

Designer Benzodiazepines

HISTORY AND BACKGROUND

Approved benzodiazepines are an important class of medications when used as prescribed by a physician. However, unapproved use of prescription benzodiazepines and the introduction of designer versions that have not been approved for human use has created a public health danger.

Benzodiazepine pharmaceuticals

Benzodiazepines ("benzos" or "BZD") are a class of drugs classified by a core structure consisting of an aryl ring fused to a diazepine which act on the central nervous system (CNS). They are common in many prescription pharmaceuticals designed to treat conditions such as depression, anxiety, muscle spasms, etc. and they act by modulating the gamma-aminobutyric acid (GABA) receptor.

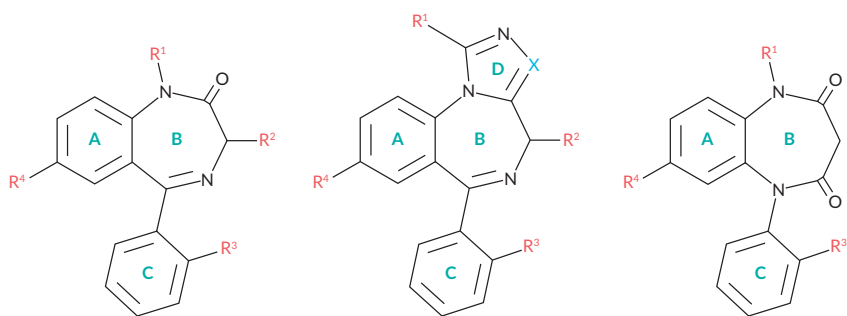
Misuse, polydrug mixtures, and the illicit market

The powerful CNS effects of benzodiazepines make them ripe for misuse/abuse and drug trafficking. They are commonly found in forensic casework alongside synthetic opioids and have been implicated in many overdose deaths. Illicitly prepared benzodiazepines are frequently found in counterfeit tablets mixed with other drugs, making them an important class of drugs for forensic chemists and toxicologists. Seizures of counterfeit tablets mimicking pharmaceutical drugs is commonplace, creating the need for careful forensic analysis.

Designer benzodiazepines (DBZD)

To circumvent the legal system, designer benzodiazepines which have not been approved for use in humans and thought to be outside of regulations continue to appear on the illicit market. Some of these substances were initially designed by legitimate scientific research seeking novel legitimate medications and there are numerous known synthetic modifications in the literature. Many of the DBZDs contain the classic aromatic ring fused to a 1,4-diazepine ring with some newer analogs incorporating a triazolo ring system onto the classic core.

COMMON DESIGNER BENZODIAZEPINE SCAFFOLDS & SITE MODIFICATIONS



1,4-azepams

1,4-azolams

1,5-azepams

Note: 1,4 and 1,5 indicates the relative positioning of the nitrogens of the diazepine ring

Possible substituent variations:

R^1 = H, CH₃, CH₂CH₃, CH₂N(CH₃)₂, CH₂CF₃, etc.

R^2 = H, CH₃, OH, C(O)OCH₂CH₃, etc.

R^3 = F, Cl, etc.

R^4 = F, Cl, Br, NO₂, etc.

Possible ring system variations:

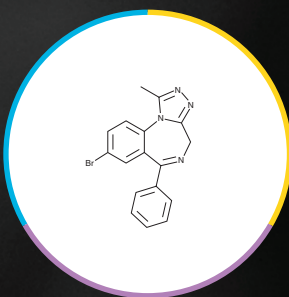
A Ring = can be other aryl rings such as thiophene

B Ring = C=O can be replaced with C=S

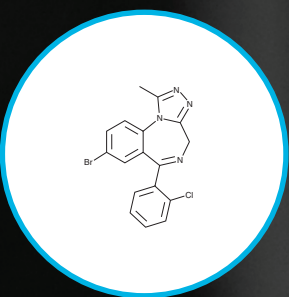
C Ring = can have substituents in other positions (mono or di) or be a pyridine ring

