**Laboratory Equipments**

The requirement of the equipments depends mainly on the type of research conducted. However, there are few basic essential requirement for culturing cells of different types where the need to maintain the sterilized environment remains the same in each experiment. Here, we have discussed basic equipments and supplies that are common to most cell culture laboratories and allow the work to be performed more efficiently or accurately.

Among the basic equipments, laminar-flow hood or biosafety cabinet, incubator, water bath, centrifuge, refrigerator and freezer (–20°C), pH meter, sterilizer (i.e., autoclave), liquid nitrogen (N2) freezer or cryostorage container; and among the various supplies, cell culture vessels (e.g., flasks, petri dishes, roller bottles, multi-well plates), pipettes, syringes and needles, waste containers, media, reagents and cells are considered to be the most essential.

**Aseptic Work Area**: The major requirement of a cell culture laboratory is the need to maintain an aseptic work area that is restricted to cell culture work. Although a separate tissue culture room is preferred, a designated cell culture area within a larger laboratory can still be used for sterile handling, incubation, and storage of cell cultures, reagents, and media. The simplest and most economical way to provide aseptic conditions is to use a cell culture hood (i.e., biosafety cabinet). The cell culture hood provides an aseptic work area while allowing the containment of infectious splashes or aerosols generated by many microbiological procedures. Three kinds of cell culture hoods, designated as Class I, II and III, have been developed to meet varying research and clinical needs. Classes of Cell Culture Hoods Class I cell culture hoods offer significant levels of protection to laboratory personnel and to the environment when used with good microbiological techniques, but they do not provide cultures protection from contamination. Class II cell culture hoods are designed for work involving BSL-1, 2, and 3 materials, and they also provide an aseptic environment necessary for cell culture experiments. A Class II biosafety cabinet should be used for handling potentially hazardous materials (e.g., primate-derived cultures, virally infected cultures, and radioisotopes, carcinogenic or toxic reagents). Class III biosafety cabinets are gas-tight, and they provide the highest attainable level of protection to personnel and the environment. A Class III biosafety cabinet is required for work involving known human pathogens and other BSL-4 materials.

**Incubator**: The purpose of the incubator is to provide the appropriate environment for cell growth. The incubator should be large enough for your laboratory needs, have forced air circulation, and should have temperature control to within ±0.2°C. Stainless steel incubators allow easy cleaning and provide corrosion protection, especially if humid air is required for incubation. Although the requirement for aseptic conditions in a cell culture incubator is not as stringent as that in a cell culture hood, frequent cleaning of the incubator is essential to avoid contamination of cell cultures. There are two basic types of incubators, dry incubators and humid CO2 incubators. Dry incubators are more economical, but require the cell cultures to be incubated in sealed flasks to prevent evaporation. Humid CO2 incubators on the other hand are more expensive, but allow superior control of culture conditions. They can be used to incubate cells cultured in petri dishes or multi-well plates

**Storage**: A cell culture laboratory should have storage areas for liquids such as media and reagents, for chemicals such as drugs and antibiotics, for consumables such as disposable pipettes, culture vessels, and gloves, for glassware such as media bottles and glass pipettes, for specialized equipment, and for tissues and cells. Glassware, plastics, and specialized equipment can be stored at ambient temperature on shelves and in drawers; however, it is important to store all media, reagents, and chemicals according to the instructions on the label.

* **Refrigerators:** A domestic refrigerator (preferably one without autodefrost freezer) is an adequate and inexpensive piece of equipment for storing reagents and media at 2–8°C. For larger laboratories, a cold room restricted to cell culture is more appropriate.
* **Freezers**: Most cell culture reagents can be stored at –5°C to –20°C; therefore an ultradeep freezer (i.e., a –80°C freezer) is optional for storing most reagents. A domestic freezer is a cheaper alternative to a laboratory freezer. While most reagents can withstand temperature oscillations in an autodefrost (i.e., self-thawing) freezer, some reagents such as antibiotics and enzymes should be stored in a freezer that does not autodefrost.
* Further, **liquid-nitrogen storage systems** are of two main types, vapor phase and liquid phase, which come as wide-necked or narrow-necked storage containers. Vapor phase systems minimize the risk of explosion with cryostorage tubes, and are required for storing biohazardous materials, while the liquid phase systems usually have longer static holding times, and are therefore more economical. Narrow-necked containers have a slower nitrogen evaporation rate and are more economical, but wide-necked containers allow easier access and have a larger storage capacity.

**Cell Counter**: A cell counter is essential for quantitative growth kinetics and a great advantage when more than two or three cell lines are cultured in the laboratory.