**Aseptic Conditions and Sterilization**

In order to execute cell culture practices successfully, it is mandatory to keep the cells free from contamination by microorganisms such as bacteria, fungi, and viruses. Biological contamination is encouraged by non-sterile supplies, media, and reagents, airborne particles laden with microorganisms, unclean incubators, and dirty work surfaces. A set of procedures that are designed to reduce the probability of contamination by creating a barrier between the microrganisms in the environment and the sterile cell culture are referred to as Aseptic technique. Sterile work area, good personal hygiene, sterile reagents and media, and sterile handling are considered to be the most essential before and after carrying out the experimental procedures.

**Sterile Work Area**: It is the most simplest and economical way to reduce contamination from airborne particles and aerosols (e.g., dust, spores, shed skin, sneezing).

* It should be properly set up and be located in an area that is restricted to cell culture that is free from drafts from doors, windows, and other equipments.
* The work surface should be uncluttered and contain only items required for a particular procedure
* The work surface should be disinfected thoroughly, and the surrounding areas and equipment should be cleaned routinely before and after carrying out the experiment
* The work surface should be cleaned with 70% ethanol before and during work.
* Ultraviolet light is used to sterilize the air and exposed work surfaces.

**Personal Hygiene**: Wash your hands before and after working with cell cultures. In addition to protecting you from hazardous materials, wearing personal protective equipment also reduces the probability of contamination from shed skin as well as dirt and dust from your clothes.

**Sterile Reagents and Media**: Commercial reagents and media undergo strict quality control to ensure their sterility, but they can become contaminated while handling. Any reagents, media, or solutions prepared in the laboratory should be sterilized by using the appropriate procedure (e.g., autoclave, sterile filter).

**Sterile Handling**: Handling error is very common while performing the experiments especially when there is lack of practice. So, few points must be taken care of while working in the laboratory and are depicted as under:

1. Hands and work area should be thoroughly decontaminated using 70% ethanol.
2. Containers, flasks, plates, and dishes should be clean from the outside with 70% ethanol before placing them in the cell culture hood.
3. Sterile glass or disposable plastic pipettes should be used and if possible, must be used only once to avoid cross contamination. Unwrapping of sterile pipettes should be done just before the start of the experiment and the pipettes should be kept in the work area.
4. The bottles and flasks must be sealed properly to prevent microorganisms and airborn contaminants from gaining entry.
5. The sterile flask, bottle, petri dish, etc. must not be left uncovered to the environment and instantly used when open.
6. If you remove a cap or cover, and have to put it down on the work surface, place the cap with opening facing down.
7. Experiments must be performed as rapidly as possible to minimize contamination.

Reference: A handbook on Cell Culture Basics by Life Technologies