
Differential spatial and structural organization of the X chromosome underlies dosage compensation in *C. elegans* + Does the physical organisation of the genome within the nucleus matter : the big picture

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Abstract

Animal sex is determined by the number of X chromosomes in many species, creating unequal gene dosage (aneuploidy) between sexes. Dosage Compensation mechanisms equalize this dosage difference by regulating X-linked gene expression. In the nematode *C. elegans* the current model suggests that DC is achieved by a two-fold transcriptional downregulation in hermaphrodites mediated by the Dosage Compensation Complex (DCC, which restricts access to RNA Polymerase II by an unknown mechanism. Taking a nuclear organization point of view, we showed that the male X chromosome resides in the pore proximal subnuclear compartment whereas the DCC bound to the X, inhibits this spatial organization in the hermaphrodites. This led us to propose an updated structural model of dosage compensation that reassigns the role of DCC from repression of genes to inhibition of activation.

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