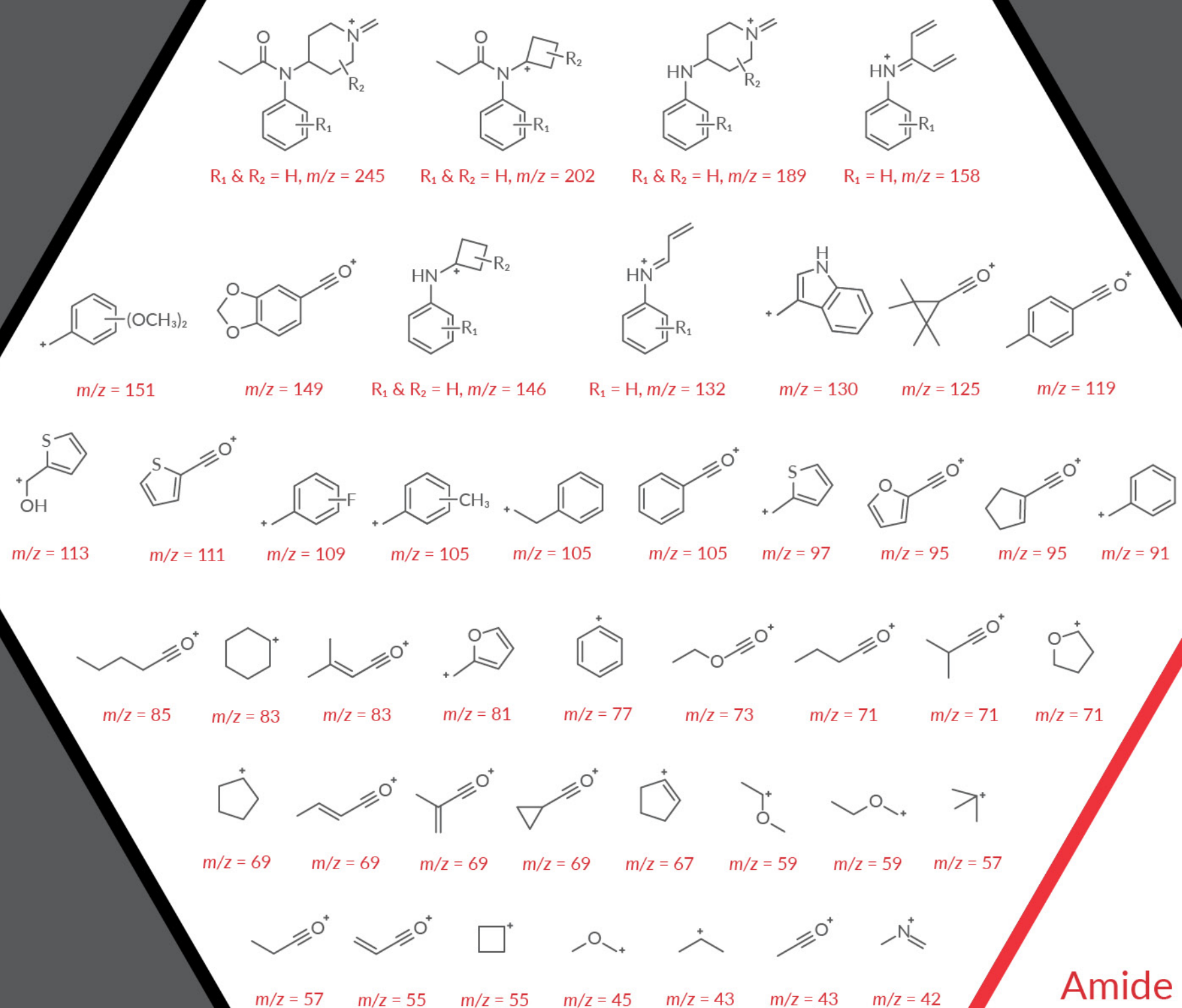
