

PRION FACT SHEET

Basic biology

- Although once called “slow viruses”, prions are actually infectious proteins which contain no genetic information (DNA or RNA)
- Prions are transmitted by ingestion of large amounts of contaminated tissue or direct inoculation into the central nervous system
- Prion diseases are very species-specific. Animal prions are unlikely to cause disease in humans and vice versa.

Precautions

- Standard BSL2 precautions are sufficient when working with non-human prion proteins or samples.
- In the event of a parenteral exposure, gently encourage bleeding and wash the area thoroughly for 5 minutes; notify employee health services.

Decontamination/Disposal

- Liquid waste can be decontaminated with 2N NaOH (final concentration), 96% formic acid (final concentration), or 2% sodium hypochlorite (20% bleach, final concentration) for one hour.
- Spills should be cleaned using the same solution used to decontaminate liquid waste. All materials used to clean up the spill must be treated as prion-contaminated waste.
- Solid waste can be incinerated or autoclaved at 132°C for 4.5 hours.
- A dedicated microtome should be used for prion work and can be decontaminated with 2N NaOH (>5 minutes of contact time) followed by repeated rinsing with distilled water.

PRION ROOM BIOSAFETY (BSL2) PROCEDURES

1. All work with prion-infected samples is conducted in a designated "prion room", access for which is restricted to authorized personnel. This room is kept locked when not in use. Work in this room conforms to BSL-2.
2. Prion-containing samples are stored in the prion room, or in a locked freezer.
3. Personnel wear disposable lab coats, which are kept in the prion room, or are discarded after working with highly infectious samples.
4. Personnel wear a double pair of gloves when working with highly infectious samples, and a single pair at all other times.
5. Personnel wear safety glasses at all times.
6. When they are done working in the room, personnel remove their lab coat, discard gloves, and then leave the room and wash their hands in the main laboratory.
7. All personnel working in the prion room are given detailed training in standard biosafety procedures.
8. All work with highly infected samples (animals, cells, and scrapie stocks) is carried out in a class II biological safety cabinet.
9. All biochemical manipulations are performed in the prion room, up to and including running of SDS-PAGE gels and development of Western blots. (Volumes of contaminated samples are typically less than 100 ml.)
10. The following procedures are followed to minimize spread of aerosol contamination:
(a) Centrifugation is carried out in closed tubes in a microcentrifuge with a lid using a rotor with a screw-on top. (b) Homogenization is carried out in the biological safety cabinet. (c) Sonication is carried out in a bath sonicator in a closed tube, or with a probe sonicator that is encased in a closed housing. (d) Personnel wear surgical masks when carrying out any of the previous procedures.
11. Waste (solid or liquid) is decontaminated by treatment with 2N NaOH or 1% LPH *aq. phenolic soln.* for 1 hr. at RT, following by collection in designated containers. Waste bags are sealed in a box, and collected regularly by EH&S for incineration.
12. After each use, contaminated surfaces and equipment are decontaminated with 1% LPH.

13. The procedures listed here are routinely followed by other laboratories in the U.S. that work with scrapie prions. There is a strong barrier to inter-species transmission of prions, particularly from rodents to humans, and prions are not casually transmissible through aerosols (the most effective route is intracerebral inoculation). Therefore, working with murine PrP and murine prions is considered by workers in the field to pose a relatively low risk to humans.