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The Homeobox Gene *mbx* Is Involved in Eye and Tectum DevelopmentAtsuo Kawahara ^{a, 1} ... Igor B. Dawid ^{a1} [Show more](#)<https://doi.org/10.1006/dbio.2002.0709>[Get rights and content](#)Under an Elsevier [user license](#)[open archive](#)

Abstract

The homeobox gene *mbx* is first activated at the end of gastrulation in zebrafish in the presumptive forebrain and midbrain region. During somitogenesis stages, the anterior expression of *mbx*, which partly overlaps the future eye field, gradually decreases, while midbrain expression intensifies and becomes restricted to the presumptive tectum. Knockdown of *mbx* expression by morpholino antisense oligonucleotides (*mbx*-MO) leads to a reduction in the size of the eyes and tectum. Expression domains of *rx1* and *pax6* in the eye field and of *mab21/2* in the eye field and tectum anlage were reduced in size in *mbx*-MO-injected embryos by somitogenesis stages. Further, induction of *islet1* and *lim3* expression in the eye at 2 days postfertilization (dpf) was suppressed in *mbx*-MO-injected embryos. In *mbx*-MO-injected embryos at 2–5 dpf, the lamination of the eye was disorganized and the number of retinal axons was substantially reduced, but the few remaining axons navigated appropriately to the contralateral tectum. A chimeric protein composed of the Mbx DNA-binding domain and the VP16 activation domain affected eye and tectum development similarly to *mbx*-MO knockdown, suggesting that Mbx acts as a transcriptional repressor in the zebrafish embryo. Based on these data, we propose that the *mbx* homeobox gene is required for the development of the eyes and tectum.

Keywords

mbx; homeobox gene; eye; tectum; midbrain–hindbrain boundary; morpholino[Recommended articles](#) [Citing articles \(50\)](#)

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