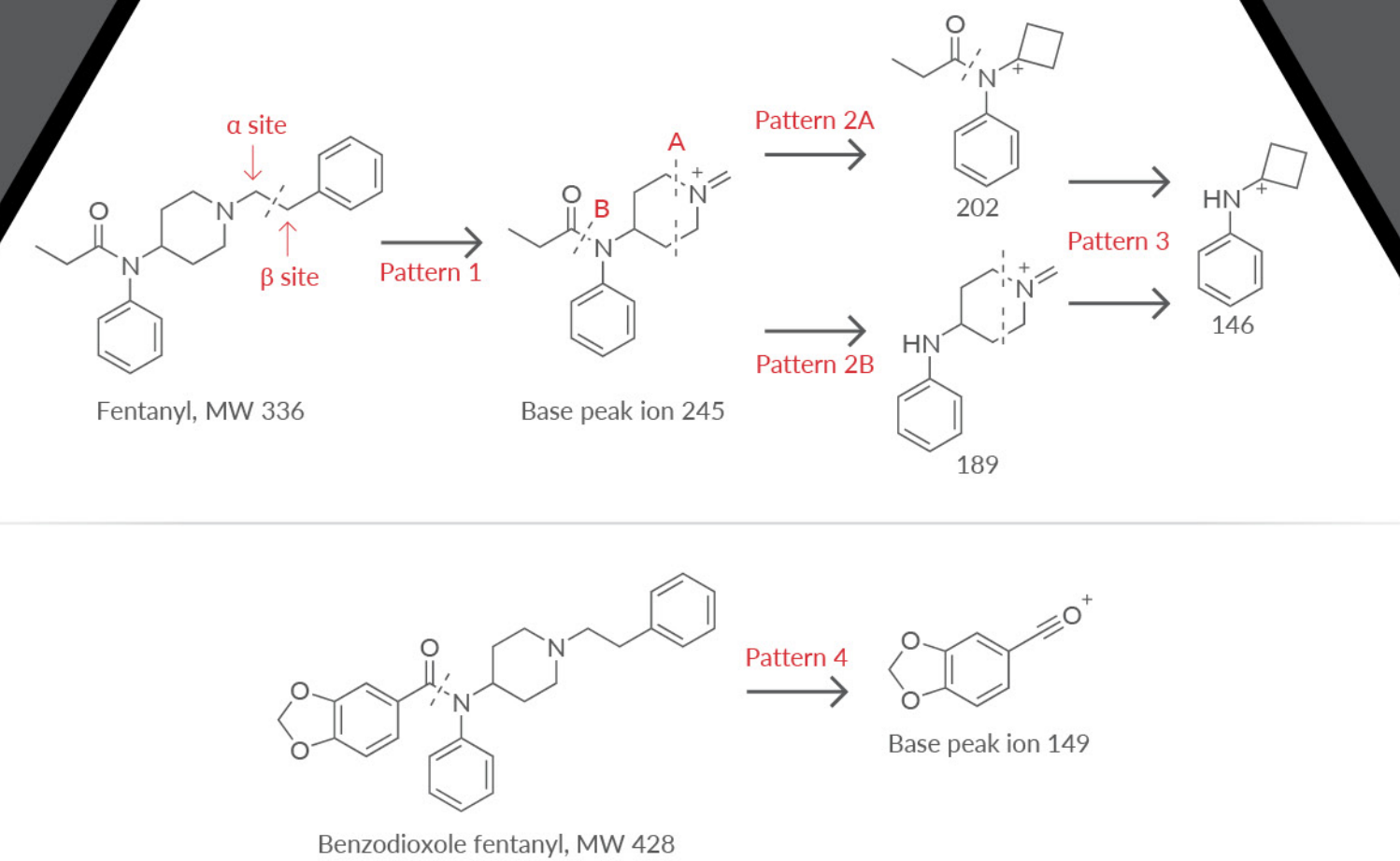


