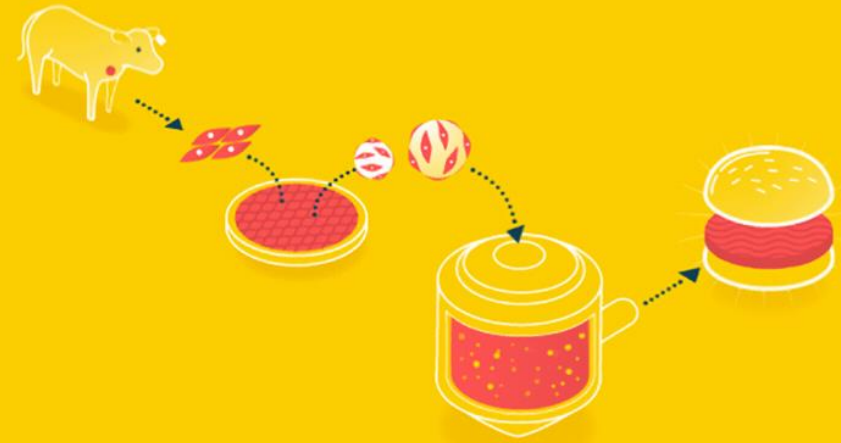


# Tufts University BME174 – Cultured Meat Lab

Week 2: Primary Cell Isolations





# Week 2



## Part 1

- Brief Introduction



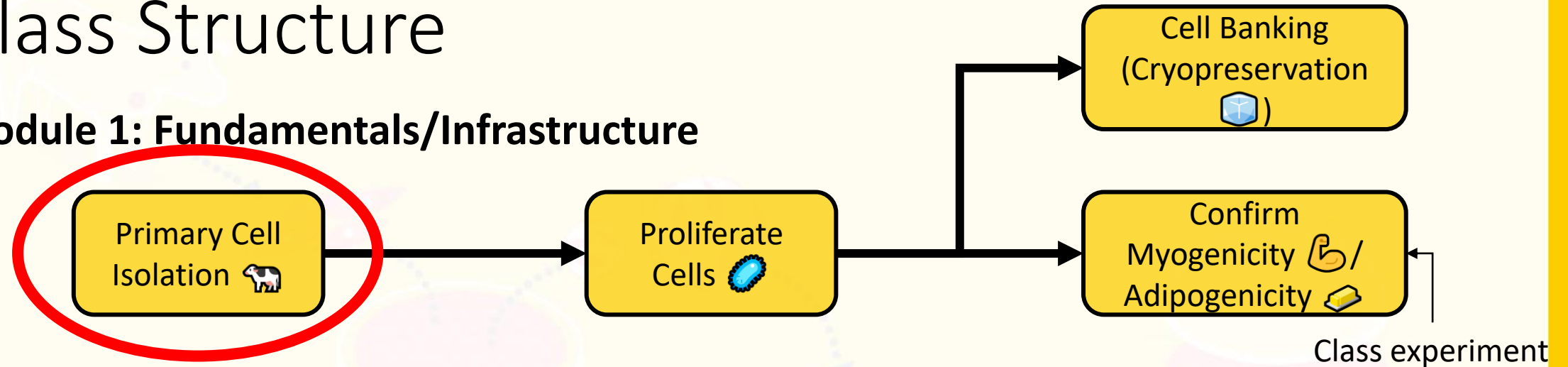
## Part 2

- Muscle and Fat isolations



# Class Structure

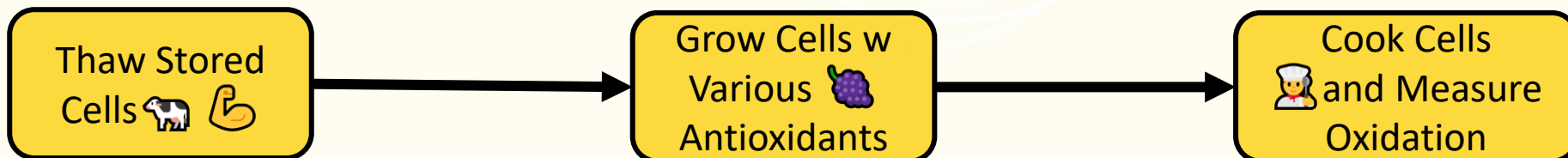
## Module 1: Fundamentals/Infrastructure



