Making Gelatin Coverslips to Grow Myotubes

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SHINE Summer High School Intensive in Next-Generation Engineering

Introduction

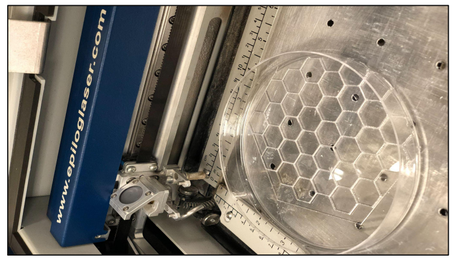
The project that my mentor Stephanie Do is working on in Dr.McCain's lab is to create myotubes from patient derived fibroblast cells. Dr.McCains lab is a tissue engineering lab. Tissue engineering is important,

- Developing drug microphysiological systems.
- Tissue engineering is a way to replicate the human body.
- Stem cells can develop into diff type of cells and help study various diseases of your body .

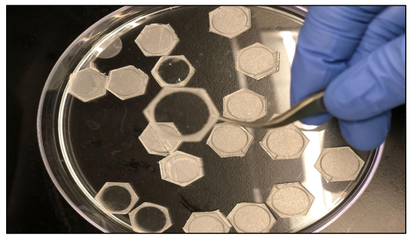
Objective & Impact of Professor's Research

- The objective of this research is to create a substrate for the long term culturing of myotubes.
- Previous substrate was made out of pdms, which caused delamination
- A new in-progress alternative are gelatin coverslips which could be better to grow myotubes
- Gelatin has an adhesive in which the cells like to be on.
- Some different conditions we did were adding AraC, which is a proliferation inhibitor which stops cells from dividing. there is the gelatin coverslip without GFP (which will not activate synNotch), with GFP but with no AraC (activates synNotch but cells can keep dividing), and with GFP an with AraC (activates synNotch but cells stop dividing).
- The impact this research can have is it can give better ways to convert stem cells into other types of cells, in order to test drugs

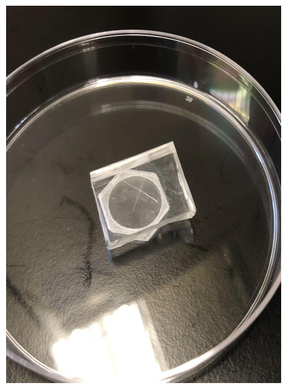
Methodology



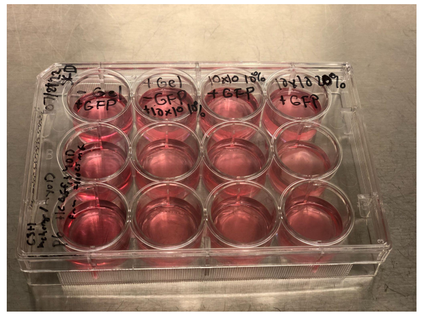
1. Create the cover slip by taking a petri dish and laser cutting it into hexagons



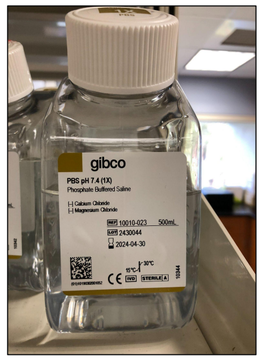
2. Peel off the tape from the middle surface area of the hexagon

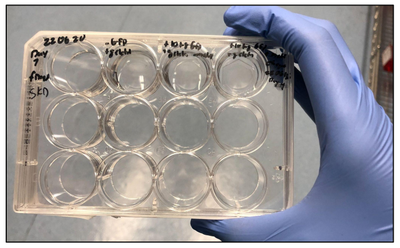


3. Make gelatin and cover over with a stamp.
4. Place the hexagon shape cover slip into the wells along with the fibroblast cells.
5. Add cells into different conditions



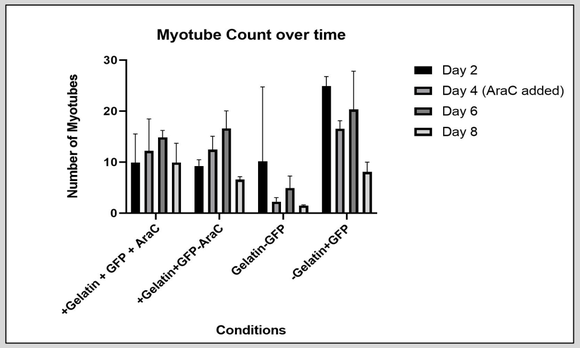
6. Collect data by imagining cells using fluorescence microscopy all cells grown into myotubes glow red.

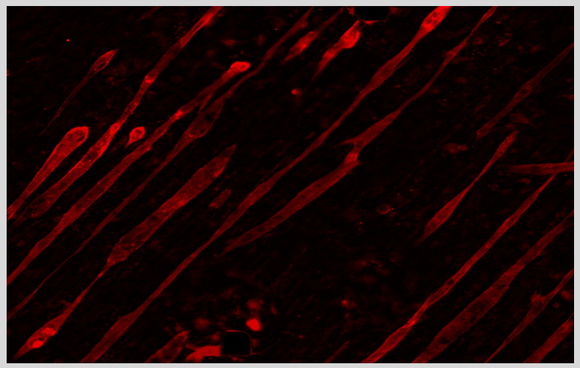




7. Once the time period for the cells to grow in is over the cells go through a process called "fixing cells" which is where they get rinsed 3 times with PBS then get poured in methanol to instantly "freeze" which allows us to be able to look at them 3 weeks from now and they will look exactly the same as today.

Data





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Resources

Bettadapur A, Suh GC, Geisse NA, Wang ER, Hua C, Huber HA, Viscio AA, Kim JY, Strickland JB, McCain ML. Prolonged Culture of Aligned Skeletal Myotubes on Micromolded Gelatin Hydrogels. Sci Rep. 2016 Jun 28;6:28855. doi: 10.1038/srep28855. PMID: 27350122; PMCID: PMC4924097.