STANDARD OPERATING PROCEDURES (SOP) RABIES PROTECTION PROGRAM

SCOPE

Rabies is a virus causing an acute central nervous system infection, which is typically transmitted by introducing the rabies virus into open cuts or wounds, or via percutaneous exposure (i.e. scratches, punctures or bites). An effective rabies virus vaccination is available and is offered free of charge to employees who are determined to have exposure to rabies virus through employment with the University of Pittsburgh. This SOP was designed to establish a system of information and safeguards that should be followed at the University of Pittsburgh when using rabies virus or certain animals in the research environment.

PROCEDURE

AGENT

Rabies virus (prototype of the genus Lyssavirus, family Rhabdoviridea)

1. EMPLOYEES AT RISK

1.1. Naturally or experimentally infected laboratory animals are a potential source of infection to exposed unvaccinated laboratory personnel. Such personnel are also at risk of acquiring rabies infection when working with rabies virus, having direct contact with quarantined animals potentially infected with rabies, having exposure to potentially infected animal tissues and having responsibility for capturing or destroying wild animals. To further delineate employees at risk, categories of exposure and risk have been developed.

1.1.1. Continuous Risk Category- Potential exposure due to the manipulation of rabies virus in the research environment, or manipulation of bats, a wild animal species known to harbor rabies virus. This category includes all individuals involved in experiments using rabies virus, all animal care staff handling animals that have been infected with the rabies virus, and all research or animal care staff handling bats.

1.1.2. Frequent Risk Category- Potential exposure due to the manipulation of wild animal species known to harbor rabies virus, including but not limited to wild canines, wild felids, ferrets, and wild terrestrial carnivores. This category includes veterinarians and animal care staff and other staff who handle wild or pre-quarantined animals whose species is known to harbor rabies virus.

1.1.3. Infrequent Exposure- Exposure to rabies virus is typically episodic with a recognized source but exposure may be unrecognized although very rare. This category includes veterinarians and animal care staff who handle purpose-bred or post-quarantine wild animals that have not been infected with the rabies virus but their species is known to harbor rabies virus, including wild canines, wild felids, ferrets, and wild terrestrial carnivores.

1.1.4. Rare Exposure- Exposure is always episodic from a recognized source. This category would include employees exposed to research animals with negligible rabies rates. It should be noted that small rodents and rabbits have not been known to transmit rabies to humans.

2. LABORATORY HAZARDS

2.1. Virus-ladened saliva introduced via a bite, scratch or very rarely into a fresh break in the skin or mucous membrane or body fluids from an animal in the research environment is the typical route of transmission, although very rare instances of transmission have been reported via inhalation or ingestion of very high concentrations of virus. In addition, research and animal care staff may be exposed via use of sharps with viral cultures or infected animals.

2.2. Biosafety Level 2 (BSL-2) practices, containment equipment and facilities are required for all activities involving the use or manipulation of rabies virus or rabies infected animals (ABSL-2).

3. PRE-EXPOSURE PROPHYLAXIS

3.1. Continuous Risk Category

3.1.1. These individuals are required to undergo a primary course of vaccination with serologic levels of rabies antibodies monitored every six months. Vaccination shall be the human diploid cell vaccine (1.0 ml HDCV) or purified chick embryo cell vaccine (1.0 mL PCECV) given intramuscularly in the deltoid. Vaccine is given on days 0, 7 and 21.

3.1.2. Four weeks after vaccine dose 3 at day 21, persons will undergo serological testing by having a serum sample tested for rabies antibody using rapid fluorescent focus inhibition tests (RFFIT). Thereafter, persons in the continuous risk category will undergo serological testing every six months. Booster doses of vaccine are administered to maintain a serum titer corresponding to at least complete neutralization at a 1:5 serum dilution.

3.2. Frequent Risk Category

3.2.1. These individuals are required to undergo a primary course of vaccination with serologic levels of rabies antibodies monitored every two years.

3.2.2. Four weeks after vaccine dose 3 at day 21, persons will undergo serological testing by having a serum sample tested for rabies antibody using rapid fluorescent focus inhibition tests (RFFIT). And thereafter, persons in the continuous risk category will undergo serological testing every two years. Booster doses of vaccine are administered to maintain a serum titer corresponding to at least complete neutralization at a 1:5 serum dilution.

3.3. Infrequent Risk Category

3.3.1. Animal users as defined in the infrequent risk category are offered rabies vaccination as the primary course is listed above.

3.3.2. It is recommended that infrequent risk category persons who elect to be vaccinated have a serum sample tested for rabies antibody according to the frequencies and administrations outlined above.

