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Imaging axial emergence though self-organization in embryonic organoids.

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Emergence of multicellular forms (tissues, organs and organisms) from cells through changes in their shape, size, number and organization is central to understanding the process of morphogenesis. While molecular players are known, we do not know how the activity of genes and proteins is translated into 3D structures in space and time. Preexisting spatial cues, species-specific geometry and extraembryonic signaling centers, confound studying these processes *in vivo*. We have recently shown that 3D cell aggregates from different species (mouse embryonic stem cells and zebrafish blastula cells, which we term *gastruloids* and *pescoids* respectively) generate spatial asymmetries in gene expression and cell behavior within otherwise equivalent groups of cells, to develop a global coordinate system (body axes) *de novo*. Combining light-sheet imaging with germ-layer specific labelling of cells we are now gaining some insights into the spatio-temporal precision and species-independent manner, with which such 3D embryonic cell aggregates generate the major body axes even in the absence of any embryonic information. Using these embryonic organoids, as a minimal alternate system, sufficient to generate embryonic axes, we aim to understand early development in embryos as an emergent phenomenon of the self-organization of pluripotent cells.

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Terms and Conditions

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