

Standardized Naming of Substituted Fentanyls

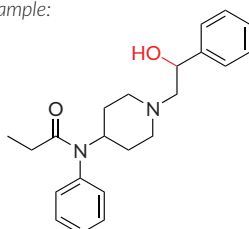
Cayman's scientists standardized a fentanyl naming system to help provide a more unambiguous way to describe substituent placement on the fentanyl scaffold. This system differentiates the points of substitution by region in the following manner:

ACCREDITED
ISO/IEC 17025 #AT-1773
ISO 17034 #AR-1774

N-Alkyl Chain

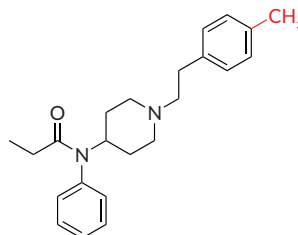
N-alkyl chain substituents occur at either the α or β points on the carbon chain linker and/or the 2', 3', or 4' position of the associated phenyl ring.

for example:



β -hydroxy Fentanyl

contains a hydroxyl group at the β -position of the N-alkyl chain linker



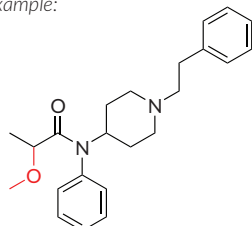
4'-methyl Fentanyl

contains a methyl group at the 4'-position of the phenyl ring of the N-alkyl chain

Amide Group

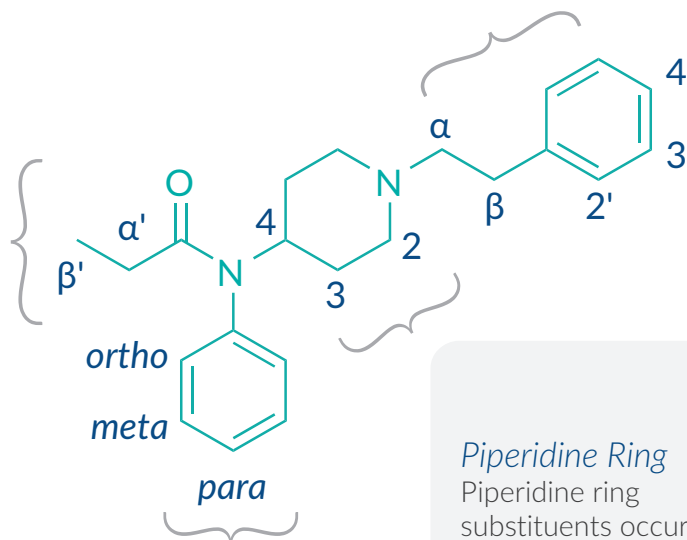
Amide group substituents occur at either the α' or β' position.

for example:



α' -methoxy Fentanyl

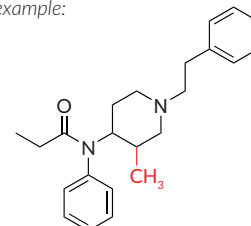
contains a methoxy substituent at the α' -position of the amide group



Piperidine Ring

Piperidine ring substituents occur at the 2, 3, and/or 4 positions.

for example:



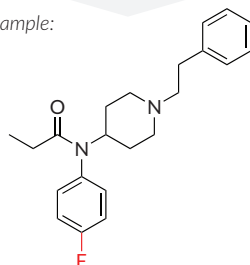
3-methyl Fentanyl

contains a methyl group at the 3-position of the piperidine ring

Aniline Ring

Aniline ring substituents occur at the *ortho*, *meta*, and/or *para* positions.

for example:

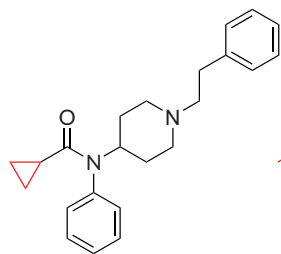


***para*-Fluorofentanyl**

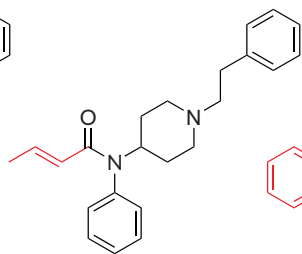
contains a fluorine atom at the *para*-position of the aniline ring

Common Amide Group Swaps

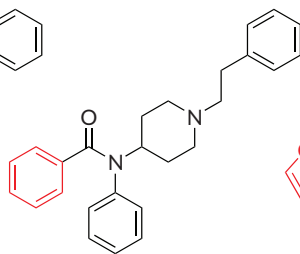
Named by placing the name of the moiety that is replacing the typical fentanyl ethyl group in front of the word "fentanyl." The moiety name may account for the carbon of the carbonyl or the entire carbonyl itself.



