IBC Guidance for Safe Handling of Cell Lines (01/09/2020)

Cell lines (including cell culture) are commonly used in biological and biomedical research laboratories. Although cell lines do not inherently pose a risk to lab workers, certain safe handling precautions must be taken because of their potential to harbor pathogenic organisms. In general, cell lines can be contaminated with bacteria, fungi, mycoplasma, viruses and prions. Human cell lines may pose the greatest risk. In 1991, the Occupational Safety and Health Administration (OSHA) issued the Bloodborne Pathogens (BBP) Standard to protect employees who have occupational exposure to human blood or other potentially infectious materials. At that time, there was no stated policy on the safe handling of human cell lines.

In 1994, OSHA issued an interpretation of the applicability of the BBP Standard towards human cell lines. According to the interpretation, human cell lines are considered to be potentially infectious and within the scope of the BBP Standard unless the specific cell line has been characterized to be free of hepatitis viruses, HIV, Epstein-Barr virus, papilloma viruses and other recognized bloodborne pathogens. Also, the CDC publication, Biosafety in Microbiological and Biomedical Laboratories (BMBL), recommends that human and other primate cells should be handled using Biosafety Level 2 (BSL2) practices and containment.

Given these advisories, the IBC requires that all cell and organ cultures of human origin, including well-established cell lines, shall be handled in accordance with the OSHA Bloodborne Pathogens Standard and under Biosafety Level 2 (BSL2) containment. The IBC further requires that investigators follow safe handling practices for cell lines described in Appendix H of BMBL. In addition, the IBC **recommends** that mammalian cell cultures of non-human origin be handled under the same BSL-2 containment practices and **requires** disposal as follows.

The IBC requires the following specific disposal protocols for all mammalian cell culture regardless of origin and viral transformation:

(1) All waste solutions (e.g. spent media) and unused cells should initially be decontaminated with “premium bleach” at 10% final concentration*. Spent media and unused cells should be in contact with the 10% bleach solution for at least one hour. This liquid must then be autoclaved. Contaminated plastics should be treated with bleach immediately after use and then autoclaved. Disposable plastics (e.g. plates, tubes, etc.) and other solids should be placed in doubled orange biohazard bags and autoclaved. Work surfaces (especially within a biological safety cabinet) should be decontaminated with a disinfectant (e.g. bleach or Envirocide) before and after working with cell lines.

(2) In some cases, it may not be possible to autoclave bleached liquids or solids, for example in cases where the cellular waste is contaminated with a radioisotope or a toxin. For cellular waste contaminated with radioisotope, the IBC requires sterilization by two consecutive chemical methods that must be described in the rDNA/infectious waste application. If radiolabeled materials are present, materials must be delivered to radiation safety for disposal.

* Premium bleach is defined as having a hypochlorite concentration of at least 5.25% hypochlorite. Some house brands might only be 3% and some brands do not list the percentage.