### Common Fentanyl MS Fragments

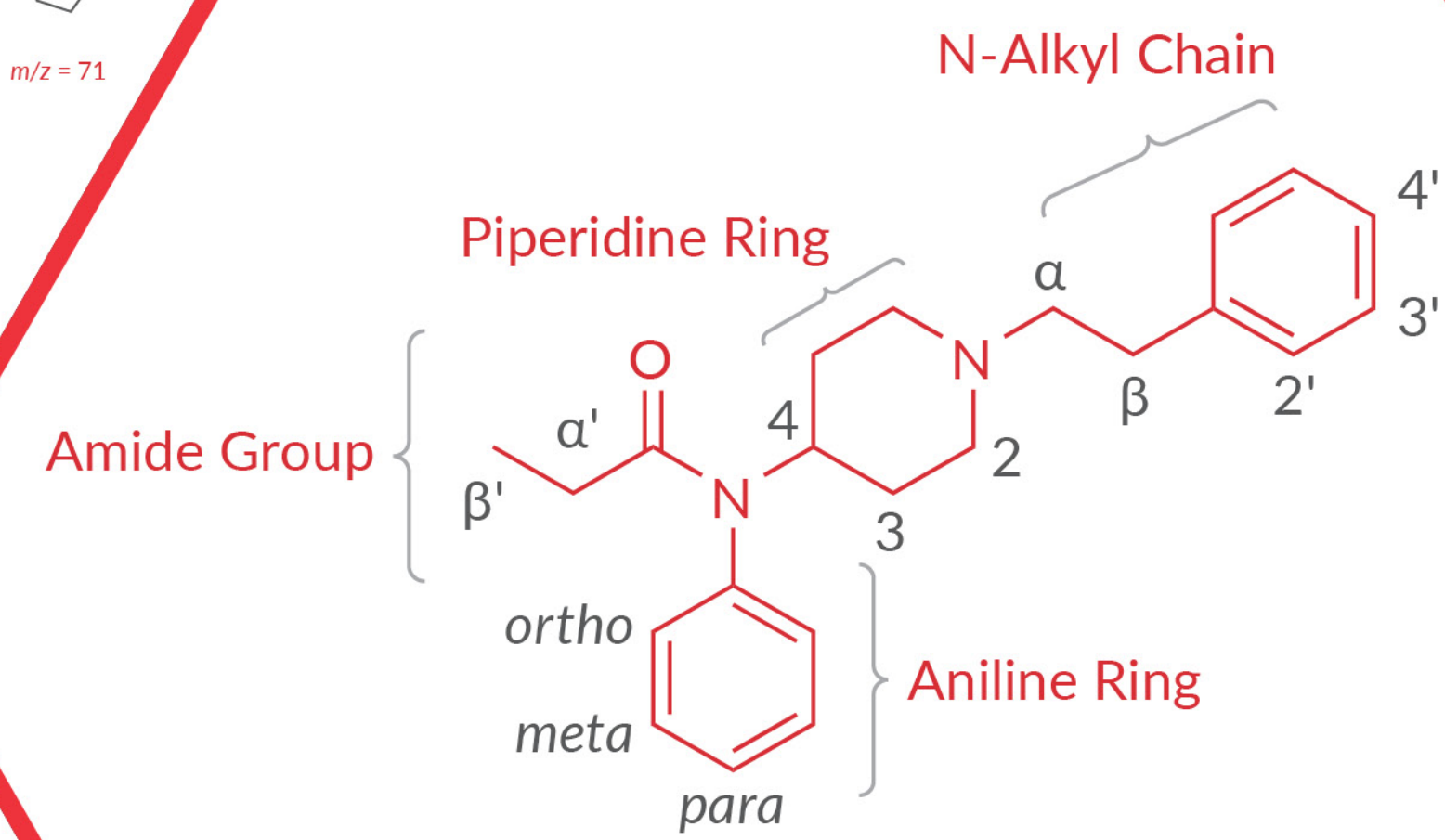


# Laboratory Guide for FENTANYL Identification, Naming, and Metabolism

### Major Fentanyl Predictive Patterns



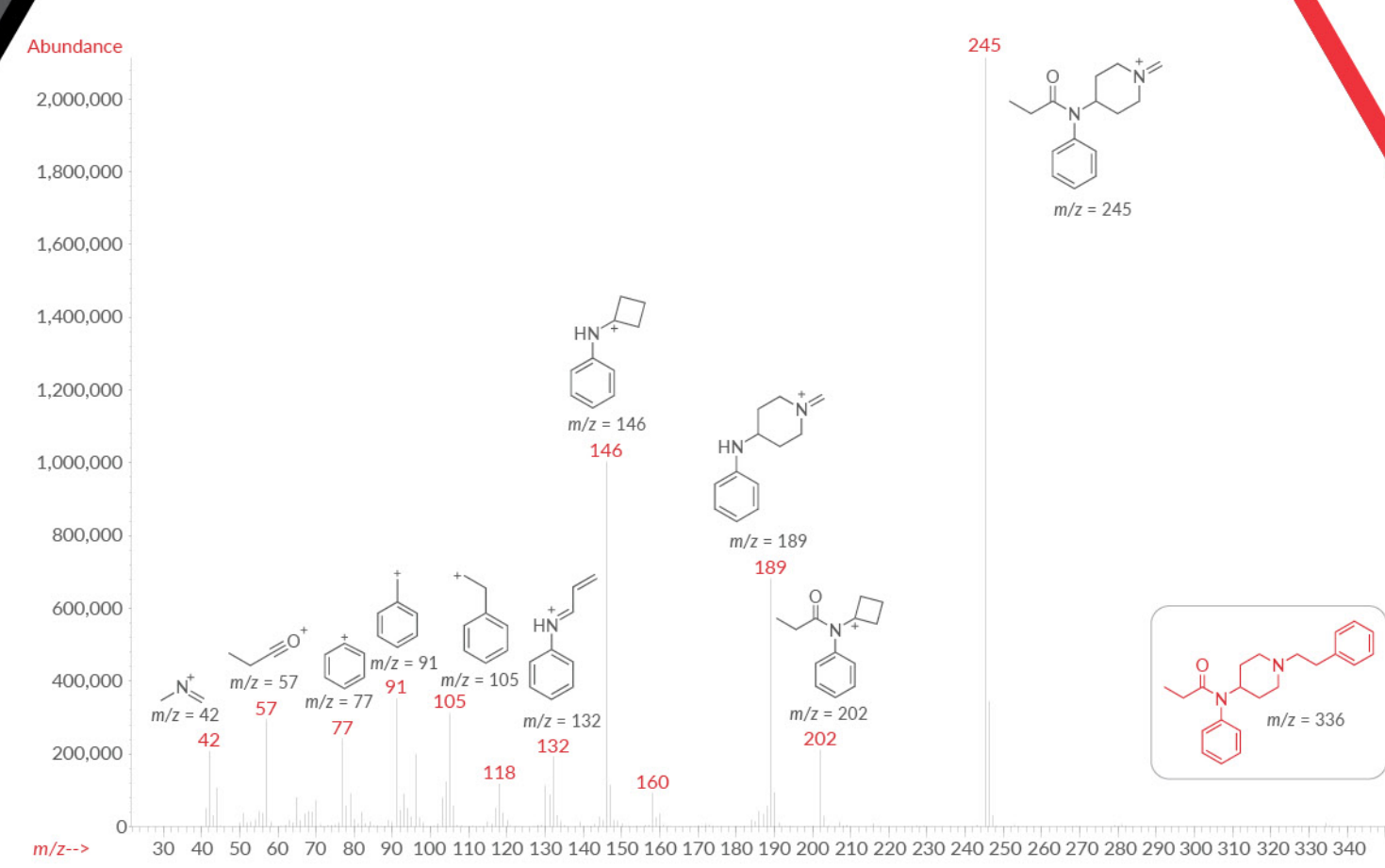
### Standardized Naming of Substituted Fentanyls



- Simple substituents on the fentanyl skeleton (by region):
- **Amide group** substituents occur at either the  $\alpha'$  or  $\beta'$  position.
  - **Aniline ring** substituents occur at the *ortho*, *meta*, and/or *para* positions.
  - **Piperidine ring** substituents occur at the 2, 3, and/or 4 positions.
  - **N-alkyl chain** substituents occur at either the  $\alpha$  or  $\beta$  points on the carbon chain linker and/or the 2', 3', or 4' position of the associated phenyl ring.

