

## Senior Project – BioPrinter

09/12/2012

### GOALS FROM LAST WEEK

- Selection of polymer – synthetic vs. natural polymer
  - PCL –affordable and commonly used , synthetic polymer
    - Used for soft tissue application
  - Collagen – costly, natural polymer
    - Exist as organic solvent
- Discussion of cell deposition methods
  - Filtration – negative vs positive pressure (?)
  - Based on the height of the scaffold – add a medium
  - Method of seeding
  - Get the scaffold into medium before cell deposition
  - Modified medium
- Sterilization
  - Before cell seeding
- Extruder
  - Solenoid: room temperature, but also produces magnetic field – may affect analog components.
  - Piezoid electric: deformation by high frequencies
  - Mini extruder: rotating screw and a motor, eliminates needs for solvents. Temperature unstable
- Polymers
  - Makes long chains and cross linker aids
  - Serum: will be 10% serum in the medium
  - Pre-wetting
- Cells
  - Mouse fibroblasts cell lines: 3T3
- Scaffold
  - Sterile plastic dish, treated to be negatively charged. → Plastic petri dish
  - How many do we needed attached
  - Consider Cyclic deposition
  - If the inside is biocompatible
  - Cell damage with movement of the printing

### ADVANCES OF THIS WEEK

- Budget
  - Solenoid vs. Piezoid electric
  - Arduino Mega2560 Rev3

- Parameters
  - CO<sub>2</sub> – may not be necessary, if medium sits around medium gets alkaline. Place the medium in an incubator in order to balance the pH. Control initial seeding with buffer to keep it at 7.2 -7.4.
  - Temperature – 29 -31 C
  - Humidity – 45-50 % evaporative
    - Consider size and cost
- Fumehood
  - Can be worked out in the Chem Building
- Crosslinker
  - Links chain to chain
  - Essential for fortifying the structure
  - Enhanced proliferation

#### GOALS FOR NEXT WEEK Tuesday 11:30 AM

- Budget
  - Major pieces: motors, sensors, boards
- Polymer decision : find out the cost
  - Collagen vs. PCL
- Machine size, countertop available.
- Cross Linker: viable options for crosslinker
- Find the MSDS sheet and get them to Dave before ordering any chemicals.