Building tissues to understand how tissues build themselves

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Cells are living materials – their physical properties are not static but rather change dynamically in response to their surroundings. This property of cells as materials gives them the capacity to self-organize into specific three dimensional structures. Indeed, the capacity of cells to self-organize into tissues is critical to their normal developmental and their ability to self-repair. Thus, a better understanding of how tissues self-organize will improve our ability to synthesize tissues and organs in the lab, and suggest new strategies to slow the breakdown of tissue structure that contributes to the initiation and progression of disease. We are working to understand the physical mechanisms used by cells to self-organize robustly into specific tissue structures, and how these program are susceptible to the perturbations that underlie diseases such as cancer.