D Ring = often seen as an imidazole (X=CH) or triazole (X=N)

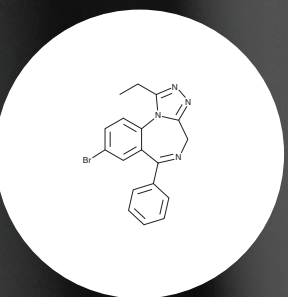
AVAILABLE DESIGNER BENZODIAZEPINE ANALYTICAL STANDARDS



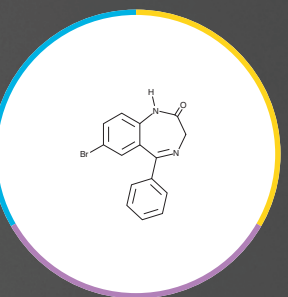
Bromazolam
(22665 | [38201](#) | [38455](#) | [36918](#))



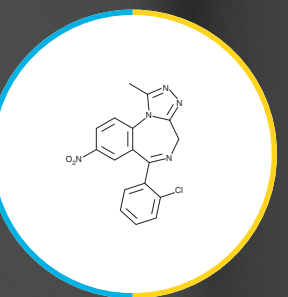
Phenazolam
(26700 | [43440](#))



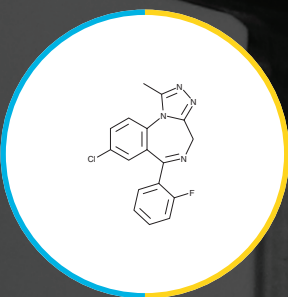
Ethylbromazolam
(42723)



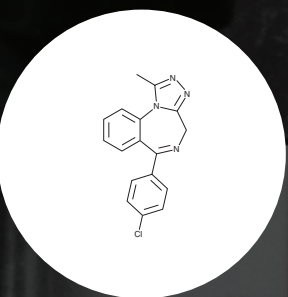
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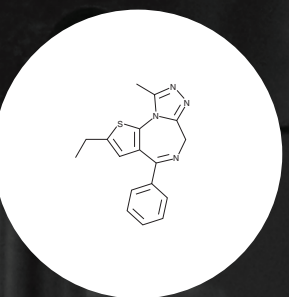
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(18173 | [25614](#) | [27782](#))



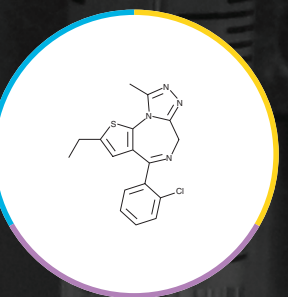
Flualprazolam
(24481 | [25577](#) | [29433](#))



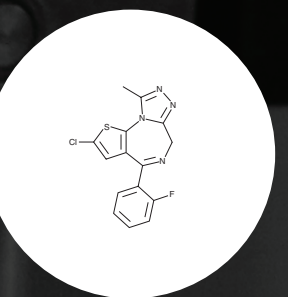
4'-chloro Deschloroalprazolam
(36057)



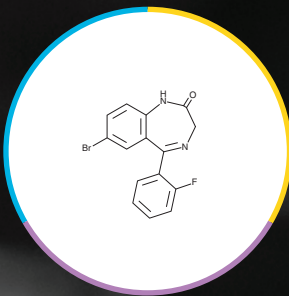
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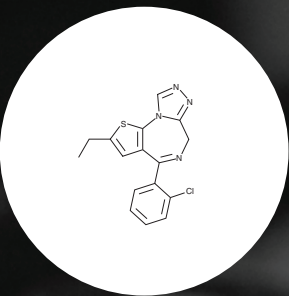
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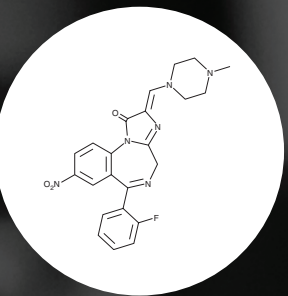
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(23524)



