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Imaging Stem Cell Aggregation Using Digital Holographic Microscopy EMILY J. GARDEL, YONAS YEMANE, DEBRA AUGUSTE, VINOTHAN N. MANOHARAN, Harvard School of Engineering and Applied Sciences, Harvard University — Stem cells in solution aggregate and self-assemble into spheres of cells called embryoid bodies (EBs). During this process, cells divide, differentiate, and influenced by interactions with other cells both chemically and mechanically. We use a combination of holographic, interferometric, and spectroscopic techniques to visualize EB formation. Such methods track the cells' positions and allow us to measure the rates and mechanisms of aggregation as well as the overall structure of the EB. The goal is to understand how cell-cell interactions influence the self-assembly process as well as the environmental cues responsible for stem cell differentiation.

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