ABET Addendum

Team #32 - Megan Chavez

(1) Desired Needs

• Create lineage specific extracellular matrix (ECM) scaffolds to mimic native cardiac microenvironments more accurately than synthetic culture systems

•Build a predictive computational network model capable of simulating chamber specific gene regulation and remodeling

• Investigate whether developmental linage influences how cardiac cells respond to mechanical stress and fibrosis related signaling.

(2) Major Constraints

• **Safety and regulatory:** Follow sterile technique, chemical handling protocols, and equipment handling

• **Risks:** contamination, failed differentiation, low viability, ECM sheets tearing, computational model error.

• **Manufacturability and QC:** ECM scaffold production currently requires long culture periods and highly controlled conditions and equipment dependent

(3) Engineering Standards

•Standard sterile cell culture, validation, and assay protocols were followed to ensure tissue quality and reproducibility

• Computational modeling used Netflix-compatible systems biology frameworks and standardized network simulation methods.

(4) Ethical, Environmental, and Societal Concerns

• **Ethical:** handling and sourcing of human iPSC-derived cells were in place throughout the project.

• **Environmental:** biological/chemical waste, plastics, glass, and reagents were disposed of through the proper safety channels .

(5) Active Teamwork and Leadership

• Members collaborated across wet lab and computational tasks while dividing responsibilities by subproject specific questions.

•Team adapted to setbacks through mentor feedback and shared problem solving.

(6) Motivation, Initiative, and Persistence

• The interdisciplinary aspects of the project motivated the team to learn new techniques in experimental design, tissue engineering, stem cell biology, and sensitivity testing in computational modeling.

(7) Innovation and Entrepreneurial Ideas

• The project has future potential in personalized medicine, regenerative therapies, and chamber-specific drug screening applications.