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# A Transgenic Lef1/ $\beta$ -Catenin-Dependent Reporter Is Expressed in Spatially Restricted Domains throughout Zebrafish Development

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## Abstract

The Wnt/ $\beta$ -catenin signaling pathway plays multiple roles during embryonic development, only a few of which have been extensively characterized. Although domains of Wnt expression have been identified throughout embryogenesis, anatomical and molecular characterization of responding cells has been mostly unexplored. We have generated a transgenic zebrafish line that expresses a destabilized green fluorescent protein (GFP) variant under the control of a  $\beta$ -catenin responsive promoter. Early zygotic expression of this transgene (TOPdGFP) mirrors known domains of Wnt signaling in the embryo. Loss of Lef1 activity results in decreased reporter expression and posterior defects, while loss of Tcf3 (Headless, Hdl) activity does not alter reporter expression, even though it results in loss of forebrain structures. In addition, ectopic Wnt1 expression can activate the reporter. In older embryos, we identify a number of transgene-expressing cell populations as novel sites of  $\beta$ -catenin signaling. We conclude that our TOP-dGFP reporter line faithfully illustrates domains of  $\beta$ -catenin activity and enables the identification of responsive cell populations.

## Keywords

Wnt;  $\beta$ -catenin; Lef1; Tcf3; GFP; reporter; transgenic; zebrafish






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