

- Announcements

- ❖ Introducing... Han-Hwa, M3 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?

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

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

humidity

[salts] (burst/shrink)

ambient  $\text{O}_2$

≠ sterility

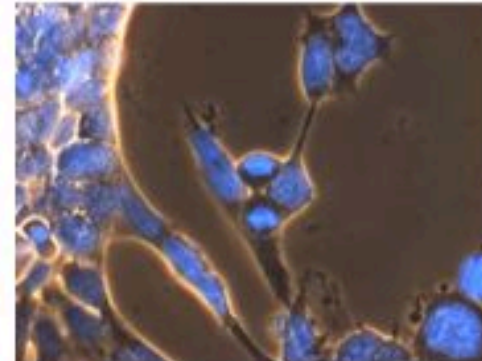


Image from [http://www.stemcellresources.org/library\\_images.html](http://www.stemcellresources.org/library_images.html)

# Tissue Culture (TC) Medium

- What do cells need to survive?

Food and/or cell life: energy source; glucose and/or L-glutamine  
(sometimes NaPyr)

essential amino acids  
optional; non-essential aa } building blocks  
vitamins, minerals, lipids } and/or co-factors  
for cells.

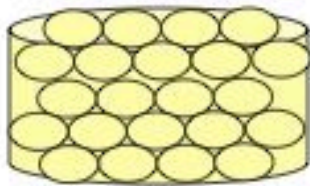
serum (~blood): growth factors

Non-food  $\left[ \begin{array}{l} \uparrow \\ \text{space} \end{array} \right]$  Antibiotics (Pen/strep)  
optional antimycotics (1°)  
phenol red (pH track)

# Components of a TE construct

## scaffold/matrix

- usually degradable, porous



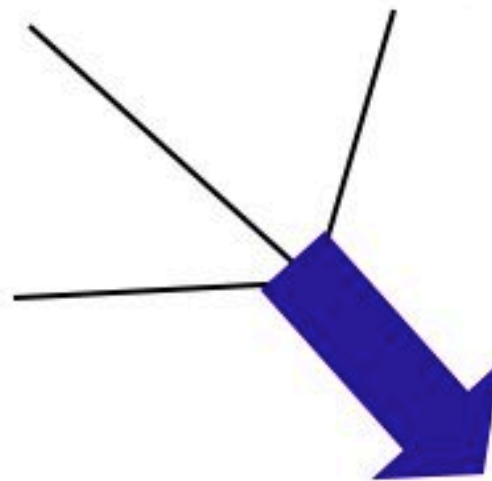
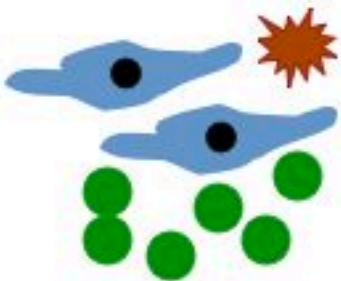
## soluble factors

- made by cells or synthetic
- various release profiles

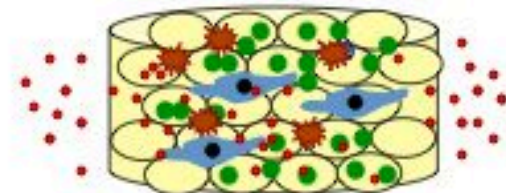


## cells

- precursors and/or differentiated
- usually autologous



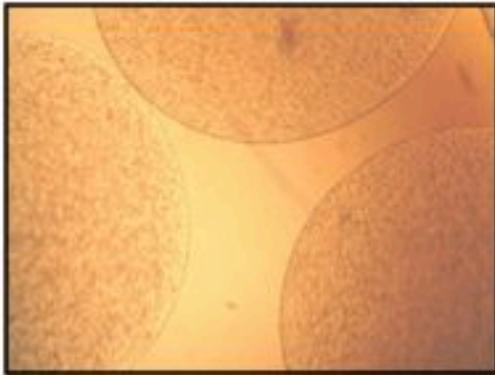
## integrated implantable or injectable device



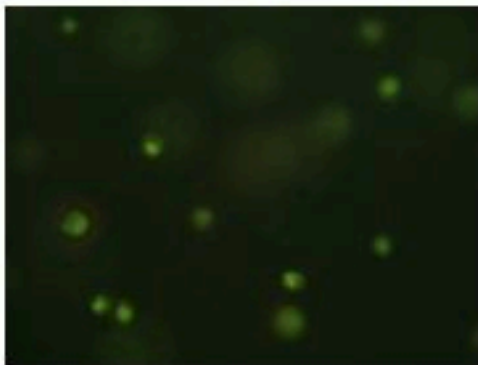
# Module overview: lab

Day 1: design

Day 2: seed cultures



Day 3: viability assay

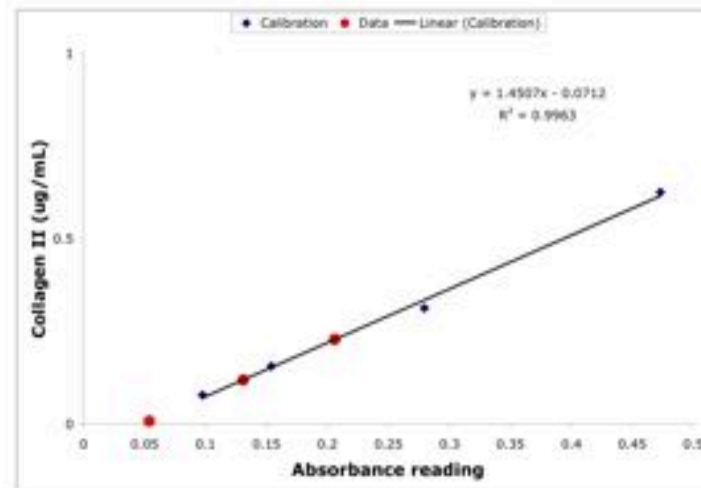
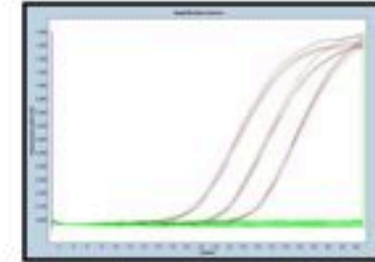


Day 4: prep RNA + cDNA

Day 5: transcript assay

Day 6: protein assay

Day 7: remaining analysis



Day 8: your research ideas!

# Today in Lab: Research + Design

- Practice cell culture with mouse cell line *review TC (Lab Basics)*
- Skim  $\geq 3$  out of 8 articles
  - Read abstract
  - Skim methods: *find typical alginate  $\tau_0$ , cell  $\rho$ , etc.*
  - Skim results/discussion: summarize in 1-2 sentences
  - Goal: *select desired info. (vs. close readings)*
- Make your own plan
  - Vary one parameter: simple or sophisticated
  - Check cell availability with teaching faculty
  - Request unique materials/equipment needed
  - Goal: *choose an explicit Q and conceive design to test it*