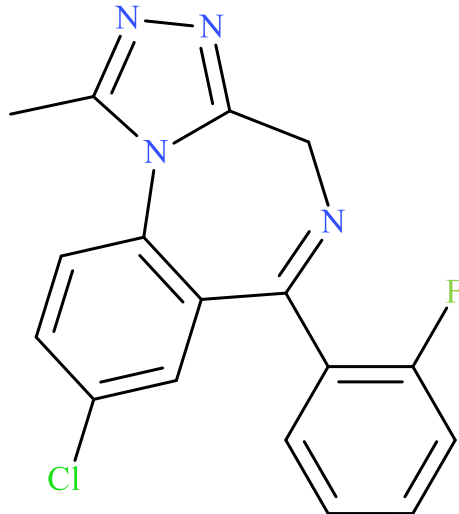# Flualprazolam

Sample Type: **Biological Fluid**

Latest Revision: **June 25, 2019**

Date of Report: **June 25, 2019**

1. GENERAL INFORMATION

IUPAC Name: 8-chloro-6-(2-fluorophenyl)-1-methyl-4H-[1,2,4]triazolo[4,3-a][1,4]benzodiazepine

InChI String: InChI=1S/C17H12ClFN4/c1-10-21-22-16-9-20-17(12-4-2-3-5-14(12)19)13-8-11(18)6-7-15(13)23(10)16/h2-8H,9H2,1H3

CFR: Not Scheduled (06/2019)

CAS# 28910-91-0

Synonyms: 2'-Fluoro Alprazolam, ortho-Fluoro Alprazolam

Source: NMS Labs – Toxicology Department

2. CHEMICAL DATA

Analyte	Chemical Formula	Molecular Weight	Molecular Ion (M)	Exact Mass [M+H]$^+$
Flualprazolam	$C_{17}H_{12}ClFN_4$	326.75	326	327.0807

Important Note*: All identifications were made based on evaluation of analytical data (LC-QTOF) in comparison to analysis of acquired reference material.*

Report Prepared By: *Alex J. Krotulski, MSFS, and Barry K. Logan, PhD, F-ABFT*

3. SAMPLE HISTORY

Flualprazolam has been identified in three cases since March 2018. The geographical and demographic breakdown is below:

Geographical Location: Pennsylvania (n=2), Indiana (n=1)

Biological Sample: Blood (n=3)

Date of First: *Collection:* March 8, 2018   *Receipt:* March 10, 2018

Date of Most Recent: *Collection:* June 3, 2019   *Receipt:* June 7, 2019

Additional NPS: Etizolam (n=2), Clonazolam (n=1), Flubromazolam (n=1)

4. BRIEF DESCRIPTION

Flualprazolam is classified as a novel benzodiazepine, although its synthesis and activity have been previously described in the literature.[1] Benzodiazepines are central nervous system depressants. Novel benzodiazepines, often pirated from early drug discovery or pharmaceutical studies, have appeared on novel and illicit drug markets in recent years. These substances have caused adverse events, including death, as described in the literature. Flualprazolam is structurally similar to the traditional benzodiazepine alprazolam, a Schedule IV substance in the United States, as well as the novel benzodiazepines flunitrazolam, clonazolam, and flubromazolam.

Flualprazolam was added to our library database in March 2019. Through data mining of datafiles acquired in 2018, flualprazolam was identified in a blood sample from March 2018. In June 2019, flualprazolam was identified in two additional blood samples through sample mining, a process our laboratory developed for real-time discovery and detection of NPS.

5. ADDITIONAL RESOURCES

1. Hester, JB. (19 October 1976). "Patent US3987052 - 6-Phenyl-4H-s-triazolo[4,3-a][1,4]benzodiazepines." https://patents.google.com/patent/US3987052A/en

https://www.caymanchem.com/product/24481

https://www.policija.si/apps/nfl_response_web/0_Analytical_Reports_final/Flualprazolam-ID-1903-18_report.pdf

https://ndews.umd.edu/sites/ndews.umd.edu/files/Emerging-Threat-Report-2018-Annual.pdf

