"the modern technology which is used to isolate various components of cell including its organelles is called cell fractionation.

3. **Tissue culture**: (invitro growth).

   Definition:

   "it is a method in which a tissue fragment of an organism is treated in a medium (enzyme, control environment) to produce a whole organism".

4. **Chromatography:** (chromo=color, graphing= to write).

   Definition:

   " it is a technique which is used for the separation of different components of a mixture."

Types:

a. **Paper chromatography**
b. **Column chromatography**.

5. **Electrophoresis:** (means = being carried/ separate)

   Definition:

   "Electrophoresis is a method of separation of charge molecules applying an electric filed".

6. **Spectrophotometry:**

   Definition:

   "the process in which the change in percentage transmission of light (absorption of light) is measured suspension materials".

7. **Micro dissection:** (dissection means= to cut into small pieces).

   Definition:

   "The process in which microscope is used to the process of dissection cells or its organelles".

Cell organelles structure and function

Cell wall:

Definition:

"it is rigid, hard, permeable and non- living outmost b boundary of plant cell".

Discovery:

- The cell wall was discovered by Robert hook in 1665.
- Cell wall is made up of living protoplasm of cell.

1. They play a role in the movement of materials within the cell e.g chromosomes movement during cell division.
2. They from the spindle fires of the dividing cells.
3. They play an important role in formation of centrioles, cilia and flagella etc.
4. They also provide support to maintain the shape of the cell.

Microfilaments:

Structure:

- They are long thread like filament extending throughout the length of cells (cytoplasm).
- In skeletal muscle cells they lie parallel to each other.
- They are made up of thick proteins called myosin and thin proteins called actin.

Diagram:

Functions:

1. They provide support and strength to the cell.
2. They help in the movement of cell.
3. They have a role in muscle contraction.
4. They help in the formation of pseudopodia in amoeba.

Intermediate filament: (10_{nm} in diameter)

Structure:

- They are intermediate between microfilaments and microtubules.
- It is a maize like network of hollow fibers spreading throughout the cell.
- The fibers are made up of keratin protein found in hair, skin etc.

Function:

1. It also helps to maintain the shape of cell.
2. They provide mechanical support to the cell.
3. They help in the attachment of muscle cells.
4. They help in locomotion process with the association to the microtubules.

3. **Leucoplasts:**

Meaning:

Leukos—colorless plast—plastid.

Definition:

"It is the type of plastid which is colorless and lacks visible pigments."

- They are mostly present in the underground portion of plants. (E.g. roots and stem)

Function of plastid:

- In chloroplast the grana perform light reaction of photosynthesis i.e.—they trop light energy to produce ATP.
- In chloroplast the stoma helps in dark reaction of photosynthesis I.e.—co_2 is fixed (reduce) to sugar.
- Chromoplast is present in flowers attacking insects for pollination.
- Chromoplast is present in the fruits attacking animals and birds for dispersal of seed.
- Leucoplast help in the storage of food (e.g. carbohydrates, oil, protein.).

10. **Nucleus:** (10µm in diameter)

Definition:

"It is controlling center which control center which control all the activity of the cell containing genes and chromosome.

Discovery:

Nucleus was first reported by Robert brown in 1831.

Structure or parts:

The nucleus has been divided into the following parts.

i) **Nuclear membrane:**

Introduction:

"It is the outer most boundary of nucleus which separates the Nuclear membrane is made up of proteins and lipids.

Structure:

- Nuclear membrane is double membrane layer i.e. outer and inner membrane.
- The pores present in the nuclear membrane, allow the mRNA to escape the cytoplasm for protein synthesis.