

**PROBING THE FRAGMENTATION REACTIONS OF PROTONATED
GLYCINE OLIGOMERS VIA MULTISTAGE MASS SPECTROMETRY AND
GAS PHASE H/D EXCHANGE IN A MODIFIED ION TRAP**

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An ion trap mass spectrometer equipped with electrospray ionization has been modified to study the structure of protonated polyglycyl peptides G_n (where $n=2-5$ glycine residues) and their product ions formed by collision induced dissociation via the novel application of gas phase ion-molecule hydrogen/deuterium exchange reactions. In particular, the structures of the y_3 , b_2 , b_3 , b_4 and b_5 ions formed via CID MS/MS from various protonated glycine oligomer precursors have been examined.

The b_2 ions, formed from the protonated G_2 and G_3 precursor ions, the b_3 ion from the protonated G_3 precursor, and the b_4 ion from the protonated G_5 ion all undergo CID and gas phase H/D exchange consistent with the formation of protonated oxazolones previously proposed for b_n -type ions. However, CID MS/MS, MS^N and H/D exchange of the putative b_4 and b_5 ions corresponding to the loss of H_2O from the protonated G_4 and G_5 precursor ions respectively, as well as experiments with various methylated derivatives of G_4 , suggest that these ions are formed via backbone-backbone neighboring group participation reactions remote to the C-terminal amino acid. Efforts to elucidate the mechanisms behind this loss will be described.