## Module 2: Making Cultured Fat



## Module 3: Nutritional Interventions

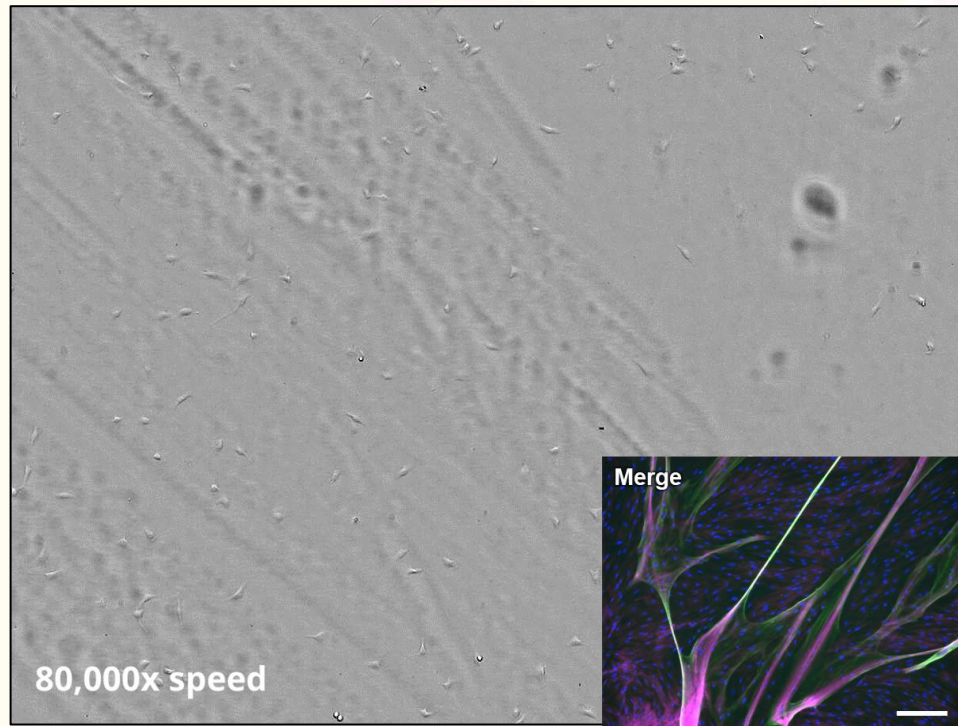


Thursday morning:  
Tufts vet school

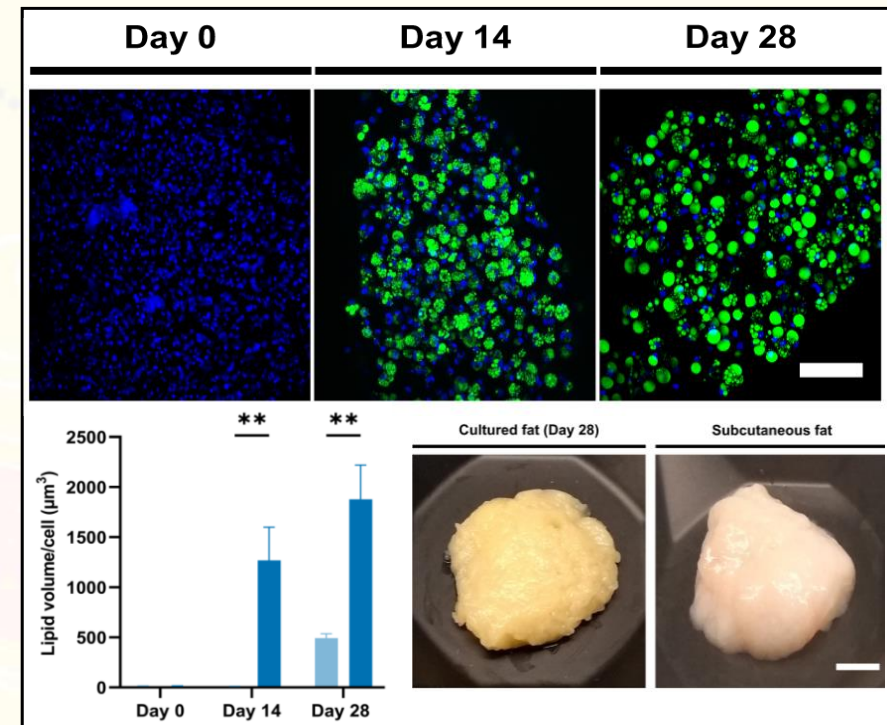


# Today's goal: Isolate muscle & fat cells

Bovine Satellite cells



Bovine Adipose cells



Dohmen, et al., *NPJ Science of Food* (2022)

# Today's goal: Isolate muscle & fat cells

[Int J Mol Sci.](#) 2021 Aug; 22(16): 8376.

PMCID: PMC8395070

Published online 2021 Aug 4. doi: [10.3390/ijms22168376](https://doi.org/10.3390/ijms22168376)

PMID: [34445082](https://pubmed.ncbi.nlm.nih.gov/34445082/)

## **Bovine Satellite Cells Isolated after 2 and 5 Days of Tissue Storage Maintain the Proliferative and Myogenic Capacity Needed for Cultured Meat Production**

[Stig Skrivergaard](#), [Martin Krøyer Rasmussen](#), [Margrethe Therkildsen](#),\* and [Jette Feveile Young](#)

