



**Al-Mustaqbal University**  
**College of Science**



# **Biochemical Techniques**

**1<sup>st</sup> Lecture**

# **Tissue Homogenization**

**Second Year Students / 2<sup>nd</sup> semester / 2024-2025**

*By*

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# Homogenization is a technique used in tissue preparation

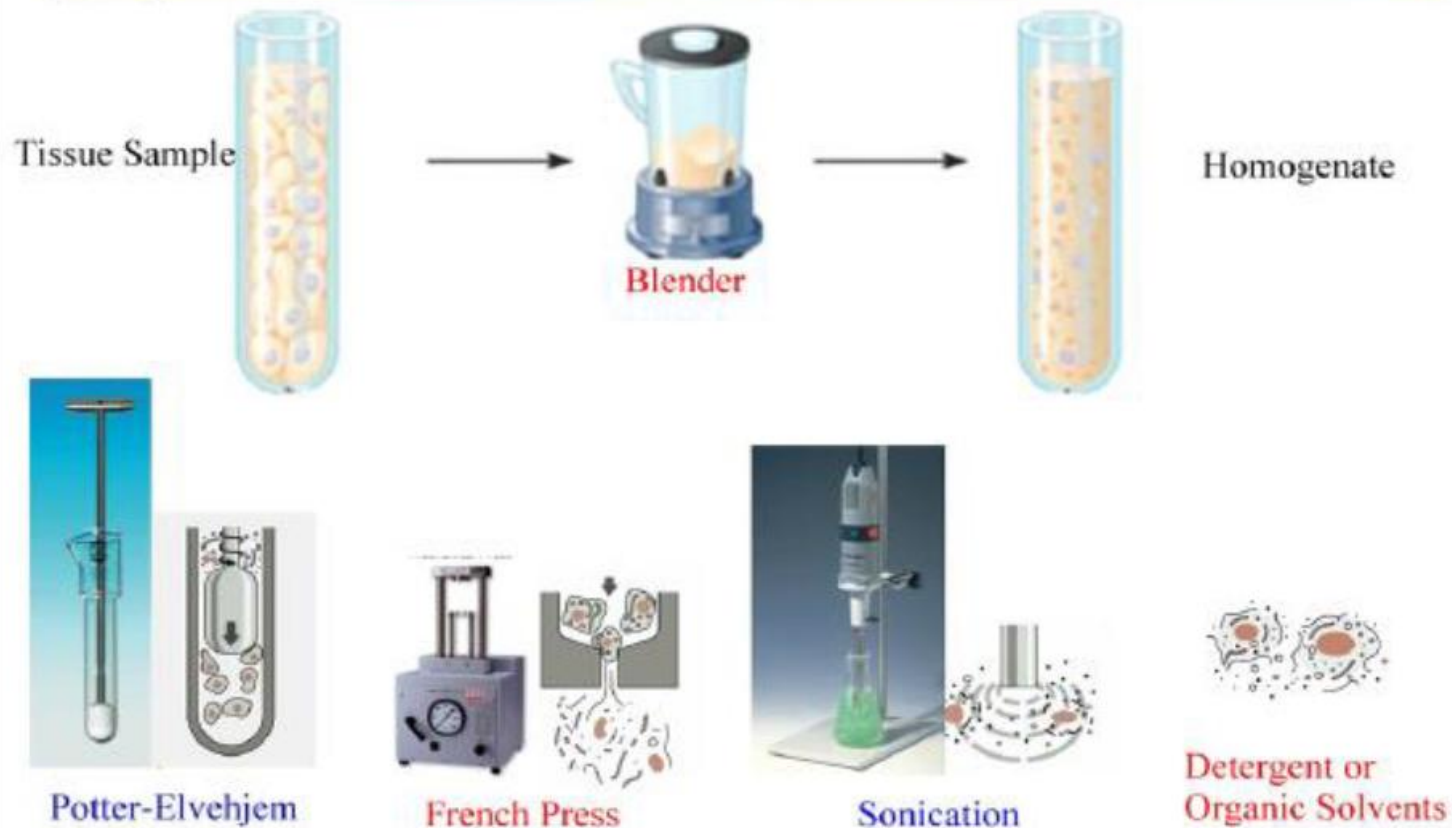
Tissue preparation is needed in several application areas, including research, pharmaceuticals, molecular biology, food science, forensics and toxicology.

# Homogenization

- Means to prepare uniform dilution of a known quantity of tissue suspended within a known quantity of a suitable diluents and uniformly macerate or crush the tissue in such a manner as to disperse minute fragments of tissue evenly throughout the mixture.
- Tissue homogenization is a process used to prepare tissue samples for certain types of studies.
- It involves lysis or breaking cells to release their contents

