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Conservation of *Brachyury*, *Mef2*, and *Snail* in the Myogenic Lineage of Jellyfish: A Connection to the Mesoderm of BilateriaJürg Spring ... Volker Schmid¹

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Abstract

One major difference between simple metazoans such as cnidarians and all the bilaterian animals is thought to involve the invention of mesoderm. The terms diploblasts and triploblasts are therefore, often used to group prebilaterian and bilaterian animals, respectively. However, jellyfish contain well developed striated and smooth muscle tissues that derive from the entocodon, a mesoderm-like tissue formed during medusa development. We investigated the hypothesis, that the entocodon could be homologous to the third germ layer of bilaterians by analyzing the structures and expression patterns of the homologues of *Brachyury*, *Mef2*, and *Snail* in the jellyfish *Podocoryne carnea*. These are regulatory genes from the T-box, MADS-box and zinc finger families known to play important roles in bilaterian mesoderm patterning and muscle differentiation. The sequence and expression data demonstrate that the genes are structurally and functionally conserved and even more similar to humans or other deuterostomes than to protostome model organisms such as *Drosophila* or *Caenorhabditis elegans*. Based on these data we conclude that the common ancestor of the cnidarians and bilaterians not only shared genes that play a role in regulating myogenesis but already used them to develop and differentiate muscle systems similar to those of triploblasts.

Keywords




cnidaria; mesoderm; evolution; myogenesis; regulatory genes






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