Safety Precautions for Working with *Entamoeba histolytica*

*Entamoeba histolytica* causes dysentery in humans and can also cause amoebic liver abscess, which can be fatal if untreated. Most cases of dysentery will subside on their own, but illness can recur if left untreated. *E. histolytica* is prevalent in many parts of the world in areas with poor sanitation and is more common in tropical and subtropical areas, but cases of amoebic dysentery are not observed in the U.S. except in travelers coming from areas where *E. histolytica* is endemic.

The life cycle has two stages: the infectious cyst form and the motile trophozoites form. Transmission occurs through ingestion of food or water contaminated with feces containing *E. histolytica* cysts. The average infectious dose is greater than 1000 cysts, but ingestion of a single cyst is capable of causing disease.

Accidental exposure to *E. histolytica* in the lab is unlikely to cause infection. An in vitro method for inducing encystation has not yet been developed and thus only the trophozoite form is cultured in the laboratory. The trophozoites form is not competent to infect humans if ingested.

Health, fully immunocompetent individuals can develop infection from *E. histolytica*, although individuals unable to mount an effective immune response are potentially at greater risk. Therefore, the following precautions should always be taken for working with *E. histolytica* cultures:

- Live *E. histolytica* should always be treated with respect. Our lab does not use needles, forceps, Pasteur pipettes, or other sharp implements when working with *E. histolytica*. Hemocytometer cover slips can have sharp edges, but our use of these is limited as we use an automated cell counting system that has special slides that do not require sharp coverslips. In the event that needles would be required for an experiment with live cells, we would minimize their use and utilize special blunt needles that are less likely to result in needle sticks.
- Standard BSL-2 precautions are taken at all times. Cultures and cells are manipulated in a biological safety cabinet and personal protective gear (lab coat, gloves, eye protection) is worn when working with cultures.
- All infected material must be decontaminated (in bleach or by autoclaving) immediately after use. Please pay particular attention to sharps and hemocytometer cover glasses.

Any possible infection, no matter how small or unlikely, must be reported immediately and should be treated as outlined below.
In Case of Possible Laboratory Infection with *E. histolytica*

**What to do:**
- First of all, don’t panic.
- Try to clarify the nature of your exposure:
  - Needle-stick, broken pipette, glass cut, eye-splash, other?
  - Known/likely/unlikely to be contaminated with *E. histolytica*?
  - What strain: *E. histolytica* strains are infectious. Other *Entamoeba* strains are not pathogenic to humans.
  - Any transgenic plasmids, markers, reporters?
  - Drug-resistance status?
- Contact Cheryl Ingram-Smith immediately at 864-247-8173 (cell) any time, day or night.
- Print out a copy of this protocol to bring with you to Clemson Student Health, Occupational Health, the Emergency Room, or elsewhere, as appropriate.
- Students and staff should contact Will Mayo (office: 864-656-5529) at Clemson Medical Surveillance Program.
- If questions or complications arise, you or your physician may contact the Centers for Disease Control Division of Parasitic Diseases and Malaria (phone, 404-718-4745; email, parasites@cdc.gov)

**Treatment:**
- General post-accident management
  - Monitor for symptoms, which may include bloody diarrhea, nausea or vomiting, stomach pain, fever and chills, abdominal tenderness and cramps, and rectal bleeding.
  - Diagnosis: confirm infection through microscopic detection of trophozoites and cysts in fecal samples, detection of *E. histolytica* antigen or specific antibodies through ELISA or EIA (test kits are commercially available), and/or in vitro cultivation of *E. histolytica* from clinical samples.
- Therapeutics
  - Oral administration of paromomycin, diloxanide furoate, or iodoquinol is used for treatment of asymptomatic infections
  - Oral administration of metronidazole or tinidazole should be used for symptomatic intestinal disease or extraintestinal infection followed by oral treatment with paromomycin or iodoquinol to prevent re-emergence of the infection from intestinal cysts.