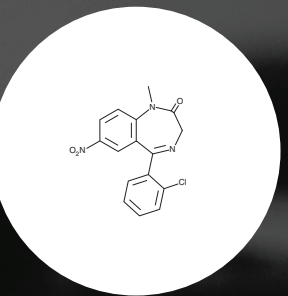
Flubromazepam
(15157 | [41178](#) | [41215](#) | [32536](#))



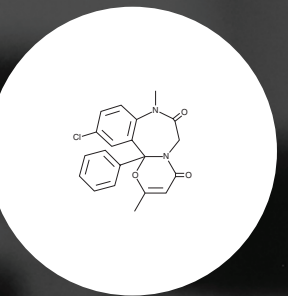
Metizolam
(23111)



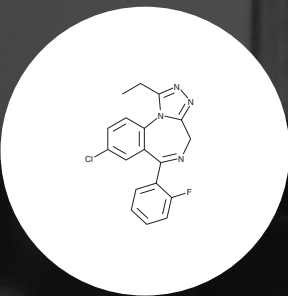
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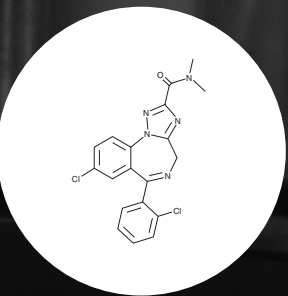
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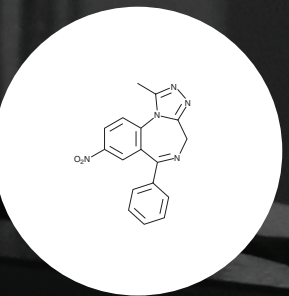
Ketazolam
(11449)



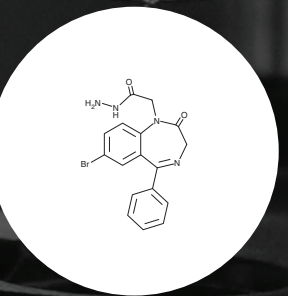
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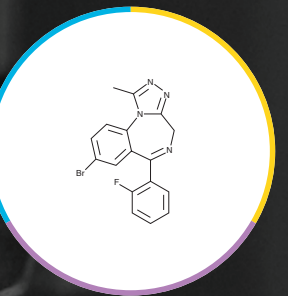
Rilmazolam
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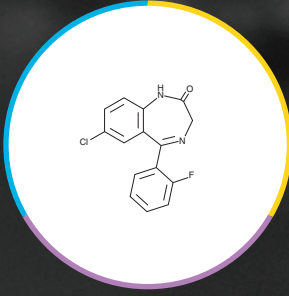
Nitrazolam
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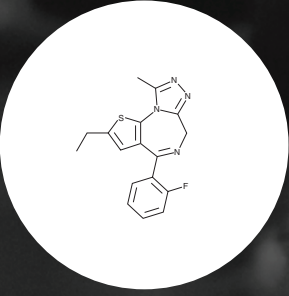
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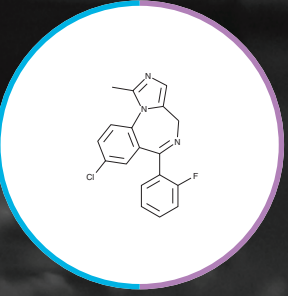
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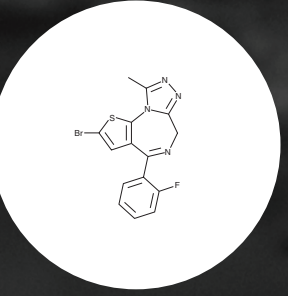
Desalkylflurazepam
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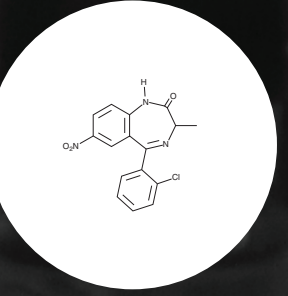
Fluetizolam
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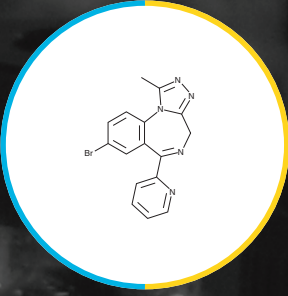
Midazolam
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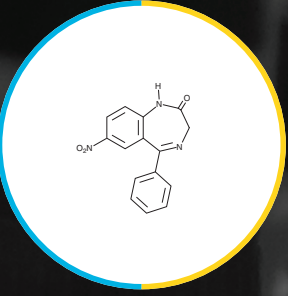
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(28470)



