# Mississippi Toxicology Bulletin

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SPECIAL POINTS OF INTEREST:

- New Assays for Anticonvulsants
- China bans Fentanyl Analogs
- Case Report: "Drugs in my weed?"
- Organophosphates and Carbamates

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Technologists are always on call for emergencies

## New Anticonvulsants by Lee Spencer BS-CFT

Seizure disorders may result from a number of problems, such as physical injury or illnesses. There are numerous classifications of seizures but about 70 percent can be controlled with medications. Anti-epileptic drugs (AEDs) are the first line of defense against seizures. Therapeutic drug monitoring of blood concentrations is used to determine optimal dosage and/or minimize the risk of toxicity associated with some AEDs. Therapeutic drug monitoring may also be used to verify recent compliance with prescribing regimens. Recently, the Analytical Toxicology Lab validated quantitative assays for the following AEDs to assist physicians in their treatment of children and adults with seizures:

- Lamotrigine (Lamictal®)
- Levetiracetam (Keppra®)
- Oxcarbazepine Metabolite (Trileptal®)
- Topiramate (Topamax®)

These assays are performed each weekday in the Analytical Toxicology Lab. Serum is the specimen of choice for these assays.

## China bans deadly Carfentanil

On March 1, China placed carfentanil and three other fentanyl analogs on its list of scheduled substances. Carfentanil is reportedly 10,000 times more potent than morphine, and has been used by drug dealers to cut heroin in order to increase profits. Carfentanil, and other fentanyl analogs have been implicated in thousands of deaths across the United States. Carfentanil is so potent that it has been used as a chemical weapon and is described as a terrorist threat. In the fall 2016, U.S. news agencies identified a dozen Chinese companies that exported carfentanil via routine mail service with no questions asked. The U.S. State Department and the DEA has been pressuring China to ban the production and distribution of carfentanil. The DEA confirmed 400 arrests involving carfentanil in eight states from July through October 2016. Furanyl fentanyl, acryl fentanyl and valeryl fentanyl were also included on China's list of scheduled drugs. See graphic video on carfentanil here:

http://time.com/4634809/photo-opioid-addiction/?iid=sr-link7

## Case report: "Who put drugs in my Weed?"

A 61 year old female presented for follow-up after having a tracheostomy tube placed several months beforehand due to tracheal erosion. The patient is known to be a previous crack cocaine abuser and her urine drug screen was positive for cannabinoids and cocaine. Both screens were confirmed using mass spectrometry. When interviewed by the clinician, the patient responded, "Who put drugs in my weed?"

Historically, researchers have believed that drug abuse was rare among older adults. However, it seems that drug and alcohol abuse knows no boundaries and can affect individuals from all locations, races, sexes, and ages. Sources anticipate substance abuse treatment for older Americans to triple from 2000 to 2020. Clinicians may not suspect substance abuse problems on the assumption that older individuals have matured and "aged out". We shouldn't forget that the baby boomer generation was notorious for drug experimentation in the 1960s. SAMHSA data indicates that older adults who "self-medicate" with prescription drugs are more likely to characterize themselves as lonely and to report lower life satisfaction. If not diagnosed and treated, substance abuse may ruin the golden years of countless Americans.

## A note on Organophosphates and Carbamates

by Debbie R. Walley M.D.

Organophosphates and carbamates are found in both agricultural and household insecticides. In Mississippi, commonly used organophosphates include acephate, chlorpyrifos and malathion, whereas commonly used carbamates include bifenthrin, thiodicarb, cypermethrin and deltamethrin. Significant absorption can occur from cutaneous exposure, inhalation and ingestion. Most incidents of toxic organophosphate or carbamate poisoning are accidental; however, organophosphates such as sarin and VX are known military nerve agents. In male rats, the medial lethal oral dose of acephate is 945 mg/kg. By comparison, the median lethal oral dose of sarin in rats is 0.55 mg/kg. Sarin is classified as a weapon of mass destruction and is the suspected agent released by the Syrian military in the Idlib Province in April 2017. Venomous agent X (VX), because of its low volatility, is 100-150 times more toxic than sarin and is the reported agent used to assassinate Kim Jong-nam, the half-brother of North Korean leader Kim Jong-un.

Organophosphates and carbamates are acetylcholinesterase inhibitors that cause unopposed cholinergic stimulation. While the toxicity of carbamate poisoning is shorter, the mortality rates of carbamate and OP poisoning are similar. The diagnosis of OP or carbamate poisoning is usually determined clinically, but mild cases of toxicity can be difficult to ascertain. Exposure can be confirmed by testing for the metabolites para-nitrophenol or dialkyl phosphate in the urine. Plasma cholinesterase activity can also be measured. Treatment of OP and carbamate toxicity includes atropine, pralidoxime, and supportive care. In cases of dermal exposure, the patient's clothes should be removed and discarded in order to avoid the exposure to heath care providers and re-exposure to the patient.

The Mississippi Toxicology Bulletin is a semi-annual newsletter published by the Analytical Toxicology Laboratory at the University of Mississippi Medical Center. Articles, reports or case studies for publication may be submitted to Dr. Patrick Kyle at pkyle@umc.edu.