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Satellite DNA and tracking chromosome and Karyotype Evolution

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Heterochromatic regions of the eukaryotic genome harbor satellite DNA sequences that are repeated many times in tandem arrays. Recent results hypothesise that satellite DNAs, and their transcripts have a regulatory role in eukaryotic organisms; chromatin modulation and control of gene expression are some of the traits in which satellite DNAs could be involved. Different satellite sequences coexist in the genome, forming a satellite DNA library made of independent evolutionary units that are ruled by the mechanisms of concerted evolution, leading to the emergence of species-specific satellite profiles. Changes in satellite DNA can be correlated with chromosomal evolution and influence the evolution of species. Here, special emphasis will be given to the mammalian groups Cetartiodactyla, Rodentia and Carnivora. Contrasting patterns of satellite DNA in chromosome and karyotype evolution will be presented, showing the differences in evolution between sex chromosomes and autosomes, evidence of salutatory events, and homogenization. The value of satellite DNA markers in the reconstruction of group phylogenies, models for chromosome rearrangement and implications in function will be highlighted.