6. QUALITATIVE DATA

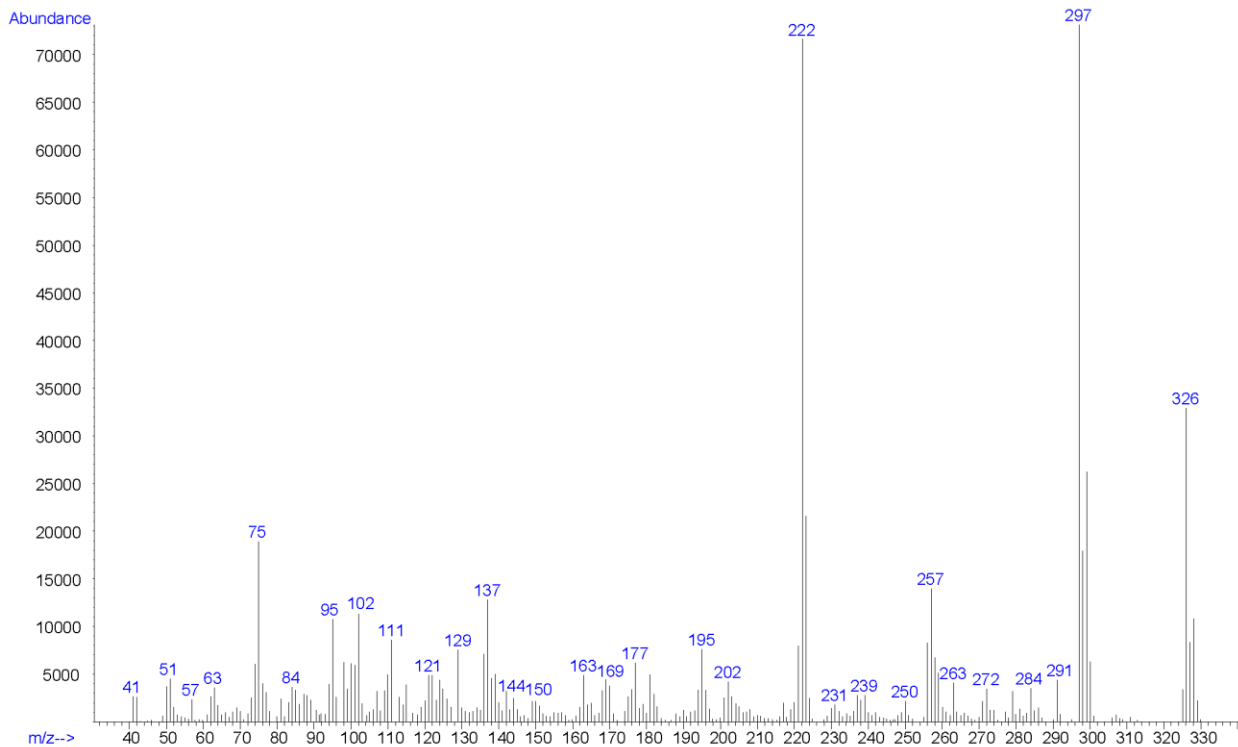## 6.1 GAS CHROMATOGRAPHY MASS SPECTROMETRY (GC-MS)

Testing Performed At: The Center for Forensic Science Research and Education at the Fredric Rieders Family Foundation (Willow Grove, PA)

Sample Preparation: Standard diluted in methanol

Instrument: Agilent 5975 Series GC/MSD System

Standard: Reference material for Flualprazolam (Batch: 0526790-9) was purchased from Cayman Chemical (Ann Arbor, MI, USA). (https://www.caymanchem.com/product/24481)

