ABSA INTERNATIONAL
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INTRODUCTION TO BIOSAFETY

Biosafety Curriculum for High School Students
Supplemental Information

Organisms and OPIM (Risk Group II):

Bacteria	**Viruses**	**Fungi, yeasts, parasites, etc.**
Bordetella pertussis	Adenovirus (type 4 or 5)	Aspergillus spp.
Clostridium perfringens	Dengue virus	Bovine Spongiform Encephalopathy Agent
Coxiella burnetii	Hepatitis C virus	*Candida albicans*
Escherichia coli	Herpes simplex virus	*Fasciola hepatica*
Helicobacter pylori	Human immunodeficiency virus	*Taenia solium*
Listeria monocytogenes	Human papillomavirus	*Toxoplasma gondii*
Neisseria gonorrhoeae	Influenza A virus	
Pseudomonas aeruginosa	Varicella-zoster virus	**OPIM**
Staphylococcus aureus		Human Blood and Bodily Fluid
Streptococcus pneumoniae		Nonhuman Primate BBF
Vibrio cholerae		Transformed cell lines (HeLa)
Yersinia pseudotuberculosis		

Procedures:

- Growth profile
  - Measure the optical density of agents to assess the rate of growth over time
- Nucleic acid (DNA or RNA) isolation
  - use kit to extract DNA from agent or phenol
- Protein isolation
  - lyse cells and remove large debris by centrifugation or filtration
- *in vitro* infection
  - infect tissue cultures cells with agents and determine survival
- Animal (*in vivo*) infection
  - infect small animals with agents and determine disease or survival
- Fixation, staining, and microscopy of cellculture
  - grow agent, collect samples, fix and stain (or stain and fix), and visualize under a microscope

- Vaccine preparation
    - grow agent and heat-kill or fix, add any adjuvants or stabilizers
    - drug efficacy testing *in vitro* test the effectiveness of a drug's ability to protect tissue culture cells from the agent. Treat cells with drug then infectcells
    - or, perform a Kirby-Bauer test to determine effectiveness of an antibiotic on a lawn of bacteria
- Drug efficacy testing *in vivo*
    - test the effectiveness of an drug's ability to protect small animal from the agent. Treat animals with drug then infect
- Mutagenesis and phenotype screening
    - expose agent to a mutagen and then assess changes in agent growth fitness
- Recombinant DNA delivery
    - mating, transformation, electroporation, or transfection
- Biofilm assay
    - grow bacteria in a way that permits them to attach to a surface and study the attached cells
- ELISA
    - Bind agent to the bottom of a multi-well plate and determine how well your antibody binds to a specific agent's surface protein
- Environmental sampling
    - Use samples collected from the environment to try and detect a specific agent