

- Announcements
 - ❖ Introducing... Nicole, Mod 3 TA
- Pre-lab Lecture
 - ❖ Cell/Tissue Culture Basics
 - ❖ Tissue Engineering (TE) toolkit
 - ❖ Mod 3 Overview
 - ❖ Today in Lab (Mod 3 Day 1)

Tissue Culture (TC) Environment

- What will “feel” physiological to a cell?

$T = 37^{\circ}\text{C}$

$\text{pH} \sim 7.2 - 7.4 \longleftrightarrow \text{CO}_2 (5\%)$

[salts] (don't burst/shrink)

* cell ρ

surface / 3D

ambient O_2

humidity

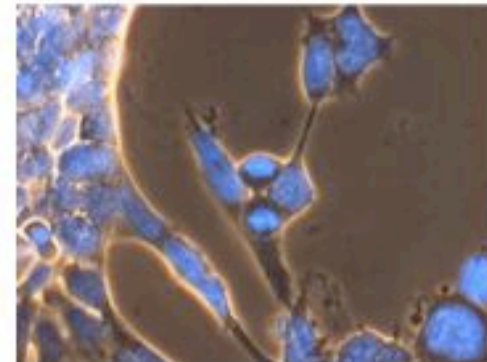


Image from http://www.stemcellresources.org/library_images.html

* sterility

Tissue Culture (TC) Medium

- What do cells need to survive?

Food and/or cell life: energy: glucose and/or L-glutamine
(optional: Na Pyr)

essential amino acids }
Optional: non-ess. aa } co-factors, rxn.
vitamins, minerals, lipids } building blocks

Serum: cytokines

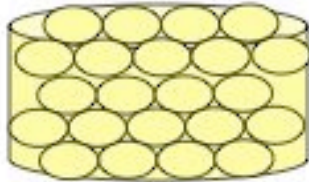
Non-food: antibiotics pen/strep
(optional: antimycotic, Amph B)

-phenol red (track pH)

Components of a TE construct

scaffold/matrix

- usually degradable, porous



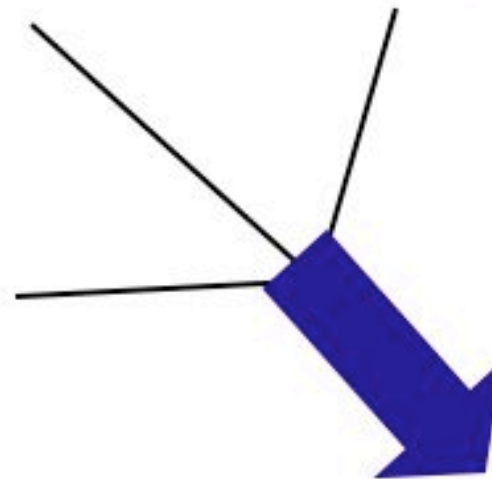
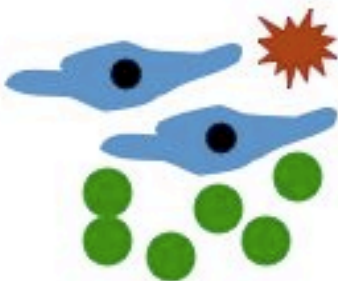
soluble factors

- made by cells or synthetic
- various release profiles

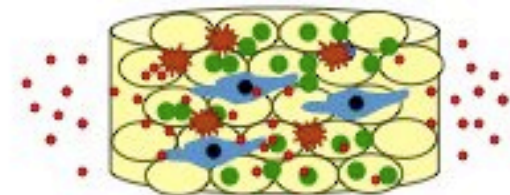


cells

- precursors and/or differentiated
- usually autologous



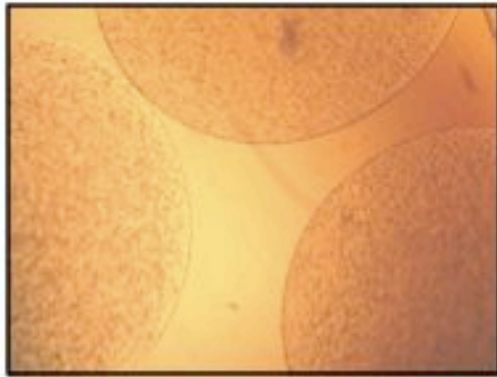
integrated implantable or injectable device



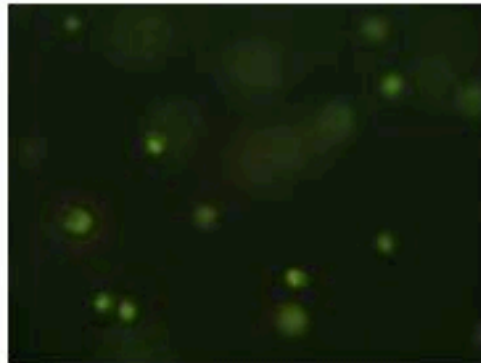
Module overview: lab

Day 1: design

Day 2: seed cultures



Day 3: viability assay



fluor. microscopy

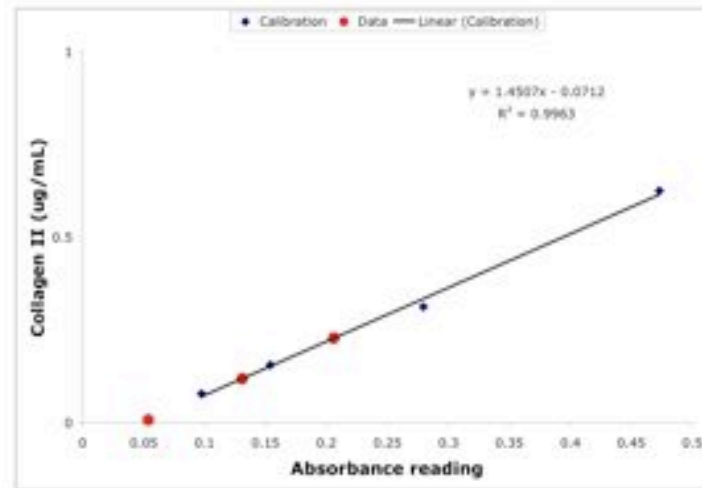
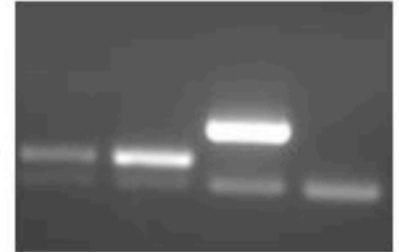
Day 4: prep RNA+cDNA

Day 5: transcript assay

Day 6: protein assay

Day 7: remaining analysis

*CNI
vs.
CNI*



Day 8: your research ideas!

Today in Lab: Research + Design

- Practice cell culture with mouse cell line
- Skim ≥ 3 out of 8 articles
 - Read abstract
 - Skim methods: *find typical alginate % , cell p, etc.*
 - Skim results/discussion: summarize in 1-2 sentences
 - Goal: *find in what you need (not deep/close reading)*
- Make your own plan
 - Vary one parameter: simple or sophisticated
 - Check cell availability with teaching faculty
 - Request unique materials/equipment needed
 - Goal: *choose an exp't'l Q, conceive design*