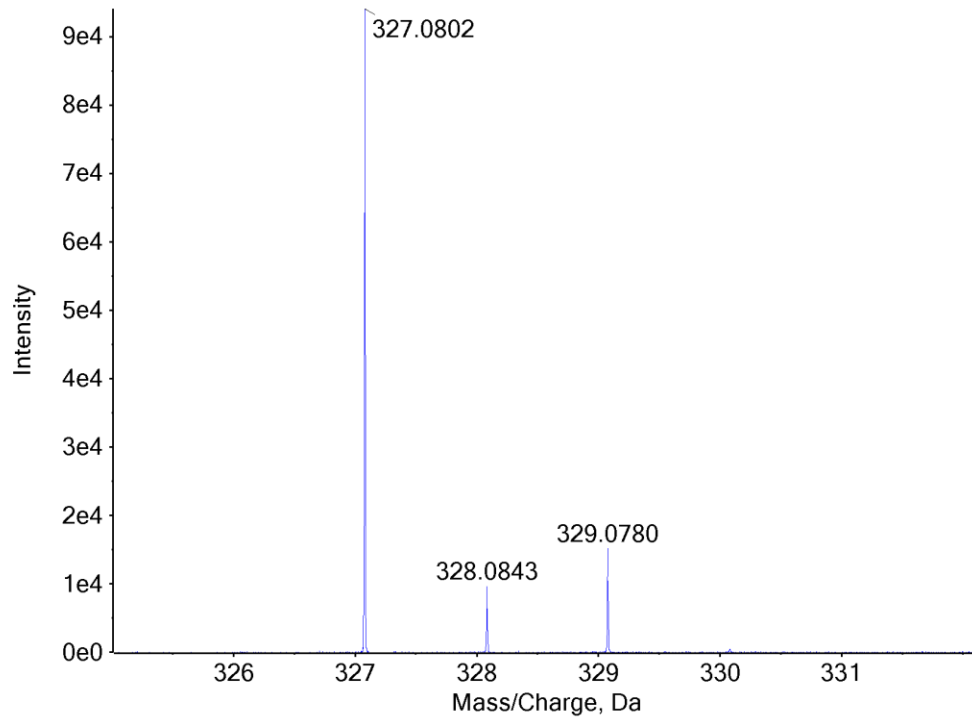**EI (70 eV) Mass Spectrum: Flualprazolam (Standard)**

6.2 LIQUID CHROMATOGRAPHY QUADRUPOLE TIME OF FLIGHT MASS SPECTROMETRY (LC-QTOF)

Testing Performed At: The Center for Forensic Science Research and Education at the Fredric Rieders Family Foundation (Willow Grove, PA)

Sample Preparation: No additional preparation - direct analysis of sample extract

Instrument: Sciex TripleTOF® 5600+, Shimadzu Nexera XR UHPLC

Column: Phenomenex® Kinetex C18 (50 mm x 3.0 mm, 2.6 µm)

Mobile Phase: A: Ammonium formate (10 mM, pH 3.0)

B: Methanol/acetonitrile (50:50)

Flow rate: 0.4 mL/min

Gradient: Initial: 95A:5B; 5A:95B over 13 min; 95A:5B at 15.5 min

Temperatures: Autosampler: 15 °C

Column Oven: 30 °C

Source Heater: 600 °C

Injection Parameters: Injection Volume: 10 µL

QTOF Parameters: TOF MS Scan Range: 100-510 Da

Precursor Isolation: SWATH® acquisition (27 windows)

Fragmentation: Collison Energy Spread (35±15 eV)

