Staphylococcus aureus

Risk Group: *2*

Health Hazards

Staphylococcus aureus is a Gram positive bacterium and is a member of the Firmicutes phylum. It is commonly found in normal, healthy microbial communities of the human mucosal surfaces. However, *S. aureus* can be an opportunistic pathogen and is a common cause of food poisoning.

Symptoms of infection include nausea, vomiting, diarrhea, abdominal cramps and abdominal pain. A range of other symptoms are possible depending on the mode of transmission including skin pathologies such as rash, impetigo, blisters and abscesses following cutaneous injury. Certain strains of *S. aureus* can cause toxic shock syndrome (TSS) which is characterized by sudden high fever, vomiting, diarrhea, hypotension and vascular collapse.

Antibiotic resistant strains of *S. aureus* are becoming more common and are carried on approximately 20% of individuals in the general population.

Staphylococcal enterotoxins are classified as Select Agents by US Health and Human Services and US Department of Agriculture. They are only allowed in UConn labs in exempt amounts (less than 5mg total).

Modes of Transmission

Common modes of transmission include ingestion, direct person-to-person contact, indirect contact across contaminated surfaces in crowded conditions and nosocomial transmission in patient care settings. Auto-infection may result since *S. aureus* is a commensal bacteria commonly found on mucosal surfaces.

Administrative Controls

- Biosafety level 2 facilities and practices must be in place.
- Access to the laboratory shall be restricted, doors must remain closed during experimentation
- Signs and labels incorporating the biohazard symbol must be posted at the entrance of the laboratory where agent is being used and on any equipment that may be used to

manipulate the agent.

- ALL laboratory personnel must be advised of the hazards of the agent
- ALL laboratory personnel must be trained in the proper handling, use and disposal prior to working with the agent
- Proper personal protective equipment (PPE) must be made available.
- All laboratory personnel must remove lab coats, discard gloves in the proper biological waste container and wash hands before exiting the lab.
- Work that may result in the creation of aerosols (any force imparted on a fluid) of contaminated liquids must be performed in a biological safety cabinet (BSC).

Engineering Controls

- All ***Staphylococcus aureus*** work must be performed in a BSL-2 laboratory and an annually **Certified Class II BSC** is strongly encouraged. If circumstances require an exception, contact the Biosafety Officer.

- **Biohazard Sharps Containers** shall be available to dispose of sharps waste, including broken glass, needles, blades, etc.
- **Centrifugation** must be performed in closed containers and using **sealed rotors or safety cups** to minimize the risk of aerosol generation. Samples must be placed into and/or removed from cups within a BSC.

- **Vacuum:** all vacuum lines must be **fitted with a HEPA filter** and a **vacuum flask**, containing the appropriate disinfectant in a volume sufficient to provide the recommended final concentration for that disinfectant when the flask is near full. At the end of the work session, aspirate a small volume of concentrated disinfectant through the vacuum tubing, into the vacuum flask. The vacuum flask must sit for a minimum time of 30 minutes prior to drain disposal.

- **Vortexing:** must be done in BSC.

- **Pipetting:** Aerosol resistant (filtered) tips must be used when pipetting.

- **Sharps (ONE-TIME USE):** All sharps should be immediately disposed of into a sharps container (located within the BSC).

Personal Protective Equipment

The following PPE must be worn at **ALL** times when handling ***Staphylococcus aureus***

Gloves

Lab coat

Safety goggles / glasses

Disinfection

A regular decontamination schedule of surfaces and equipment must be established considering *S. aureus'* ability to survive on surfaces for months.

- **Disinfectants:** 10% Sodium Hypochlorite (1:10 dilution household bleach, such as Clorox)
- **Contact time:** 30 minutes before cleanup

Disposal

Liquid waste may be treated by autoclaving or with exposure to bleach (final concentration volume 10%) for 30 minutes or longer before disposing into the sink.

Solid biohazardous waste, such as culture vials, plates, plastic tubes, etc., are disposed of into an autoclave bag, autoclaved for 60 minutes at 121°C under 15lbs psi of steam pressure, sealed, and labeled, and placed in a biohazardous box-bag unit for pickup by EH&S.

Sharps waste, such as broken glass, pasteur pipets, razor blades, and needles, are disposed of into an approved biohazard sharps containers, autoclaved for 60 minutes, placed in a box-bag unit for pickup by EH&S.

Practices for Animal Injections

Many animals can act as reservoirs for *S. aureus* and zoonosis is possible through direct or indirect contact. Procedures that may produce aerosols or involves high concentrations or large volumes of *S. aureus* must be conducted in a biosafety cabinet when possible. Work with large animals will require added precautions as determined by the Institutional Animal Care and Use Committee (IACUC).

Spill and Exposure Procedures

See pages 5-7 Laboratory Biosafety Manual

Medical Surveillance

All laboratory personnel must be advised by the PI on the health hazards of the ***Staphylococcus aureus*** prior to starting work within the laboratory. Personnel must be made aware of the signs and symptoms of infection. In the event of an exposure or potential exposure, personnel must seek medical attention. The medical treatment provider may require

continued self-monitoring of symptoms or further testing, such as serology.

First Aid/Treatment

If signs of infection are detected, antibiotic therapy may be needed. Depending on the nature of infection, topical or systemic antibiotics may be used. In the case of antibiotic resistant strains, such as methicillin resistant S. aureus, effective and appropriate antibiotic therapy will need to be determined by a physician.

Agent: *Staphylococcus aureus* Training Record

I have reviewed and understand the risks associated working with *Staphylococcus aureus*. I understand that my signature below indicates I agree to comply and work safely with the said agent.

Lab Personnel	Training Date	Signature