

Author's Accepted Manuscript

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PII: S0012-1606(18)30141-6
DOI: <https://doi.org/10.1016/j.ydbio.2018.04.007>
Reference: YDBIO7735

To appear in: *Developmental Biology*

Received date: 26 February 2018

Revised date: 11 April 2018

Accepted date: 11 April 2018

Cite this article as: Katie L. Vermillion, Rhonda Bacher, Alex P. Tannenbaum, Scott Swanson, Peng Jiang, Li-Fang Chu, Ron Stewart, James A. Thomson and David T. Vereide, Spatial patterns of gene expression are unveiled in the chick primitive streak by ordering single-cell transcriptomes, *Developmental Biology*, <https://doi.org/10.1016/j.ydbio.2018.04.007>

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Spatial patterns of gene expression are unveiled in the chick primitive streak by ordering single-cell transcriptomes

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ABSTRACT

During vertebrate development, progenitor cells give rise to tissues and organs through a complex choreography that commences at gastrulation. A hallmark event of gastrulation is the formation of the primitive streak, a linear assembly of cells along the anterior-posterior (AP) axis of the developing organism. To examine the primitive streak at a single-cell resolution, we measured the transcriptomes of individual chick cells from the streak or the surrounding tissue (the rest of the area pellucida) in Hamburger-Hamilton stage 4 embryos. The single-cell transcriptomes were then ordered by the statistical method Wave-Crest to deduce both the relative position along the AP axis and the prospective lineage of single cells. The ordered transcriptomes reveal intricate patterns of gene expression along the primitive streak.

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