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LS-13-O-3059 Posterior neural plate in axolotl undergoes a gastrulation-like involution and forms posterior trunk/tail muscles and tail spinal cord but no tail notochord

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Previous studies revealed profound rearrangements of the posterior neural plate in embryos of amphibians [1-5] and higher vertebrates [6,7]. As first shown by Bijtel, the posterior neural plate, although forming the posterior end (named “reg.3”) of the neuroepithelium of the neurula, has a mesodermal bias and gives rise to tail and posterior trunk muscles. Because morphogenesis and fate of the posterior plate had never been characterized in detail, we studied both issues in embryos of the axolotl (Ambystoma mexicanum). We grafted reg.3 from a GFP+ donor (stage 15) orthotopically into a white (d/d) host of the same stage and analysed the labelled descendants during tail development. We found that after neural tube closure reg.3 descendants undergo a gastrulation-like involution movement. As a result, the posterior half of reg. 3 gives rise to posterior trunk and anterior tail somites whereas the anterior half forms posterior tail somites and tail spinal cord. The border between tail and trunk somites does not seem to be prespecified within plate reg.3 but to rely on epigenetic events because tail presomitic mesoderm grafted into the trunk can form belly muscles which are not formed in the tail. Despite its gastrulation-like movement, reg.3 does not give rise to the notochord of the tail. This develops from involuted mesoderm underlying reg.3 in the neurula (stage 15). These results indicate that different mechanisms are involved in forming central and lateral mesoderm of the tail and that the posterior neural plate gives rise to both mesoderm and neuroectoderm.

[1] JH Bijtel, Roux Arch. EntwMech. Organ. 125 (1931) 448-486
[2] HH Chuang, Roux Arch. Entw. Mech. Organ. 143 (1947) 19-125
[3] P Ford, Proc. Zool. Soc. Lond. 119 (1947) 609-32
[4] AS Tucker and JMW Slack, Curr. Biol. 5 (1995) 807-813
[5] AS Tucker and JMW Slack, Development 121 (1995) 249-262
[6] M Catala, MA Teillet, and NM Le Douarin, Mech. Dev. 51 (1995) 51-65
[7] M Cambray and V Wilson, Development 134 (2007) 2829-2840

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