Ricardo M. Gouveia, Academic Editor

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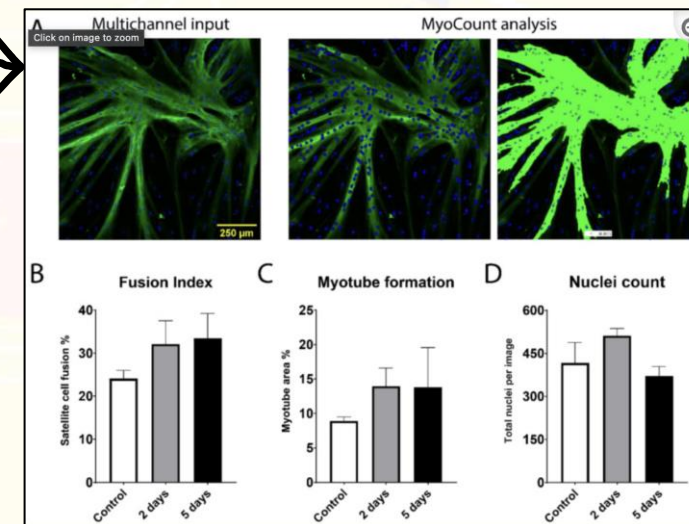
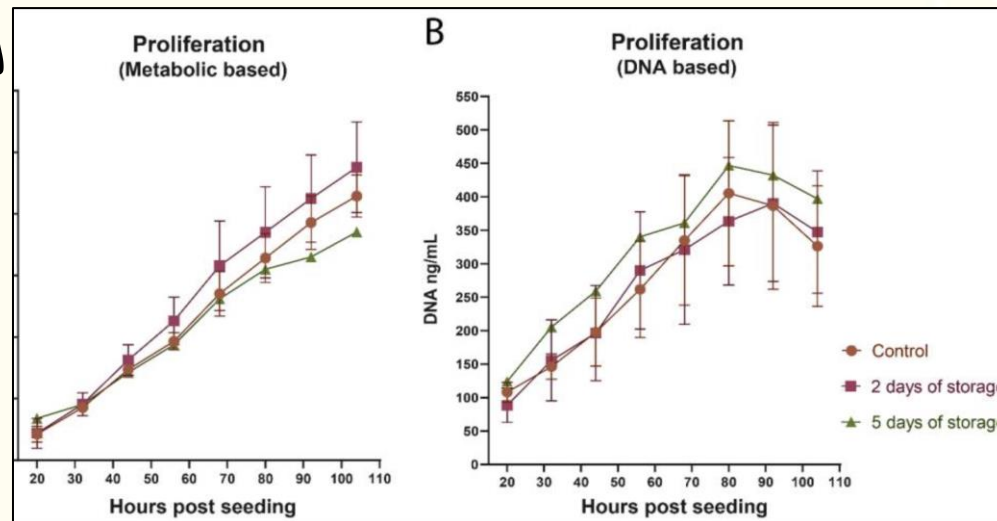
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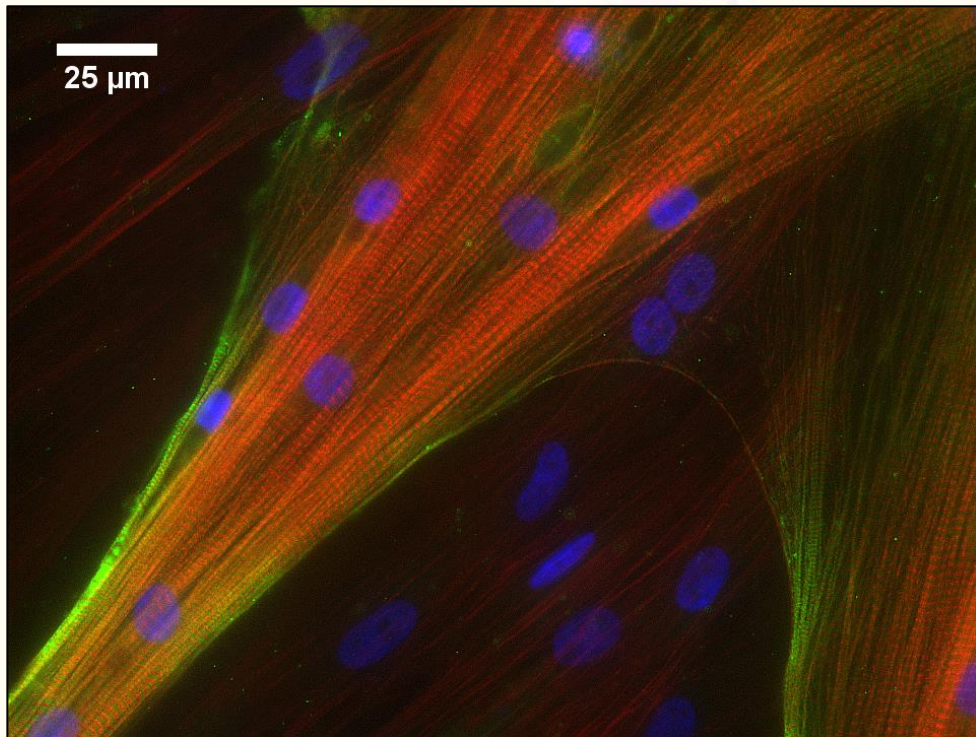
[Stig Skrivergaard](#), [Martin Krøyer Rasmussen](#), [Margrethe Therkildsen](#),\* and [Jette Feveile Young](#)