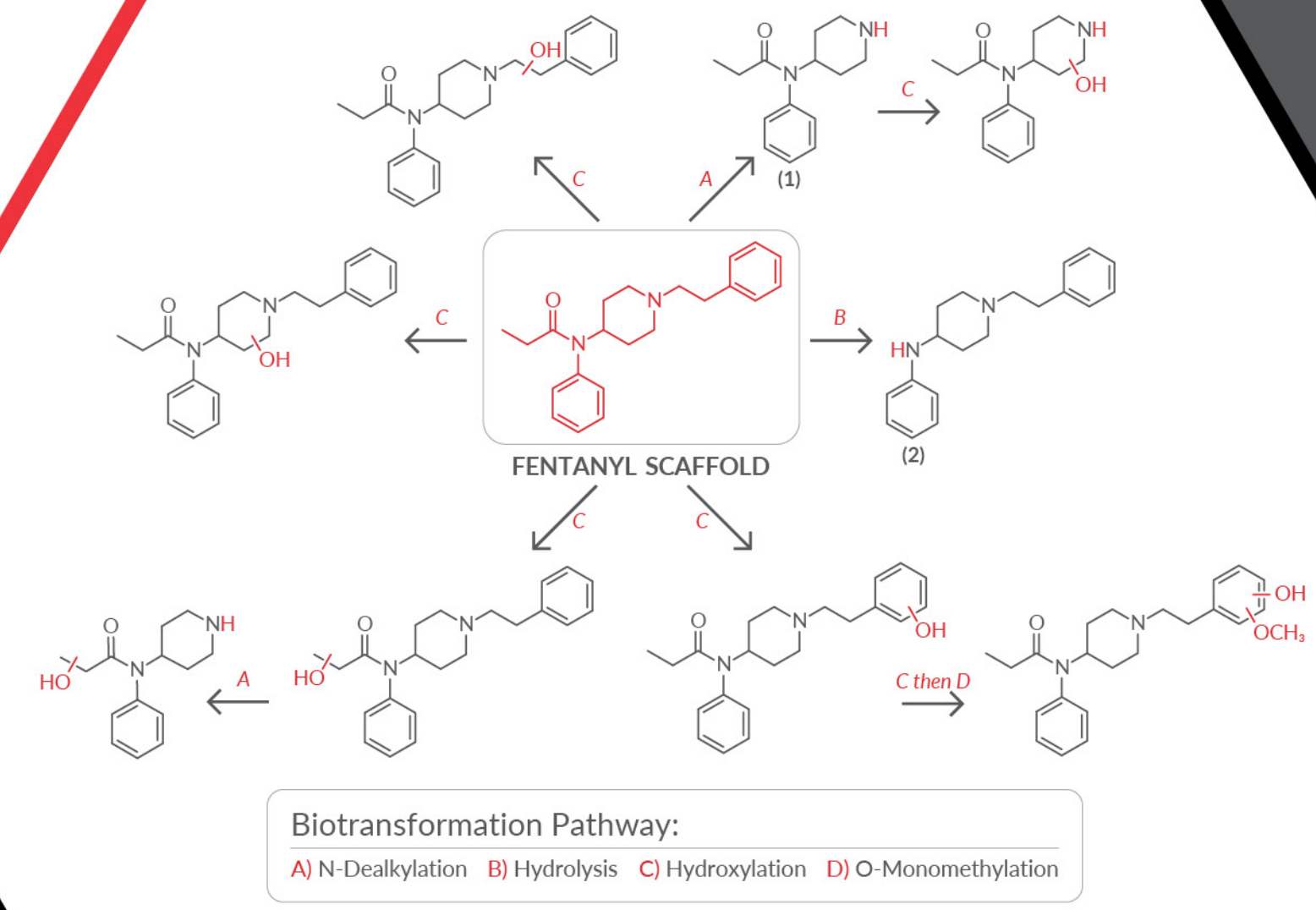
Read more about our standardized naming convention and explore examples and exceptions at [www.caymanchem.com/fentanylnaming](http://www.caymanchem.com/fentanylnaming)

### Mass Spectrum of Fentanyl and Tips for Interpretation



- Tips for GC-MS Interpretation:  
 Here are some common substituents to replace an H (such as where  $R_1$  and  $R_2$  are noted in the Common MS Fragments section above):
- |   |   |
|---|---|
| <b><math>R_1</math> (aniline ring):</b><br>· If $R_1 = CH_3$ , the $m/z$ is +14<br>· If $R_1 = F$ , the $m/z$ is +18<br>· If $R_1 = OCH_3$ , the $m/z$ is +30<br>· If $R_1 = Cl$ , the $m/z$ is +34<br>· If $R_1 = CH(CH_3)_2$ , the $m/z$ is +42<br>· If $R_1 = Br$ , the $m/z$ is +78 | <b><math>R_2</math> (piperidine ring):</b><br>· If $R_2 = CH_3$ , the $m/z$ is +14<br>· If $R_2 = F$ , the $m/z$ is +18 |
|---|---|

### Fentanyl Metabolism: Typical Phase I Metabolites



- The known routes of fentanyl metabolism include N-dealkylation to form norfentanyl (1), hydrolysis to form 4-ANPP (2), and numerous sites for hydroxylation.
  - Many of these phase I metabolites undergo phase II metabolism to form the corresponding glucuronides or sulfates.
  - Coincidentally, norfentanyl and 4-ANPP can also be considered synthetic precursors.
- Learn more about what is known about the metabolism of fentanyls at [www.caymanchem.com/fentanylmetabolism](http://www.caymanchem.com/fentanylmetabolism)

