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Analysis of Spatial and Temporal Gene Expression Patterns in Blastula and Gastrula Stage Chick Embryos

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Abstract

Studies on the genetic basis of rostral–caudal specification, neural induction, and head development require knowledge of the relevant gene expression patterns. Gaps in our understanding of gene expression have led us to examine the detailed spatiotemporal expression patterns of 19 genes implicated in early development, to learn more about their potential role in specifying and patterning early developmental processes leading to head formation. Here, we report the expression patterns of these markers in blastula- and gastrula-stage chick embryos, using whole-mount *in situ* hybridisation. *Nodal*, *Fgf8*, *Bmp7*, *Chordin*, *Lim1*, *Hnf3 β* , *Otx2*, *Goosecoid*, *Cerberus*, *Hex*, *Dickkopf1*, and *Crescent* are all already expressed by the time the egg is laid. When the primitive streak has reached its full length, a later group of genes, including *Ganf*, *Six3*, *Bmp2*, *Bmp4*, *Noggin*, *Follistatin*, and *Qin* (*BF1*), begins to be expressed. We reassess current models of early rostral patterning based on the analysis of these dynamic spatiotemporal expression patterns.

Keywords





epiblast; forebrain; head; hypoblast; induction; organiser; patterning; trunk; tail; endoderm




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