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Nodal Signaling in *Xenopus* Gastrulae Is Cell-Autonomous and Patterned by  $\beta$ -CateninMinako K. Hashimoto-Partyka<sup>a,2</sup> ... Ken W.Y. Cho<sup>a,1</sup> Show more<https://doi.org/10.1006/dbio.2002.0867>[Get rights and content](#)Under an Elsevier [user license](#)[open archive](#)

## Abstract

The classical three-signal model of amphibian mesoderm induction and more recent modifications together propose that an activin-like signaling activity is uniformly distributed across the vegetal half of the *Xenopus* blastula and that this activity contributes to mesoderm induction. In support of this, we have previously shown that the activin-response element (DE) of the *goosecoid* promoter is uniformly activated across the vegetal half of midgastrula-stage embryos. Here, we further examine the nature of this activity by measuring DE activation by endogenous signals over time. We find that the spatiotemporal pattern of DE activation is much more dynamic than was previously appreciated and also conclude that DE(6X)Luc activity reflects endogenous nodal signaling in the embryo. Using both the DE(6X)Luc construct and endogenous *Xbra* and *Xgsc* expression as read-outs for nodal activity, and the cleavage-mutant version of *Xnr2* (CmXnr2) to regionally suppress endogenous nodal activity, we demonstrate that nodal signals act cell-autonomously in *Xenopus* gastrulae. Nodal-expressing cells are unable to rescue either reporter gene activation or target gene expression in distant nodal-deficient cells, suggesting that nodals function at short range in this context. Finally, we show that DE activation by endogenous signals occurs in the absence of dorsal  $\beta$ -catenin-mediated signaling, but that the timing of dorsal initiation is altered. We conclude that nodal signals in *Xenopus* gastrulae function cell autonomously at short ranges and that the spatiotemporal pattern of this signaling along the dorsoventral axis is regulated by maternal Wnt-like signaling.




## Keywords

Wnt; TGF- $\beta$ ; Xnr; cmXnr-2;  $\beta$ -catenin; short-range; *Xenopus*[Recommended articles](#)   [Citing articles \(18\)](#)

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