

Application of the Exposure Control Plan to Human Cell Cultures

The provisions of the MSU Exposure Control Plan provide protection to employees who have occupational exposure to human blood or other potentially infectious materials (OPIM). Established human cell lines¹ which are characterized² as free of contamination from human hepatitis viruses, human immunodeficiency viruses, and other recognized bloodborne pathogens, are not to be considered as OPIM and are not covered by the bloodborne pathogens standard and the Exposure Control Plan.

Established human or animal cell lines that are potentially infected or contaminated with bloodborne pathogens, are covered by the provisions of the Exposure Control Plan.

The final judgment for making the determination if human or animal cell lines in culture are free of bloodborne pathogens will be made by the Biological Safety Officer at MSU and/or the Institutional Biosafety Committee (IBC) in consultation with the Principal Investigator (PI), in accordance with the requirements of the bloodborne pathogen standard. Documentation that such cell lines are not OPIM should be on file with the PI for MIOSHA review.

All primary human cell explants and *in vitro* passages of human tissue explant cultures (human cell strains³) must be regarded as containing bloodborne pathogens and are subject to Universal Precautions and the requirements of the ECP. Non-transformed, human cell strains characterized by documented, reasonable laboratory testing, to be free of HIV, hepatitis viruses, or other bloodborne pathogens may be exempted from the ECP requirements. However, tissue explants or subsequent cultures derived from human subjects known to carry bloodborne pathogens (e.g., HIV, HBV), or deliberately infected with bloodborne pathogens, must be handled in accordance with the bloodborne pathogens standard and the MSU ECP. The same applies for animal tissues and explants or cell lines contaminated by deliberate infection with bloodborne pathogens.

Definitions

¹ Human cell lines are defined as *in vitro* or animal passage (e.g., nude mouse) cultures or human cells that fulfill traditional requirements of a cell line designation. That is:

- immortalized cells;
- cultures transformed by spontaneous mutation;
- cultures transformed by natural or laboratory infection with an immortalizing agent (e.g., Epstein-Barr Virus (EBV)).

Human cell lines may be adulterated with laboratory pathogens introduced by cultivation with other cell cultures, or cells may be physically contaminated by other cultures handled in the same lab. Cells should be documented to be pure cells and shown to be free of bloodborne pathogens in order to be exempted from the ECP requirements.

² Characterization of human cells, for exclusion from compliance with the bloodborne

pathogen standard, must include (1) screening of the cell lines or strains for viruses characterized as bloodborne pathogens (e.g., HIV, HBV, EBV), and (2) determining that the cells are not capable of propagating such viruses. Most cell lines are screened only for human mycoplasmas and are determined to be free of bacterial and mycotic contaminants. Testing to identify latent viruses capable of infecting humans such as Herpesviruses (e.g., EBV), or papilloma members of the Papovirus group, etc. may include:

- antigenic screening for viral or agent markers;
- co-cultivation with various indicator cells that allow contaminants to grow;
- using molecular techniques (polymerase chain reaction or nucleic acid hybridization).

Cell lines obtained from commercial vendors or other sources documented as free of human bloodborne pathogens and protected by the employer from environmental contamination may be excluded from the bloodborne pathogens standard.

3 Human cell strains are cells propagated *in vitro* from primary explants of human tissue or body fluids which have finite lifetime (non-transformed) in tissue cultures for 20-70 passages. Human cell strains must be handled as potential biohazards unless characterized by documented testing to be free of bloodborne pathogens.