## K49 Acute Intoxications With Phenibut (ß-Phenyl- γ -Aminobutyric Acid), an Emergent Psychoactive γ -Aminobutyric Acid (GABA) Agonist

*Erin L. Karschner, PhD*, Armed Forces Medical Examiner System, 115 Purple Heart Drive, Dover Air Force Base, DE 19902; John J. Kristofic, BS, Armed Forces Medical Examiner System, 115 Purple Heart Drive, Dover Air Force Base, DE 19902; Jeffrey D. Chmiel, MS, Armed Forces Medical Examiner System, 115 Purple Heart Drive, Dover Air Force Base, DE 19902; Neal C. Goebel, PhD, Armed Forces Medical Examiner System, 115 Purple Heart Drive, Dover Air Force Base, DE 19902; and Jeff Walterscheid, PhD, Armed Forces Medical Examiner System, Division of Forensic Toxicology, 115 Purple Heart Drive, Dover Air Force Base, DE 19902*

After attending this presentation, attendees will be familiar with the behavioral and physiological effects of the psychoactive compound known as phenibut. Attendees will also understand the importance of updated screening libraries for the detection of Novel Psychoactive Substances (NPS).

This presentation will impact the forensic science community by raising awareness regarding phenibut abuse and by providing examples of screening and confirmation techniques for this analytically challenging substance.

Phenibut is an analogue of the inhibitory neurotransmitter γ-aminobutyric acid (GABA) and the antispasmodic baclofen. Neuromodulation occurs when phenibut binds to GABA receptors, primarily at $GABA_B$. While not licensed for medical use in the United States, phenibut has been prescribed in Russia since the 1960s for the treatment of anxiety, alcohol withdrawal, and insomnia. It is currently available on the internet as a nutritional supplement and marketed as a nootropic, anxiolytic, and euphoriant, where typical doses range from 500mg to 2g. Phenibut tolerance develops rapidly, similar to other GABA receptor modulators. Tolerance may precipitate substantial dose increases. Additionally, co-administration with other GABA modulators, such as ethanol, may result in more pronounced pharmacological effects. In this submission, two unrelated cases involving phenibut intoxication are presented.

**Case 1:** A 21-year-old male was found unconscious in a dormitory hallway. The subject was minimally responsive, slurring his words, and walking into walls when emergency personnel arrived. The man vomited, his condition deteriorated, and he was transported to the hospital. The attending physician described his aggressive and combative behavior as excited delirium. He assaulted medical staff, was restrained, and remained in the hospital for two days.

**Case 2:** A 21-year-old male was unconscious and unresponsive in a dormitory stairwell the morning after a night of drinking with friends. Two individuals were sent to retrieve the man and found him staggering and slurring his speech. The man was taken to his dorm room, where he laid down and fell asleep. His roommate attempted to wake him 1h later, but he appeared incoherent and confused. Medical personnel applied multiple sternum rubs to revive the individual. He jolted awake, appeared disoriented, and his pupils were non-reactive to light stimulus. He was transported to the hospital where toxicology revealed no drugs or alcohol.

Urine from each case was submitted to the Armed Forces Medical Examiner System (AFMES) Division of Forensic Toxicology. Both specimens were negative for ethanol by gas chromatography/flame ionization detection and for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, opioids, phencyclidine, and sympathomimetic amines by immunoassay. In addition, both cases screened negative for alkaline-extractable drugs by gas chromatography/full-scan mass spectrometry. After case histories were reviewed, a non-targeted liquid chromatography/quadrupole time of flight/mass spectrometry drug screen was added. In Case 1, phenibut and ondansetron were detected in the urine. Phenibut, naloxone, and ondansetron were detected in the urine from Case 2. Phenibut was confirmed in the urine from both cases by liquid chromatography/tandem mass spectrometry.

Unknown to the lab at time of analysis, the individual in Case 1 later admitted to self-medicating with an internet-purchased supplement for his social anxiety and attention-deficit hyperactivity disorder. On the date of the incident, he self-reported ingesting 20g of phenibut, causing him to vomit shortly thereafter. He then ingested an additional 10g in an attempt to account for the amount he regurgitated. The individual in Case 2 was interviewed after discharge and stated he drank wine, beer, and champagne the night prior to the incident. He did not recall any events 8h prior to medical intervention in his dormitory room. The individual also admitted to purchasing phenibut from the internet, but did not provide information concerning the amount ingested or if the dose was co-ingested with alcohol.

In summary, two acute intoxications with phenibut that emphasize the difficulties encountered during extraction and instrumental analysis are presented. If proper analytical techniques are not available, methods are not current, or history is incomplete, it is possible to overlook phenibut and other NPS. In these cases, history was a key factor in directing additional testing. Intoxication effects corroborated previous reports of somnolence/stupor, confusion, agitation, nausea, and vomiting. These cases underscore the need for vigilance when evaluating casework and promote the use of comprehensive screening techniques that may reveal rare, but significant, findings.

**Phenibut, NPS, QTOF**



*Presenting Author