

Visualization of Enhancer-Derived Noncoding RNA

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Abstract

Enhancers are principal regulators that allow spatiotemporal tissue-specific control of gene expression. While mounting evidence suggests that enhancer-derived long noncoding RNAs (long ncRNAs), including enhancer RNAs (eRNAs), are an important component of enhancer function, their expression has not been broadly analyzed at a single cell level via imaging techniques. This protocol describes a method to image eRNA in single cells by in situ hybridization followed by tyramide signal amplification (TSA). The procedure can be multiplexed to simultaneously visualize both eRNA and protein-coding transcript at the site of transcriptional elongation, thereby permitting analysis of dynamics between the two transcript species in single cells. Our approach is not limited to eRNAs, but can be implemented on other transcripts.