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Genome architecture and dynamics during S. cerevisiae's cell cycle.

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Summary

Improper genome organization can compromise the functional regulation of DNA related metabolic processes, and lead to chromosome instability and genomic diseases such as premature aging or cancer. Chromosome organization can notably affect the fidelity of repair pathways and promote for instance ectopic recombination between non-allelic sequences. The influence of 3D organization on genomic stability is likely to change during the cell cycle. Nevertheless, genome-wide descriptions of the dynamic reorganization of eukaryotic chromosomes during the cell cycle remain limited, preventing to fully address its impact. Working with synchronized populations of cells, we aimed at providing a comprehensive picture of the overall 3D organization of *Saccharomyces cerevisiae*'s genome during the cell cycle. We therefore capture chromosomal interactions using chromatin conformation capture experiments (Hi-C) of yeast populations synchronized in G1, S phase, G2 and different mitosis stages. The comparative analysis of chromosome organization at several time points in combination with modeling approaches provides a genomic overview of many results obtained through studies performed with imaging and genetic methods, while unveiling new aspects of genomic condensation and segregation. The high-resolution data constitutes a resource for any lab aiming at investigating DNA-related metabolic processes in light of 3D genome organization.

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