

Zebrafish heparin-binding neurotrophic factor enhances neurite outgrowth during its development

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摘要

Abstract

Heparin-binding neurotrophic factor (HBNF) is a secreted heparin-binding protein containing highly basic and cysteine-rich amino acid residues. In this study, we cloned the full-length HBNF cDNA from zebrafish and determined its genomic structure by bioinformatics analysis. Zebrafish HBNF gene is composed of five exons and four introns spanning approximately 82kb. RT-PCR analysis revealed that zebrafish HBNF transcript was highly expressed in adult brain and intestine tissues while less in other tissues. During embryogenesis, zebrafish HBNF transcript was observed to be moderately expressed at earlier stages with a gradual decline. Higher expression level was observed after hatching and maintaining this level into adulthood. The overall amino acid sequence of zebrafish HBNF shows 60% identity to human HBNF, but with approximately 40% identity to other midkine proteins. Like mammalian homolog, zebrafish HBNF could induce significant neurite outgrowth in PC12 cells without NGF stimulation. In addition, zebrafish HBNF was able to enhance extensive neurite outgrowth in zebrafish embryos during embryogenesis. In , a feasible in vivo assay for neurite outgrowth was established in zebrafish.