

Cell Culture

Basic Equipment's Used in Cell Culture Lab

Cell Culture Laboratory

- A cell culture laboratory is a controlled environment where cells are grown outside the body.
- Proper equipment is required to maintain sterile and suitable growth conditions.

Basic Equipments Used in Cell Culture Lab

A. Laminar Air Flow Cabinet

- It provides a sterile working environment.
- Filtered air flows in one direction to prevent contamination.
- It is used during handling of cells and media.

B. CO₂ Incubator

- It maintains suitable temperature, humidity, and carbon dioxide levels.
- Most animal cells are grown at 37°C with 5% CO₂.

C. Microscope

- It is used to observe cell shape, growth, and contamination.
- Inverted microscopes are commonly used for cell culture work.

D. Autoclave

- It sterilizes equipment and media using steam under pressure.
- It prevents microbial contamination.

E. Centrifuge

- It separates cells and particles based on density.
- It is used during cell isolation and washing.

F. Refrigerator and Deep Freezer

- Refrigerators store media and reagents at low temperatures.
- Deep freezers store biological samples for long periods.

G. Liquid Nitrogen Storage System

- It stores cells at extremely low temperatures.
- It is mainly used for cryopreservation.

H. Water Bath

- It maintains constant temperature for warming media and reagents.

I. pH Meter

- It measures the acidity or alkalinity of media.

J. Pipettes and Micropipettes

- They are used for accurate measurement and transfer of liquids.

K. Culture Vessels

- Flasks, plates, and dishes are used for cell growth.

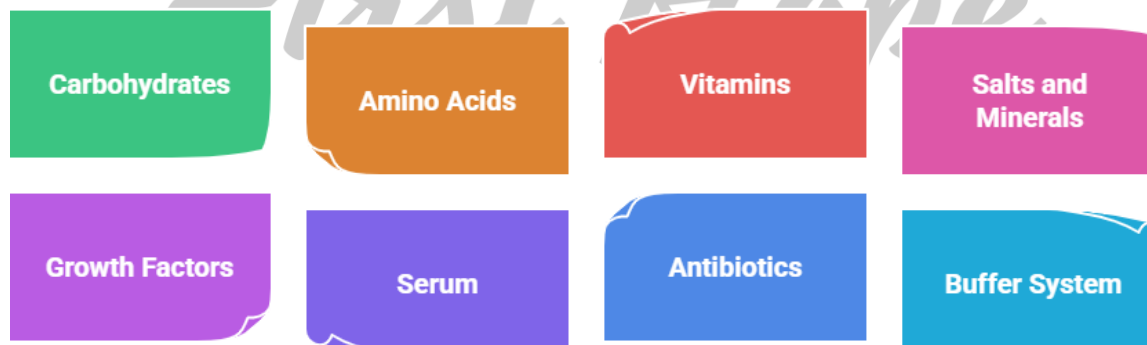
Importance of Proper Equipment

- Proper equipment helps maintain sterile conditions.
- It improves cell growth and experimental accuracy.

Cell Culture Media

- Cell culture media are nutrient solutions used for growth and maintenance of cells outside the body.
- They provide essential nutrients, energy sources, and growth factors.

Components of Cell Culture Media



1. Carbohydrates

- Glucose is the main energy source for cells.

2. Amino Acids

- They are required for protein synthesis.

3. Vitamins

- They support metabolic activities.

4. Salts and Minerals

- They maintain osmotic balance and cell function.

5. Growth Factors

- They stimulate cell growth and division.

6. Serum

- Fetal bovine serum is commonly added.
- It provides hormones and proteins.

7. Antibiotics

- They help prevent bacterial contamination.

8. Buffer System

- Buffers maintain stable pH conditions.

Types of Cell Culture Media

1. Natural Media

- Derived from natural biological fluids.
- Examples include serum and plasma.

2. Artificial or Synthetic Media

- Chemically prepared media with defined components.

Subtypes of Synthetic Media

1. Serum-containing Media

- Contain animal serum for growth support.

2. Serum-free Media

- Do not contain serum.
- Used for controlled experimental conditions.

Examples of Cell Culture Media

1. Dulbecco's Modified Eagle Medium (DMEM)
2. RPMI-1640
3. Minimum Essential Medium (MEM)

Functions of Cell Culture Media

- They provide nutrients for cell growth.
- They maintain pH and osmotic balance.
- They support cell survival and multiplication.

Various Types of Cell Culture

- Cell culture is the process of growing cells outside the organism under controlled laboratory conditions.

Types of Cell Culture

1. Primary Cell Culture

- Cells are directly obtained from tissues or organs.
- These cells closely resemble normal body cells.
- They have limited lifespan.

2. Secondary Cell Culture

- Cells from primary culture are transferred to fresh media.
- This process is called subculturing.