MS/MS Scan Range: 50-510 Da

Retention Time: 7.30 min

Standard Comparison: Reference material for Flualprazolam (Batch: 0526790-9) was purchased from Cayman Chemical (Ann Arbor, MI, USA). Analysis of this standard resulted in positive identification of the analyte in the extract as Flualprazolam, based on retention time (7.29 min) and mass spectral data. (https://www.caymanchem.com/product/24481)
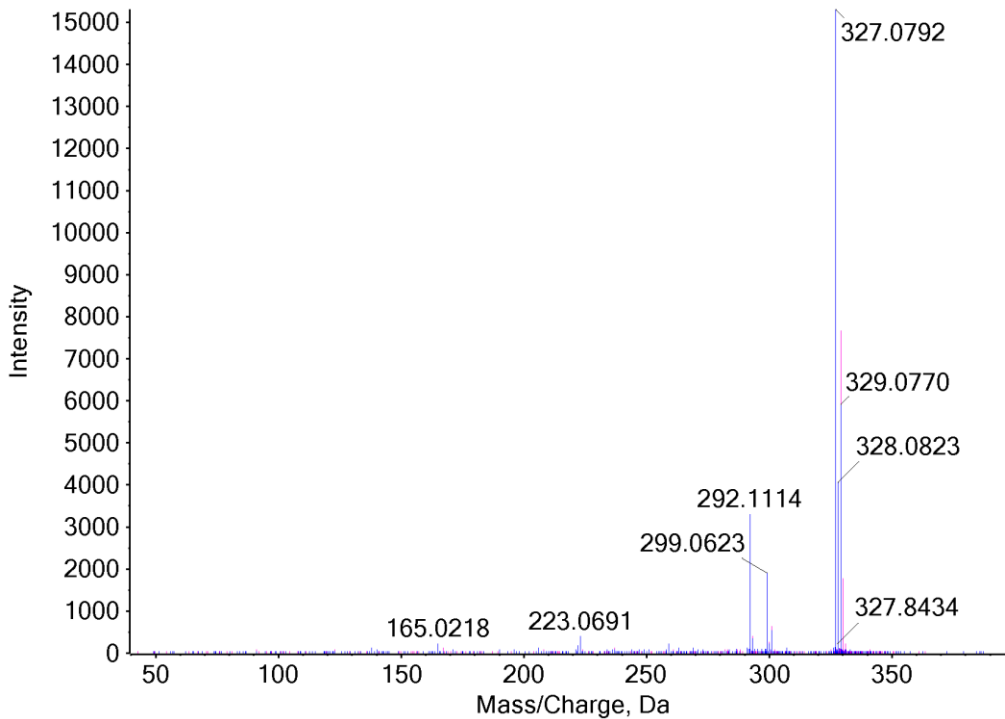
Extracted Ion Chromatogram: Flualprazolam
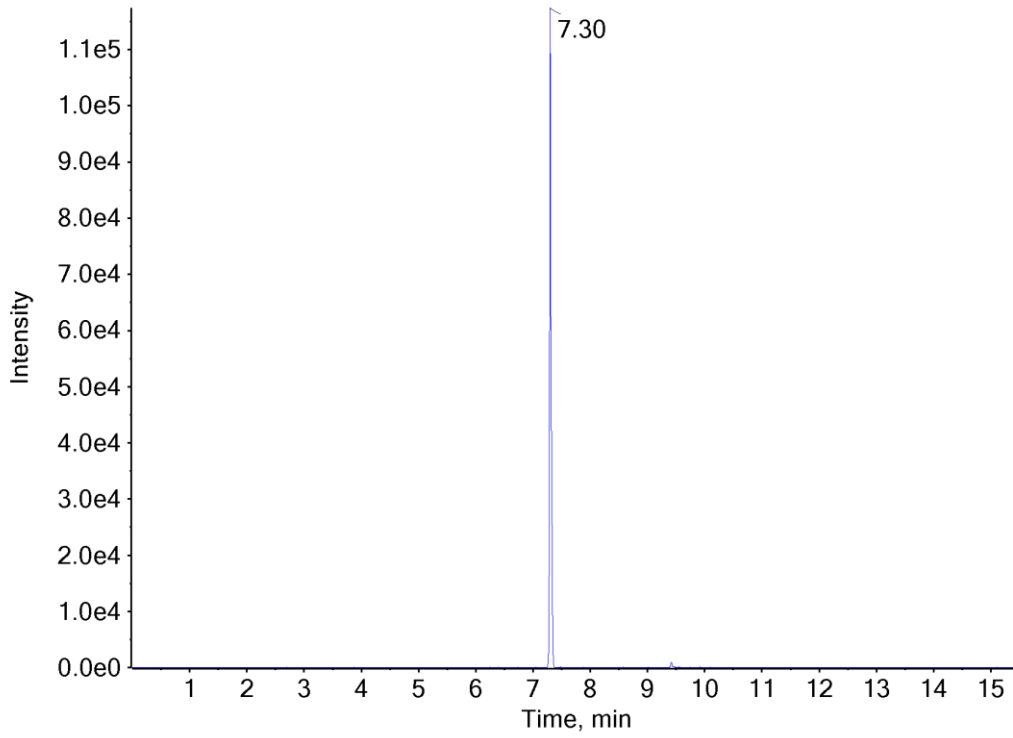
TOF MS Spectrum: Flualprazolam

MS/MS Spectrum: Flualprazolam