Retinoic acid activates HOXB4 chromatin

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Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references

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Stable identifier: R-HSA-5617859

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Compartments: nucleoplasm

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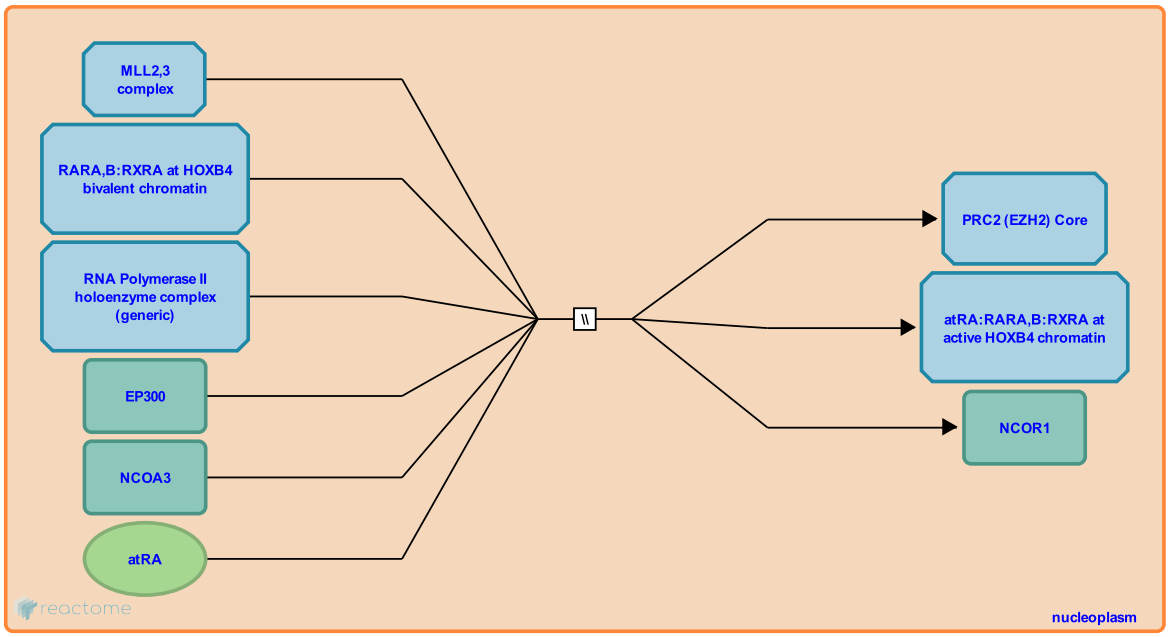

As inferred from mouse embryos, retinoic acid activates the HOXB4 gene in rhombomere 7 (r7) by binding retinoic acid receptor RARB (Folberg et al. 1999) and perhaps RARA in RAR:RXR dimers bound to retinoic acid response elements (RAREs) located in the 3' flanking region of the HOXB4 gene, causing dissociation of corepressors and recruitment of coactivators. HOXB4 maintains its own expression by binding and activating its own promoter.

In human fibroblasts activation of chromatin at the HOXB4 gene accompanied by loss of methylation of lysine-27 at histone H3 (H3K27me3, Lan et al. 2007). Based on observations from mouse embryonic stem cells, Polycomb repressive complex 2 (PRC2), which binds H3K27me3, is anticipated to be lost while methylation of H3K4 is gained, possibly through the action of the histone demethylase KDM6A (UTX) which, in human fibroblasts, binds HOXB4 (Lan et al. 2007). Other factors may be involved in demethylating H3K27me3. KDM6A can form complexes containing the histone methyltransferases KMT2C,D (MLL2,3) which may participate in methylating H3K4 (Lee et al. 2007).

Literature references

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Editions

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