Ricardo M. Gouveia, Academic Editor



# Why do we care about muscle & fat cells?

## Muscle cells



### Muscle cells provide:

**Texture** - Long cell structures help provide the *fibrous* nature of meat.

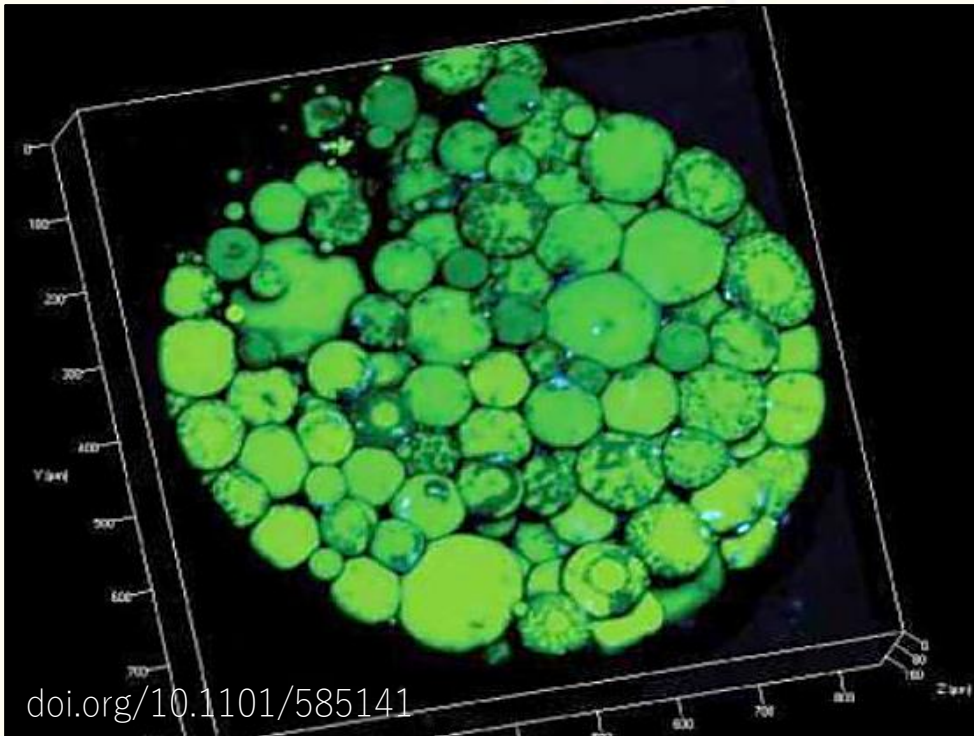
**Flavor** – Proteins in muscle cells are attributed with providing the *shared meaty flavor* to all meats.

**Nutrition** – These proteins also provide *essential amino acids*.



# Why do we care about muscle & fat cells?

## Fat cells



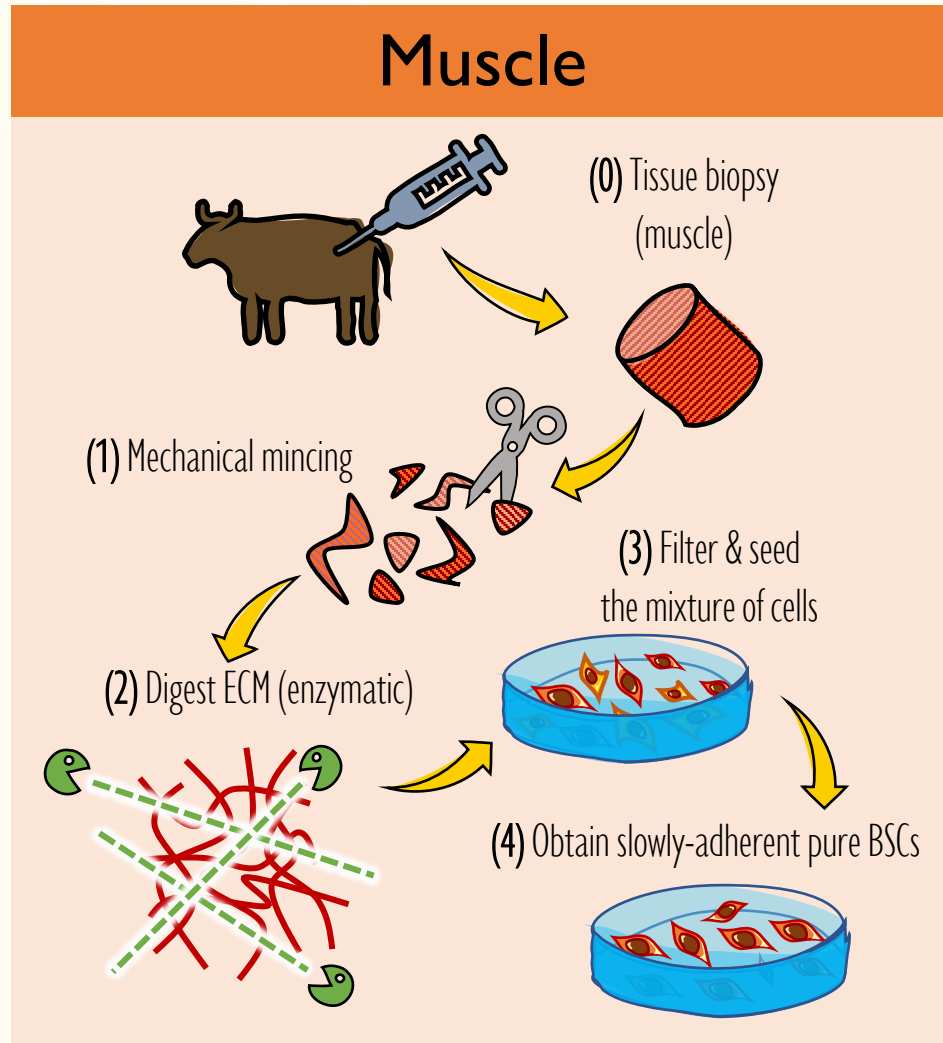
### Fat cells provide:

