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Expression of *Patella vulgata* Orthologs of *engrailed* and *dpp-BMP2/4* in Adjacent Domains during Molluscan Shell Development Suggests a Conserved Compartment Boundary MechanismAlexander J. Nederbragt^{1,2} ... Wim J.A.G. Dictus Show more<https://doi.org/10.1006/dbio.2002.0653>[Get rights and content](#)Under an Elsevier [user license](#)[open archive](#)

Abstract

The *engrailed* gene is well known from its role in segmentation and central nervous system development in a variety of species. In molluscs, however, *engrailed* is involved in shell formation. So far, it seemed that *engrailed* had been co-opted uniquely for this particular process in molluscs. Here, we show that, in the gastropod mollusc *Patella vulgata*, an *engrailed* ortholog is expressed in the edge of the embryonic shell and in the anlage of the apical sensory organ. Surprisingly, a *dpp-BMP2/4* ortholog is expressed in cells of the ectoderm surrounding, but not overlapping, the *engrailed*-expressing shell-forming cells. It is also expressed in the anlage of the eyes. Earlier it was shown that a compartment boundary exists between the cells of the embryonic shell and the adjacent ectoderm. We conclude that *engrailed* and *dpp* are most likely involved in setting up a compartment boundary between these cells, very similar to the situation in, for example, the developing wing imaginal disc in *Drosophila*. We suggest that *engrailed* became involved in shell formation because of its ancestral role, which is to set up compartment boundaries between embryonic domains.

Keywords

mollusc; development; gene expression; compartment boundary; shell; eye; apical organ

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