

## Trichothecene Mycotoxin (T2) as a Bioterrorist Agent

**Agent:** Trichothecene mycotoxin (T2) can theoretically be used in aerosol form “yellow rain” to produce lethal and non-lethal casualties. T2 is one of the more stable toxins, retaining its bioactivity even when heated to very high temperatures. T2 can enter the body through the skin and aero-digestive epithelium, without being inhaled, and quickly inhibit protein and nucleic acid synthesis. These mycotoxins are low molecular weight compounds produced by filamentous fungi of the genera *Fusarium*, *Myrotecium*, *Trichoderma*, *Stachybotrys* and others.

**Disease:** T2 mycotoxin poisoning

**Time to Onset:** Minutes to hours

**Signs/Symptoms:** T2 exposure causes pruritis, redness, vesicles, necrosis, epidermal sloughing, dysesthesias, nausea, weight loss, vomiting and diarrhea. Effects on the airway include nose and throat pain, nasal discharge, itching and sneezing, cough, dyspnea, wheezing, chest pain and hemoptysis. T2 also produces effects after ingestion or eye contact. Severe poisoning results in prostration, weakness, ataxia, collapse, reduced cardiac output, shock, and death.

### **Diagnosis:**

*Differential Diagnosis:* Mycotoxin poisoning should be considered especially when multiple patients present with similar clinical syndromes, particularly if victims report a “yellow rain” or if droplets of yellow fluid contaminate clothing or the environment. Radiation, chemical, or plant toxicity are other diagnoses to consider.

*Laboratory:* Gas-liquid chromatography (GLC) and high-pressure liquid chromatography (HPLC) with mass spectrometry (MS) may be used to detect T2 and related trichothecene mycotoxins in plasma and urine. Between 50-75% of the toxin and metabolites are eliminated in the urine and feces within 24 hours. Toxin metabolites may be detected up to 28 days after exposure.

Early postexposure (0-24 hours) nasal or throat swabs and induced respiratory secretions may be collected for HPLC/GLC/MS and immunoassay. During the clinical phase (24 - 72 hours) blood for serum may be collected in a tiger-top (SST) or red-top tube for toxin assays. Urine may be collected with 0.1ml concentrated hydrochloric acid (HCl) added per 100 ml of urine for recent exposure. If several

days have elapsed since exposure, a 24-hour urine collection with HCl added should be submitted.

Send specimens for laboratory confirmation in a triple container to the Oregon State Public Health Laboratory, 1717 SW Tenth Avenue, Portland, OR 97201. Prior notification is requested by calling the laboratory at (503) 229-5882 and Acute and Communicable Disease Prevention at (503) 731-4024.

*Supportive Tests:* In the rodent model, hematological alterations include marked but transient leukocytosis characterized by rapid lymphocytosis and a mild neutrophilia. Leukopenia follows and WBC normalizes 4-7 days postexposure. There is also a reduced hematocrit with the presence of nucleated erythrocytes.

**Treatment:** Outer clothing should be removed and exposed skin should be decontaminated with soap and water. Super-activated charcoal should be given orally if toxin is swallowed. Eye exposure should be treated with copious saline irrigation. Supportive therapy should be provided as needed.

**Exposure Control/Decontamination:** Standard precautions should be practiced. A chemical protective mask and clothing are required to avoid exposure. Exposed skin should be washed with soap and water. Bed linens, clothing, other exposed articles, and wash waste can be decontaminated through the use of a hypochlorite solution under alkaline conditions such as 1% sodium hypochlorite and 0.1M NaOH with one hour contact time.

**Report:** Immediately report any suspect cases to your local health department or the Oregon Health Division at (503) 731-4024 during working hours (8:00 am to 5:00 pm Monday through Friday) or (503) 731-4030 nights, weekends and holidays.