autoradiographic exposure with a signal-to-noise ratio of 10. The method has been successfully applied to detect transcripts of the homeotic gene Antennapedia. Serial sections allow us to study the spatial pattern of gene expression in the course of development.
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