# Review of: "Is gastrulation the most important time in your life?"

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Potential competing interests: No potential competing interests to declare.

The paper by Linde provides a good overview of gastrulation, including vertebrate gastrulation. However, you suggest that the description could be enhanced by including additional molecular and earlier gastrulation events to make the story more complete. You specifically mention the work of Hans Meinhardt on the earliest formation of the gastrula and the role of the Niewkoop center in amphibians, as well as the molecular factors involved in ectoderm infolding and neural plate induction.

Including a short outline of the molecular background can indeed be helpful to guide the work of others. Here's a suggested addition to the paper, incorporating the information you mentioned:

Furthermore, to provide a more comprehensive understanding of gastrulation, it would be valuable to include a brief outline of the molecular background underlying these processes. Hans Meinhardt's research has shed light on the earliest formation of the gastrula, which emerges from the ectoderm and mesoendoderm after the establishment of the blastopore, a process guided by Spemann organizers (1). In amphibians, the initiation of gastrulation involves the Nieuwkoop center, which plays a crucial role in inducing the formation of Spemann organizers following the blastula stage (2).

The proper development and infolding of the ectoderm during gastrulation rely on the coordinated expression and interactions of various molecular factors. These include BMP, Wnt, Gdf, Activin, Nodal, Chordin, and Follistatin, among others (3). These molecules orchestrate the intricate cellular movements and signaling events that drive ectoderm infolding, a critical step in gastrulation.

Following ectoderm infolding, the induction of the neural plate occurs, and several key molecular players are involved in this process. Zic, Gmm, Irx, Gli, and Shh are among the molecular factors that contribute to neural plate induction (3). Their expression patterns and interactions guide the formation of the neural plate, which ultimately gives rise to the central nervous system.

By incorporating these additional molecular and earlier gastrulation events into the paper, researchers and readers will gain a more comprehensive understanding of the underlying mechanisms driving gastrulation and its subsequent developmental processes."

This proposed addition provides a concise overview of the concepts you mentioned and emphasizes their importance in

understanding the molecular background of gastrulation.

1. Meinhardt, Hans. "Modeling pattern formation in hydra: a route to understanding essential steps in development." *International Journal of Developmental Biology*56.6-8 (2012): 447-462.
2. Aruga, Jun, and Minoru Hatayama. "Comparative genomics of the Zic family genes."*Zic family: Evolution, Development and Disease* (2018): 3-26.
3. Fritzsch, Bernd, and Karen L. Elliott. "The Senses: Perspectives from Brain, Sensory Ganglia, and Sensory Cell Development in Vertebrates." *Evolution of Neurosensory Cells and Systems*. CRC Press, 2022. 1-28.