

SSoE Design Expo
Spring 2017
Best Overall Project

A Robust Biomechanical Culture System for Tissue Engineered Corneas

Project Summary

The goal of this project is to design a bioreactor that simulates the biological conditions of the human eye to grow corneal stem cells. Corneal transplants are the most common transplant surgery in the U.S., but there is a 50% chance of immune system rejection by 10 years following the surgery. Research is being conducted at UPMC to grow corneal tissue using the patients' own stem cells to prevent immune system rejection. Stem cells will not grow healthy corneal tissue unless they experience the exact physiological conditions of the eye, thus, a bioreactor to grow the tissue and replicate the conditions found in the eye is desired. There have been three previous iterations of the bioreactor, so by incorporating components of the previous systems as well as considering feedback from the end user, an updated version of the bioreactor was designed.