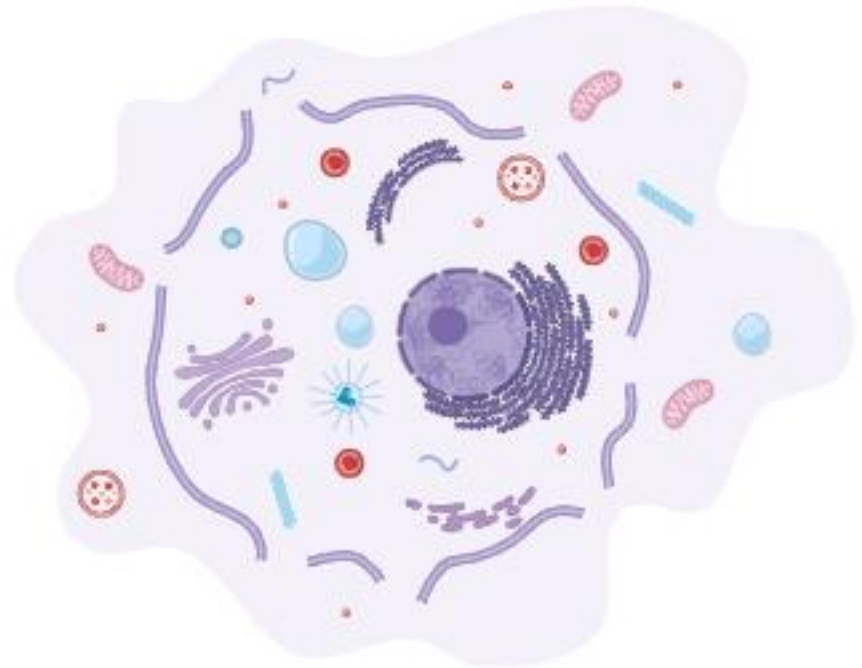


# Homogenization



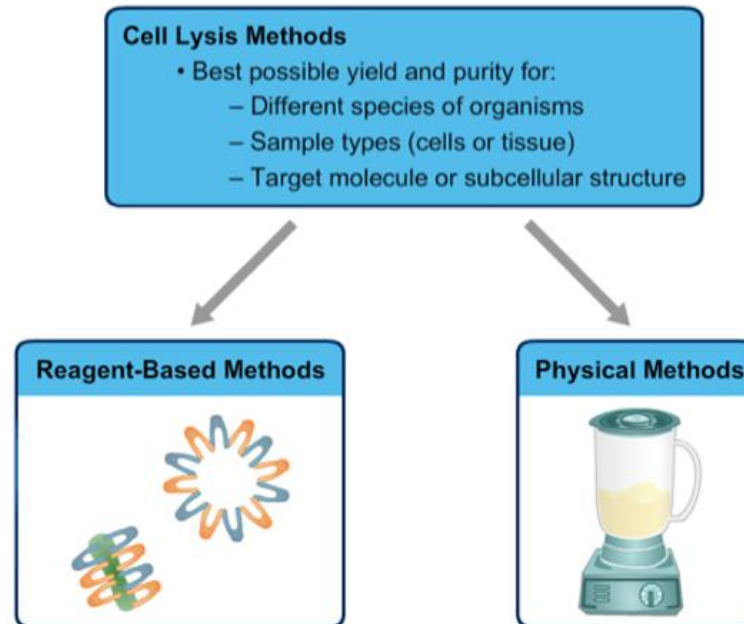
# Cell lysis and disruption:

- Cell lysis is the first step in cell fractionation, organelle isolation and **protein extraction and purification**.
- Many techniques ???



# Cell lysis and disruption methods:

- Mechanical and non-mechanical methods.



Traditional Methods for Cell Lysis - Thermo Fisher Scientific

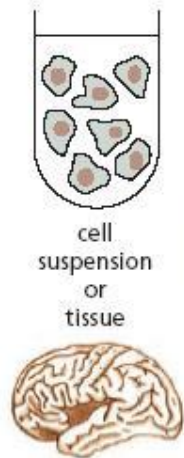
[Traditional Methods for Cell Lysis - Thermo Fisher Scientific](#)

# Cell disruption by different mechanical and non-mechanical methods:

## BREAKING CELLS AND TISSUES

The first step in the purification of most proteins is to disrupt tissues and cells in a controlled fashion.

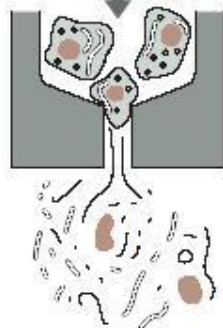
Using gentle mechanical procedures, called **homogenization**, the plasma membranes of cells can be ruptured so that the cell contents are released. Four commonly used procedures are shown here.



- 1 Break cells with high-frequency sound.



- 2 Use a mild detergent to make holes in the plasma membrane.

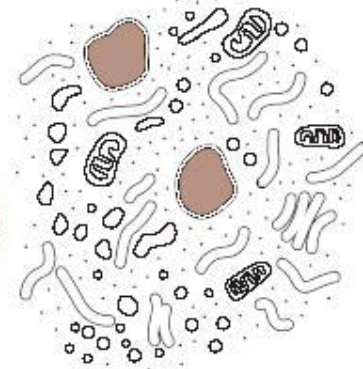


- 3 Force cells through a small hole using high pressure.



- 4 Shear cells between a close-fitting rotating plunger and the thick walls of a glass vessel.

The resulting thick soup (called a **homogenate** or an **extract**) contains large and small molecules from the cytosol, such as enzymes, ribosomes, and metabolites, as well as all of the membrane-enclosed organelles.



When carefully conducted, homogenization leaves most of the membrane-enclosed organelles intact.