



# 第 299 回つくば分子生命科学セミナー

TSUKUBA MOLECULAR LIFE SCIENCE SEMINAR

演題：ナメクジウオが示す脊索動物における体軸形成の遺伝的普遍原理  
Evolution of the chordate body plan: the amphioxus embryo reflects the fundamental genetic basis for axial patterning in chordates

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会場：医学学系棟 2 階会議室 272

## Summary

The basal chordate amphioxus resembles vertebrates in having a dorsal, hollow nerve cord, a notochord and somites. However, it lacks extensive gene duplications and its embryos are small and gastrulate by simple invagination. Here we demonstrate that head specification in amphioxus involves nodal/Vg1/activin, BMPs, and Wnt/ $\beta$ -catenin signaling, which respectively promote dorsal/anterior, ventral/posterior and posterior identity. Knockdown and gain-of-function experiments show that specification of these regional identities is modulated by dorsally and/or anteriorly expressed genes including *chordin*, *Dkk3*, *cerebrus*, and *blimp1*. Overexpression and/or reporter assays in *Xenopus* with amphioxus proteins including these four plus nodal and BMP2/4 reveal evolutionarily conserved functions. Thus, a fundamental genetic mechanism for axial patterning involving opposing nodal/Vg1 and BMP signals, promoting respectively dorsal/anterior and ventral/posterior identity, together with Wnt/ $\beta$ -catenin signaling specifying posterior identity is present in amphioxus and was probably also present in the common ancestor of amphioxus and vertebrates and perhaps even earlier in deuterostome evolution.

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