**Texture** – Lipids in fat cells provide *juiciness* to meat products.

**Flavor** – Fatty acids in fat cells are attributed with providing *distinct species-specific flavors* to meats.

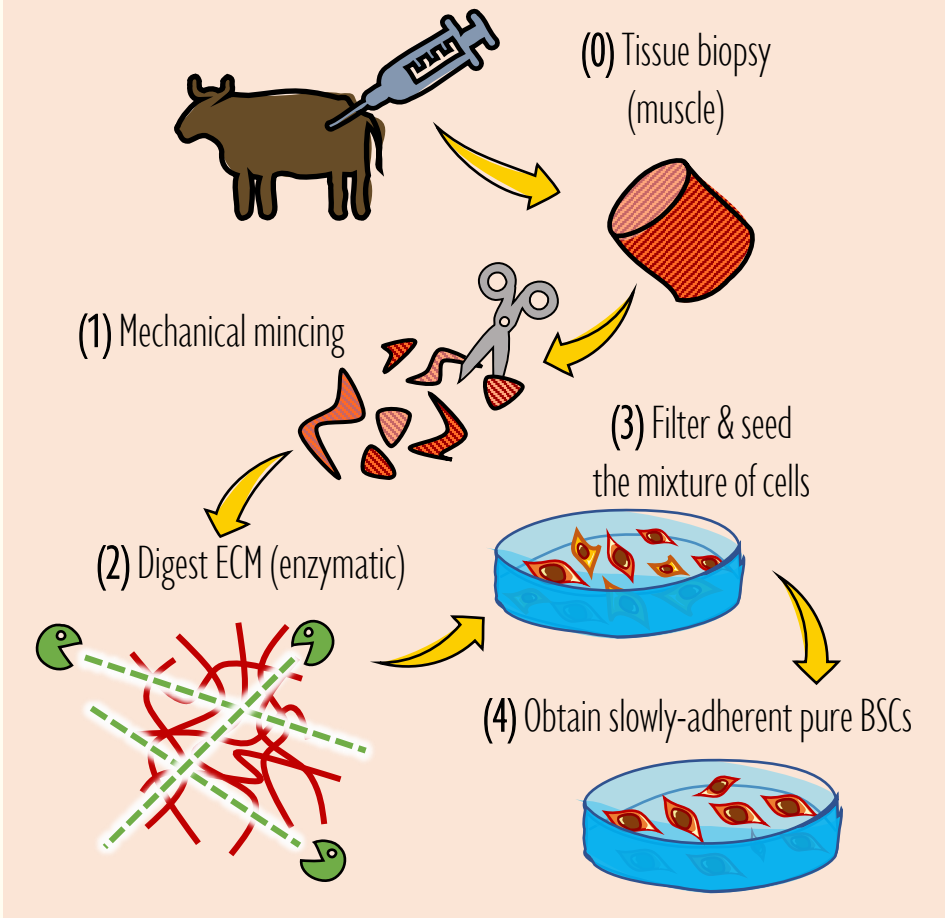
**Nutrition** – Fat cells offer *essential fatty acids*, as well as lipophilic nutrients such as some *vitamins*.