3. Cell Lines

- Cells that can be repeatedly subcultured are called cell lines.

Types of Cell Lines

1. Finite Cell Lines

- These cells divide for a limited number of times.

2. Continuous Cell Lines

- These cells divide indefinitely.
- Many cancer cells belong to this category.

Classification Based on Growth Pattern

1. Adherent Cell Culture

- Cells attach to the surface of culture vessels.
- Most animal cells grow in this manner.

2. Suspension Cell Culture

- Cells grow freely suspended in media.
- Blood cells commonly grow in suspension.

Classification Based on Cell Origin

1. Animal Cell Culture

- Cells are obtained from animals or humans.

2. Plant Cell Culture

- Cells are obtained from plant tissues.

Special Types of Cell Culture

1. Organ Culture

- Small pieces of organs are maintained in culture.

2. Tissue Culture

- Tissue fragments are grown under controlled conditions.

3. Stem Cell Culture

- Stem cells are cultured for research and therapy.

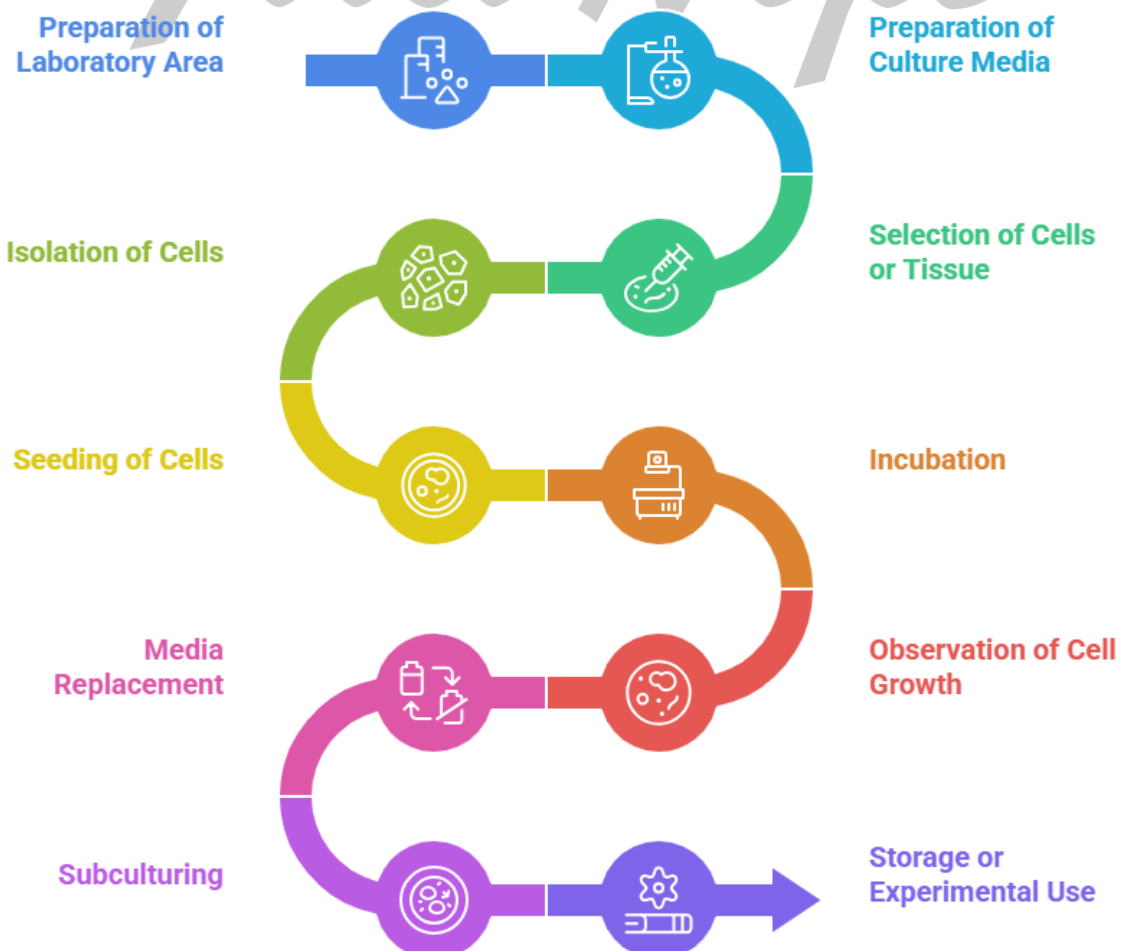
Applications of Cell Culture

- Vaccine production.
- Drug testing.
- Cancer research.
- Genetic engineering studies.

General Procedure for Cell Cultures

- Cell culture procedures involve growing cells under sterile and controlled laboratory conditions.
- Proper techniques are necessary to avoid contamination and maintain healthy cells.

Steps in General Cell Culture Procedure





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