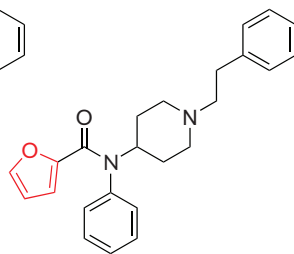
Cyclopropyl fentanyl



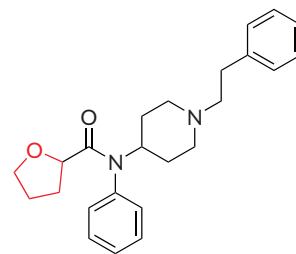
Crotonyl fentanyl



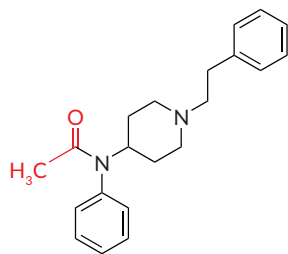
Phenyl fentanyl



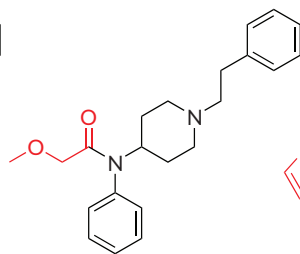
Furanyl fentanyl



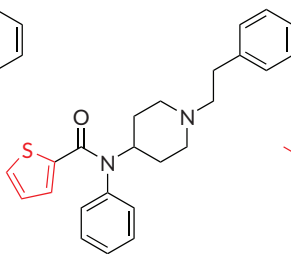
Tetrahydrofuran fentanyl



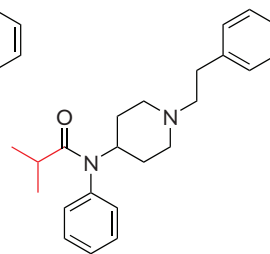
Acetyl fentanyl



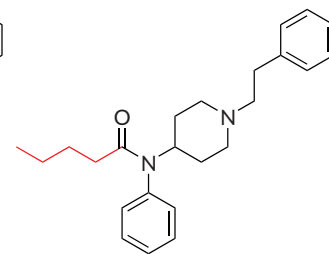
Methoxyacetyl fentanyl



Thiophene fentanyl



Isobutyryl fentanyl

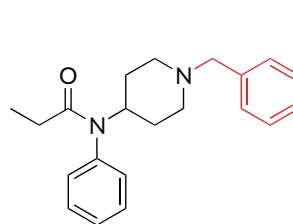


Valeryl fentanyl

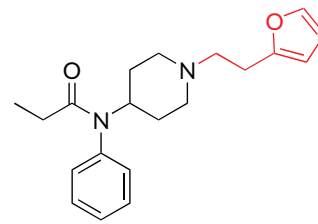
N-Alkyl Group Swaps

Legacy Exceptions

Note that Cayman catalog standards Benzyl fentanyl and Furanylethyl fentanyl do not have amide group swaps as the name implies. They were named before our amide group naming system was established.



Benzyl fentanyl

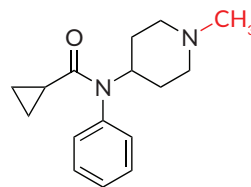


Furanylethyl fentanyl

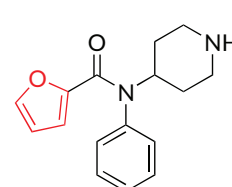
Cayman Naming Convention

N-alkyl chain swaps are named by the root word "norfentanyl" to indicate a fentanyl without a substitution off the piperidine nitrogen. Legacy exception Benzyl fentanyl should be named "N-benzyl Norfentanyl" under this convention. An example of the new convention in action is N-methyl Cyclopropyl norfentanyl.

Note that, common fentanyl analog metabolites do not have the "N"- designation to clarify that the swap occurs at the amide group and not the N-phenethyl. For example, Furanyl norfentanyl represents a swap at the amide group and not at the N-phenethyl moiety.



N-methyl Cyclopropyl norfentanyl



Furanyl norfentanyl

To cite this naming system: Lula, D.M. Standardized Naming of Substituted Fentanyls. *Article, Cayman Chemical* (2018).

Read more about the standardized naming of substituted fentanyls
at www.caymanchem.com/fentanylnaming