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Dynamics of Nucleosome Positioning Maturation Following Genomic Replication

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Abstract

Chromatin is thought to carry epigenetic information from one generation to the next, although it is unclear how such information survives the disruptions of nucleosomal architecture occurring during genomic replication. Here, we measure a key aspect of chromatin structure dynamics during replication—how rapidly nucleosome positions are established on the newly replicated daughter genomes. By isolating newly synthesized DNA marked with 5-ethynyl-2′-deoxyuridine (EdU), we characterize nucleosome positions on both daughter genomes of *S. cerevisiae* during chromatin maturation. We find that nucleosomes rapidly adopt their mid-log positions at highly transcribed genes, which is consistent with a role for transcription in positioning nucleosomes in vivo. Additionally, experiments in *hir1Δ* mutants reveal a role for HIR in nucleosome spacing. We also characterized nucleosome positions on the leading and lagging strands, uncovering differences in chromatin maturation dynamics at hundreds of genes. Our data define the maturation dynamics of newly replicated chromatin and support a role for transcription in sculpting the chromatin template.

Full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5014762/