3.4. Rare Risk Category

3.4.1. The primary course of rabies vaccination is available but not recommended for these individuals. If the vaccination is requested and administered, no ongoing serological testing is required.

4. POST EXPOSURE PROPHYLAXIS

4.1. An exposed individual should immediately cleanse the wound with soap and water and a virucidal agent, such as a povidone-iodine solution. If the exposed site is the mucous membranes, an irrigation of the site with potable water for 15 minutes is conducted.

4.2. The individual should report the exposure to their supervisor and to the appropriate occupational health clinic.

4.2.1. The occupational health clinic for the Oakland campus of the University of Pittsburgh is Employee Health Services (*My*Health@Work), 3708 Fifth Ave, Medical Arts Building, Fifth floor, Suite 500.59, 412-647-4949. Monday through Friday 7 AM – 3:30 PM. Rabies exposures occurring outside these times should proceed to the UPMC Presbyterian Emergency Department for clinical evaluation and treatment.

4.2.2. Rabies exposures occurring on the job but outside the Oakland Campus should be treated emergently at the nearest hospital emergency room.

4.2.2.1. After wound cleansing, a previously vaccinated individual should be injected intramuscularly with 1.0 mL of HDCV or 1.0 mL of PCECV. An additional 1.0 ml intramuscular injection of HDCVor PCECV should be given day 3 post exposure.

4.2.2.2. After wound cleansing, an unvaccinated individual should receive a dose of human rabies immunoglobulin HRIG (20 IU per kilogram body weight). If anatomically feasible, the full dose should be infiltrated around the wound. Any remaining volume should be administered intramuscularly at an anatomical site distant from the site of subsequent vaccine administration. In addition, intramuscular injections in the deltoid area of 1.0 ml HDCV or PCECV are to be administered at the time of exposure and post exposure on days 3, 7, and 14.

5. IMPLEMENTATION

5.1. Completion of a vaccination series for rabies virus and documentation of current and adequate immunity to rabies virus is required for all individuals entering spaces or rooms in which rabies infected animals are present and for all individuals whose job duties include anticipated contact with wild animals known to carry rabies virus.

5.2. All principal investigators using rabies virus must enroll all personnel manipulating rabies virus in this Rabies Protection Program. Those individuals with potential exposure to animals which are rabies infected or which belong to species known to carry rabies virus are offered rabies protection upon enrollment in the University of Pittsburgh Animal Exposure Surveillance Program.

5.3. Individuals refusing or having a medical contraindication to both rabies vaccinations as determined by Employee Health Services will be prohibited from directly handling rabies virus cultures or infected animals at the University of Pittsburgh. The determination of all prohibited tasks will be made by the employee's supervisor in consultation with the Department of Environmental Health and Safety.

5.3.1. Staff members refusing or having a medical contraindication to both rabies vaccines shall be referred to their supervisor. The supervisor, in consultation with the Office of Human Resources (and if necessary EH&S and Employee Health Services), will examine the feasibility of other duties for the employee that do not involve handling of rabies virus or infected animals.

5.3.2. Faculty members refusing or having a medical contraindication to both rabies vaccines shall be referred to the respective department chair or dean. The supervisor, in consultation with the Office of Human Resources and the Office of the Provost (and as necessary EH&S and Employee Health Services), shall determine other duties for the faculty member that do not involve handling rabies virus or infected animals.

5.4. All laboratories utilizing rabies virus and all ABSL-2 animal housing areas utilizing rabies virus are inspected by the Department of Environmental Health and Safety to verify appropriate containment and practices. Additional primary containment, personnel precautions and personal protective equipment, such as those described for biosafety level 3, may be indicated for activities with a high potential for droplet and aerosol production and for activities involving production quantities or concentrations of rabies virus.

6. REFERENCES

1. Centers for Disease Control and Prevention. Use of a reduced (4-dose) vaccine schedule for postexposure prophylaxis to prevent human rabies: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 2010; 59(RR-2): 1-9.

2. Centers for Disease Control and Prevention. Human rabies prevention—United States, 2008: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morb Mortal Wkly Rep. 2008; 57 (RR-3): 1-26, 28.

3. Biosafety in Microbiological and Biomedical Laboratories. 5th edition. Washington D.C. Centers for Disease Control and Prevention and National Institutes of Health (US); 2009, December.

4. NIH guidelines for research involving recombinant DNA molecules. Bethesda: The National Institutes of Health (US), Office of Biotechnology Activities; 2009, September.