

Group #32

### **Chamber-Specific Cardiac Model**

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#### Abstract

Heart failure remains difficult to model because left and right chambers exhibit chamber-specific molecular responses due to variations in developmental origin and biomechanical workload. This project aims to develop both a chamber-specific cardiac tissue model and computational network model to better study molecular responses to mechanical stretch across heart chambers. iPSC-derived engineered cardiac tissues were successfully differentiated from first heart field (FHF) and second heart field (SHF) developmental lineages, from which lineage-specific gene expression data were obtained to validate a computational network model. This complementary approach allows for rapid prediction of heart failure progression while reducing reliance on large experimental studies in the long-term, whereas the tissue model provides biological validation and refinement of model predictions. Future work for this project includes extensive characterization of engineered cardiac tissues to confirm lineage-specificity, and expanding both tissue and computational models to include additional cell types such as macrophages and vascular cells.