

## **Polycomb proteins and 3D genome folding in the epigenetic regulation of development**

The eukaryotic genome folds in 3D in a hierarchy of structures, including nucleosomes, chromatin fibers, loops, chromosomal domains (also called TADs), compartments and chromosome territories that are highly organized in order to allow for stable memory as well as for regulatory plasticity, depending on intrinsic and environmental cues. Polycomb Group (PcG) and trithorax group (trxG) proteins form multimeric protein complexes that regulate chromatin via histone modifications, modulation of nucleosome remodeling activities and regulation of 3D chromosome architecture. These proteins can dynamically bind to some of their target genes and affect cell proliferation and differentiation in a wide variety of biological processes. Polycomb group proteins form two main complexes, PRC2 and PRC1, which coregulate a subset of their target genes, whereas others are regulated only by one of the complexes. We have recently described the 3D architecture of the genome and identified the Polycomb system as one of the fundamental folding and regulatory principles. Our progress in these fields will be discussed

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