Exposure Response Plan for the Laboratory Handling of Leishmania

**Background Information**

*Leishmania* is an obligate parasite. In the wild, it is a vector-borne disease transmitted by sandflies. The sandfly bites transfer the promastigote form (the infective stage) to humans, rodents and dogs. *Leishmania* quickly complete their life cycle in these vertebrate hosts. Promastigotes are phagocytized by macrophages and transform into amastigotes. Amastigotes multiply by binary fission. When the macrophage ruptures, the infection spreads to other macrophages. Multiple *Leishmania* species infect humans with various clinical presentations. Cutaneous disease occurs in the US states of Texas and Oklahoma. Visceral disease is not endemic in the US. Kala azar (black disease) refers to the characteristic darkening of the skin and may be fatal. Host immune response is a factor in disease presentation and progression.

**Exposure Incident:** Laboratory acquired infections (LAIs) are correlated with accidental percutaneous inoculation of promastigote forms. Mucous membrane exposures and skin contact may also result in exposure. LAIs may be asymptomatic. Infrequent LAIs have been reported.

**Reporting Exposure Incidents:** Report all exposures to the Principal Investigator/lab supervisor and seek immediate medical evaluation. If help is needed with injuries or clean up, members of the University will contact the Police at 6-6911 and members of the Medical Center will contact Security at 6-5151. Whenever there is an accident involving *Leishmania*, the Biosafety Officer must be notified.

**Pre-exposure Health Screening:**

All employees will receive training on the risks of working with *Leishmania* and symptoms of exposure by the PI or Occupational Health Professional prior to beginning work with or around this agent.

**Before an Exposure Incident Occurs:**

Immunization for *Leishmania* is currently not available.

Recovery from cutaneous leishmaniasis does not confer immunity against the visceral form. People with cutaneous disease tend not to develop a significant antibody response. Approximately 21 strains can infect humans.

**After an Exposure Incident Occurs: Immediate Action by Route of Exposure**
Needlestick, Animal Bite or Laceration: Wash the area with soap and running water. Promastigotes are susceptible to ethyl or propyl alcohol. However, topical application of alcohol will not kill those released into the blood stream or soft tissue.

Mucous membranes (eye, nose, mouth): If contaminated material is splashed or sprayed contaminating the eyes, nose or mouth: Flush the eyes for 10-15 minutes. Rinse mouth out with clean water and do not swallow. Wash the face being sure that the nasal cavities have been rinsed as much as possible.

Inhalation: If contaminated materials are aerosolized outside of primary containment and potentially inhaled, rinse mouth twice expelling the rinsate. Do not swallow.

Contact with intact skin and clothing: Remove contaminated clothing using gloves and place objects in plastic bags. Dispose of as biological or medical waste. Wash contaminated skin with soap and water.

After an exposure incident occurs: medical evaluation and follow-up:

Following immediate post exposure actions, contact the TMC Employee Health Clinic (Boston), TCSVM Occupational Medical Clinic (Grafton) or the Mt. Auburn Occupational Health Services (Medford) and arrange for medical evaluation, diagnosis and treatment if needed.

During this medical evaluation, the exposed individual may be asked to provide a blood sample, may be educated on the signs or symptoms of Leishmaniasis, and instructed to watch for the development of these signs and symptoms. As long as parasites persist in the circulating blood or skin lesions, the disease can be passed to others. Although person to person transmission is rare, congenital transmission from mother to child can occur.

Signs and Symptoms of Leishmaniasis include:

Cutaneous disease is characterized by one or more sores on the skin of either macule or papule form. The sores often result in slow-healing ulcers with a raised edge.

The visceral form results in systemic signs such as fever and enlarged spleen or liver.

Mucosal form results in a stuffy nose, nosebleeds or difficulty breathing.

Diagnostic testing can be difficult. Parasitological or serological testing of blood fluids or tissues may be done.

Post-exposure prophylaxis:

There is currently no post exposure pre-symptom prophylaxis for Leishmaniasis.
If any individual working with or around *Leishmania* develops signs or symptoms suggestive of exposure to *Leishmania*, they must inform their PI and Biosafety Officer immediately. Signs and symptoms of cutaneous disease usually develop within a week to months of exposure. Signs and symptoms of visceral disease usually develop within 2-4 months of exposure; the range is 10 days – 2 years. The individual must be evaluated at TMC Employee Health (Boston), must notify the TCSVM Occupational Health Nurse who will refer the individual to an Infectious Disease specialist (Grafton), or a physician at Mt. Auburn Hospital Occupational Health Group (Medford).

Massachusetts Department of Public Health classifies Leishmaniasis as a reportable disease (any case of an unusual illness) and must be reported to the Local Board of Health immediately by the attending physician. In accordance with Massachusetts regulation, any clinical laboratory identifying an infection caused by a *Leishmania* species may be reported to the Massachusetts Department of Public Health in accordance with disease-reporting regulations.

If an employee develops signs and symptoms associated with *Leishmania* exposure in the absence of an exposure incident and appropriate travel history, the PI and Biosafety Officer shall be notified immediately. The infection will be considered laboratory-acquired until proven otherwise.