# Isolation overview

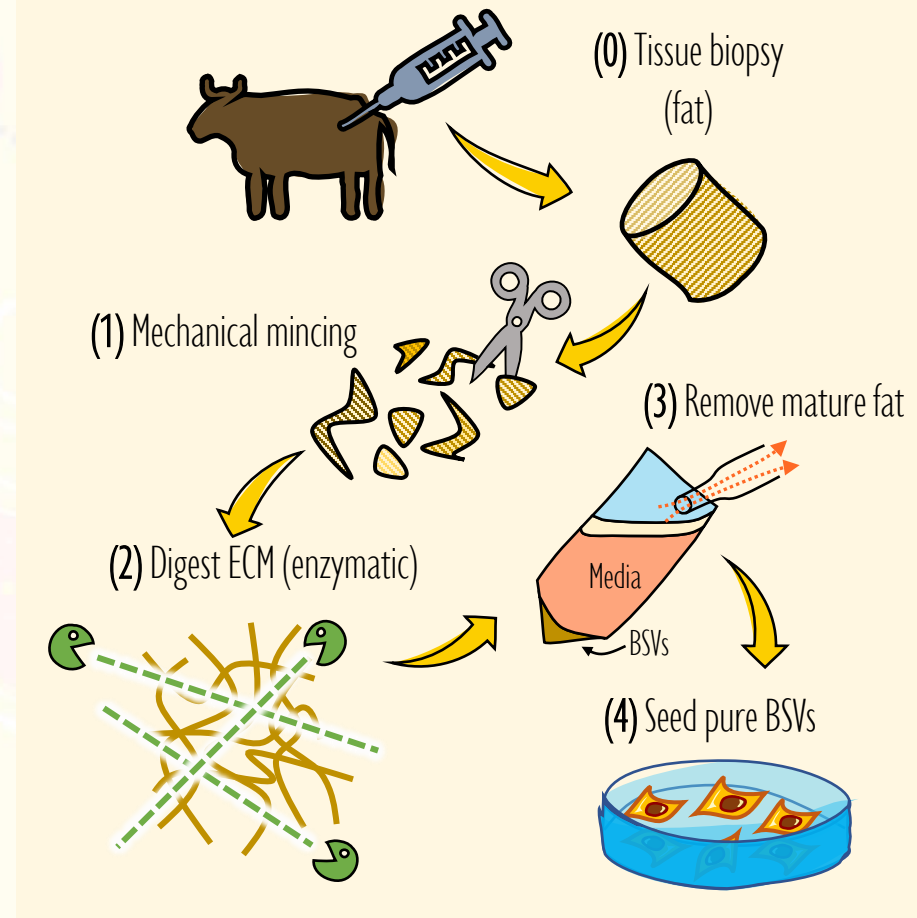


# Isolation overview

## Muscle

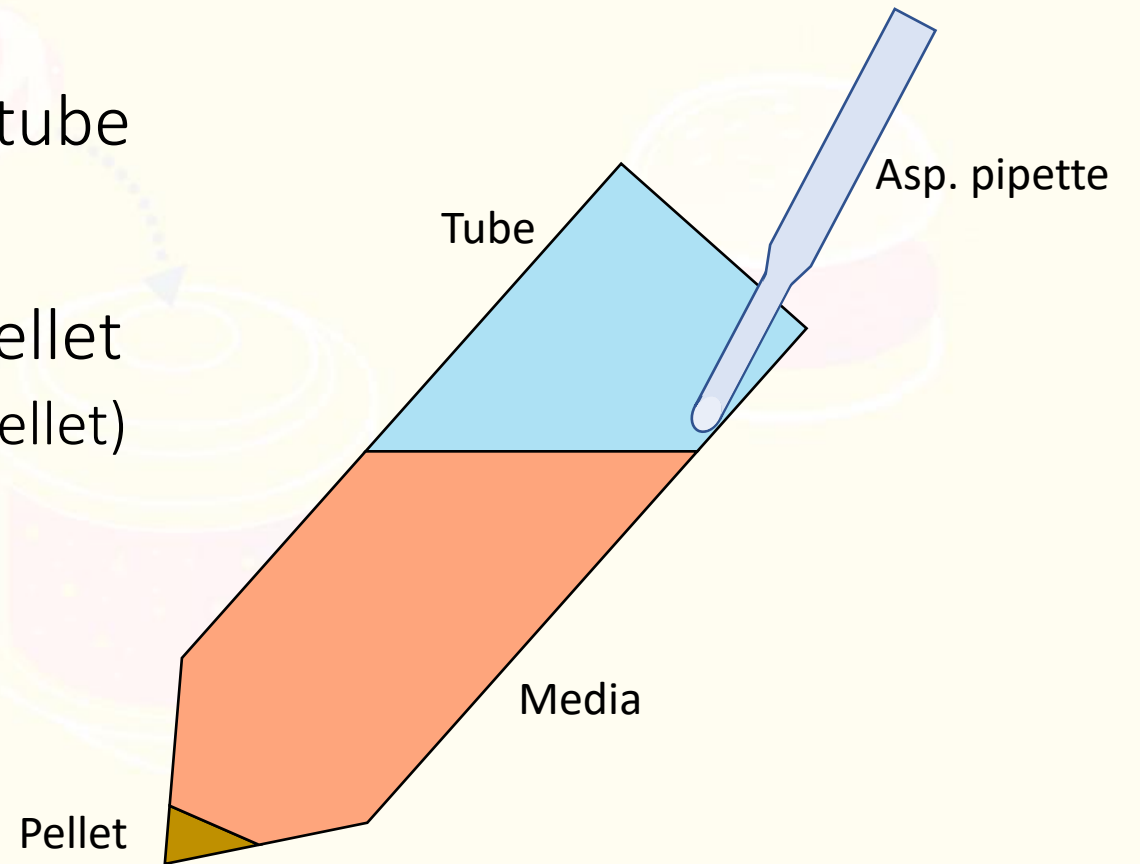


## Adipose



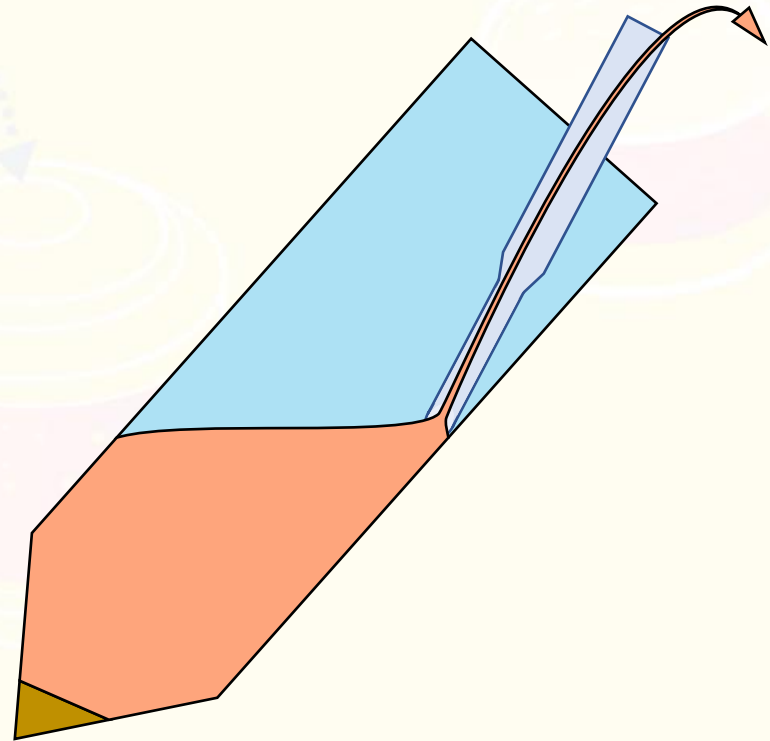
# New/Important technique: aspirating pellets

1. Turn on vacuum pump
2. Connect aspirating pipette  $\leftrightarrow$  tube
3. Tilt the tube  $\sim 45$  degrees
4. Suck up the media, leaving the pellet  
\*\*Leave  $\sim 0.5$  mL of media above the pellet)