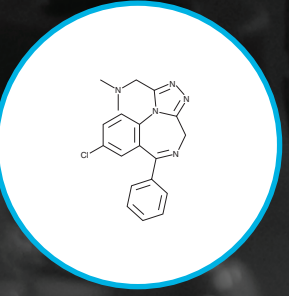
(±)-Meclonazepam
(23110)



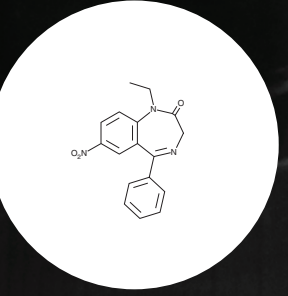
Pyrazolam
(14901 | [43438](#) | [38176](#))



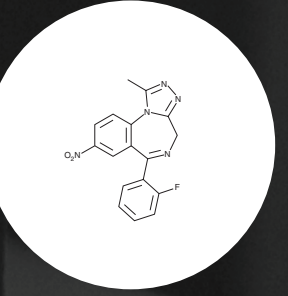
Nitrazepam
(16196 | [ISO60201](#) | [16197](#))



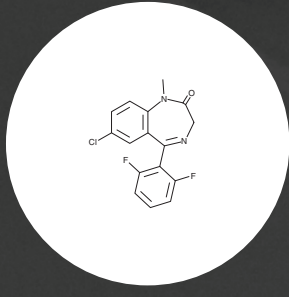
Adinazolam
(18205 | [30186](#))



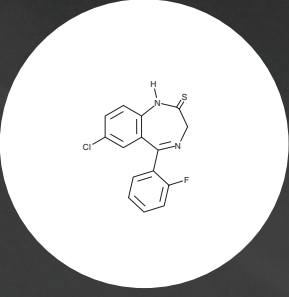
N-ethyl Nitrazepam
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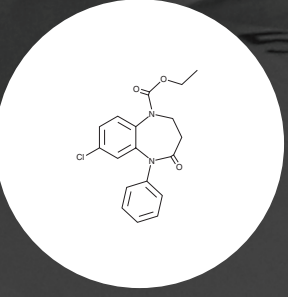
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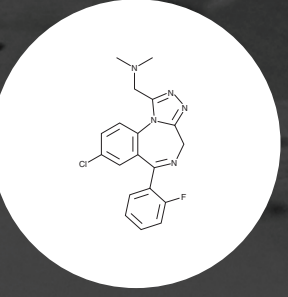
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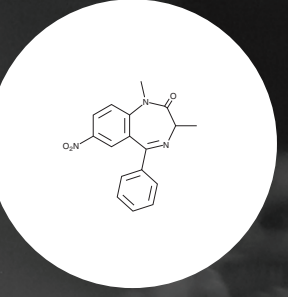
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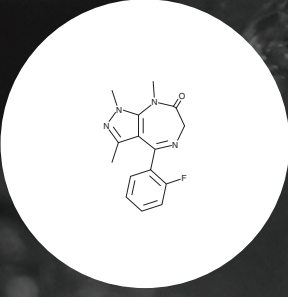
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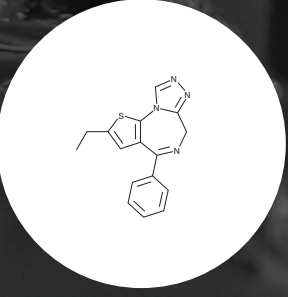
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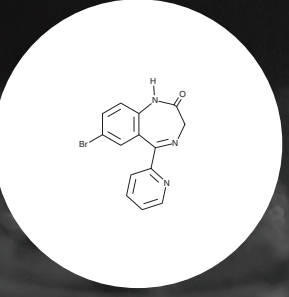
(±)-3-methyl Nimetazepam
(38630)



