

# **Organization of Genetic Information at Single Molecule Resolution**

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Control of gene expression in the cell nucleus is regulated by the binding of transcription factors and coactivators to regulatory elements (enhancers and promoters). Active regulatory elements carry characteristic epigenetic histone modifications. Transcription regulation further requires 3D folding of chromatin to facilitate interactions between promoters and distal enhancers. We use optical single-molecule super-resolution microscopy to resolve the organization of chromatin and proteins around transcription condensates at near molecular scales. Transcription condensates concentrate factors of the transcription machinery in liquid-like membrane-less organelles at super enhancer-controlled cell identity genes. Our results show that multiple active chromatin elements associate with the condensate surface. This finding suggests new models for structure-function relationships of transcription condensates in gene regulation.