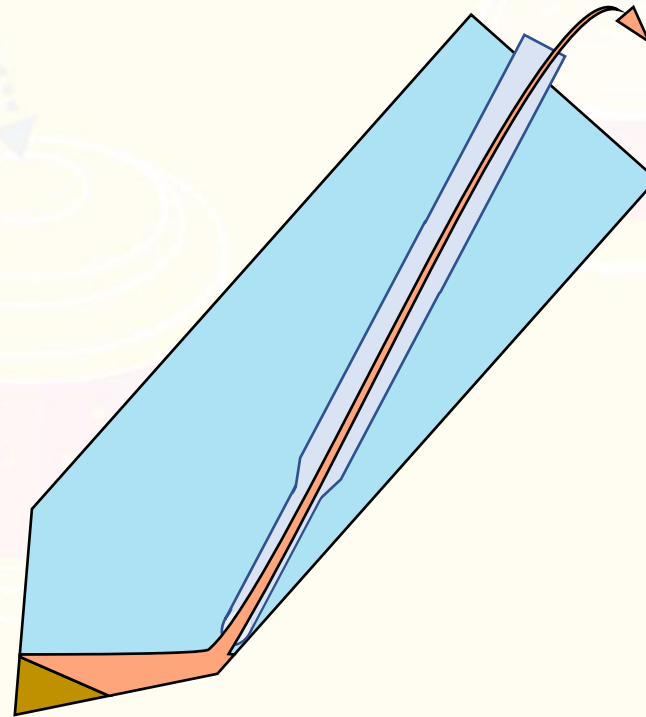
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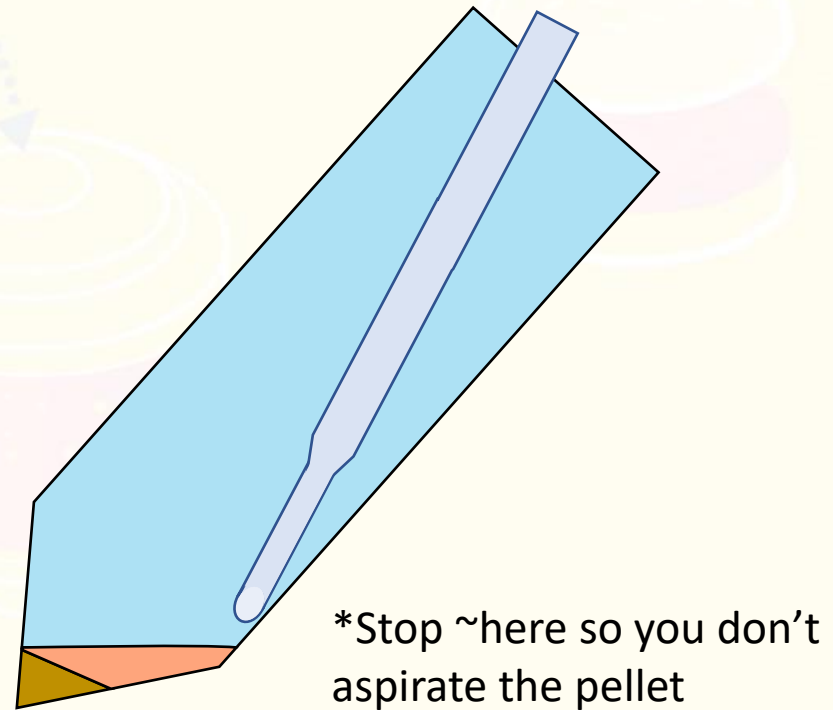
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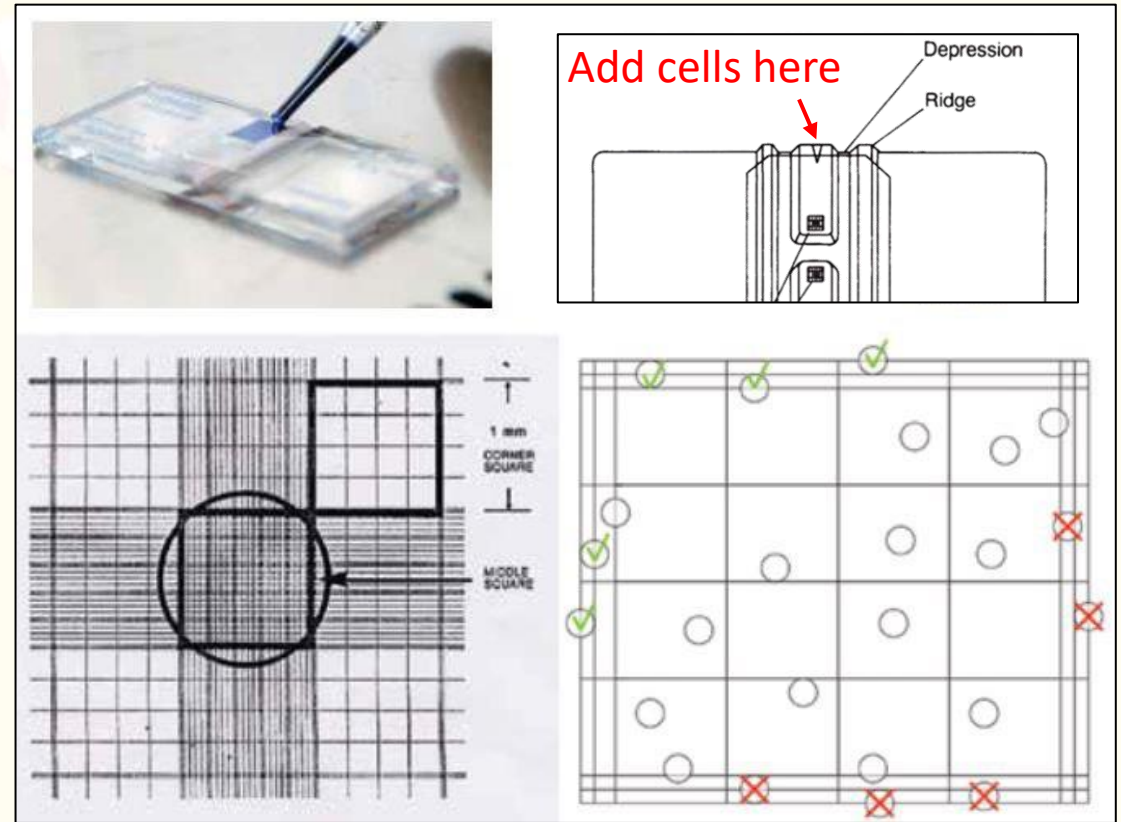
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# New/Important technique: Cell counting