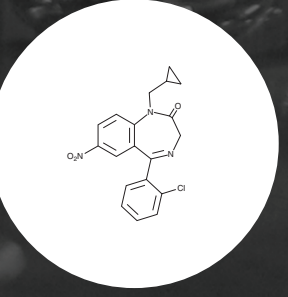
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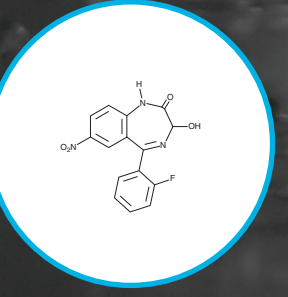
Deschlorometizolam
(42885)



Bromazepam
(14260)



Cloniprazepam
(23106)



Nifoxipam
(9002425 | [27242](#))

CRM Deuterated CRM Internal Standard

ADDITIONAL DESIGNER BENZODIAZEPINE RESOURCES



Monograph, Issue 5

Ethylbromazolam: Cayman Novel Psychoactive Substances Metabolism Monograph

View more at www.caymanchem.com/benzo-monograph



Technical Brief

Analysis of a Complex Mixture of 13 Benzodiazepines Using HPLC-PDA Detection

Learn more at www.caymanchem.com/benzo-detection

FEATURED TOOLS & RESOURCES FOR NPS IDENTIFICATION

Cayman Chemical is dedicated to working with the forensic community to quickly make authentic reference standards available as well as update our free, searchable GC-MS library. We also pride ourselves on providing informative NPS snapshots, webinars, and application notes.

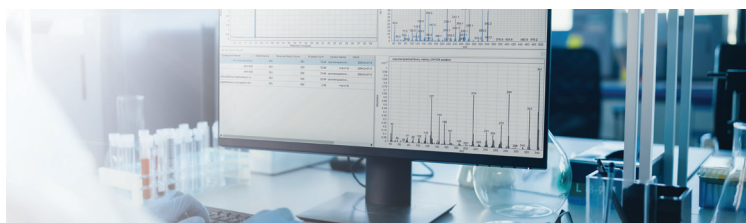
NPS DASHBOARD

We collaborate with the Center for Forensic Science Research & Education (CFSRE) to provide analytical reference standards for emerging NPS. Cayman maintains an updated dashboard to align with the CFSRE's quarterly NPS scope recommendations, matching reference standards with recommended NPS to help testing laboratories easily find reference standards to the most pressing NPS.

View the dashboard at www.caymanchem.com/NPS-dashboard



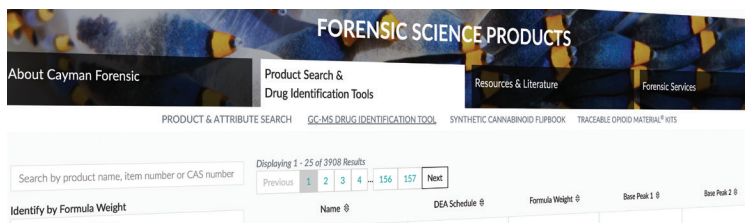
IDENTIFICATION RESOURCES



Cayman Spectral Library

Our free, searchable, GC-MS spectral database contains 70eV EI mass spectral data of 2,750+ of Cayman's forensic drug standards.

Download the database at www.caymanchem.com/CSL



GC-MS Drug Identification Tool

Cayman's GC-MS drug identification tool can help you search unknowns by formula weight, base peak, and 2nd base peak ion.

View the tool at www.caymanchem.com/drugID