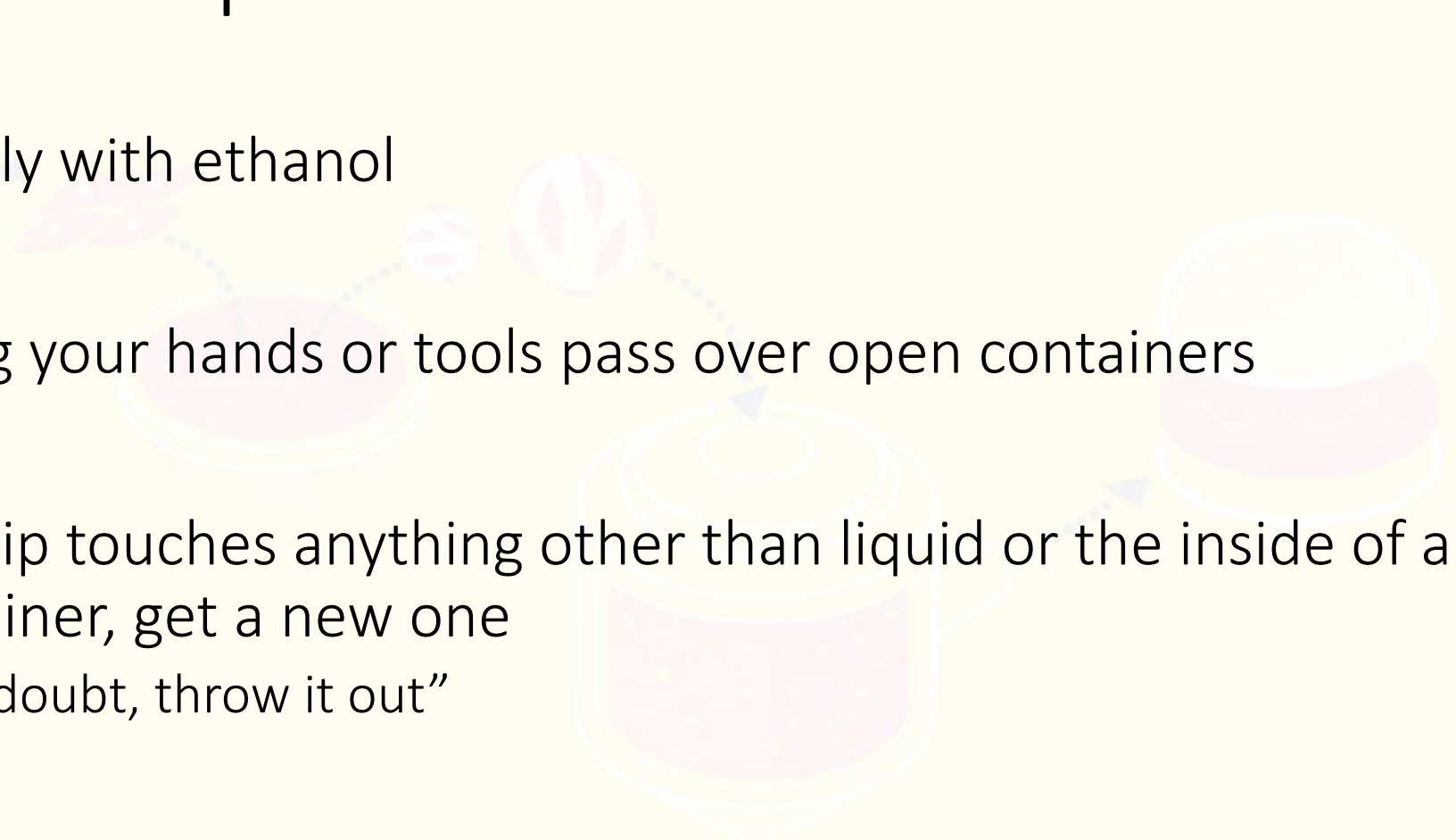
1. Resuspend pellet in 5 mL
2. 10  $\mu$ L to hemocytometer
3. View under Microscope
4. Count cells 4 corner boxes
5.  $\text{Cells/mL} = \text{count} / 4 * 10,000$
6.  $\text{Total count} = \text{cells/mL} * 5 \text{ mL}$





# Sterile technique reminders from last week:

- Spray liberally with ethanol
- Avoid having your hands or tools pass over open containers
- If a pipette tip touches anything other than liquid or the inside of a sterile container, get a new one
  - “When in doubt, throw it out”



# Next up:

## Today:

- 2 groups: fat isolations
- 2 groups muscle isolation

## This week:

- Muscle group transfer cells (tomorrow)
- Fat groups feed cells (Sunday & Tuesday)

\*\*Can coordinate with other groups to share cell feeding responsibilities

