Supplement – Calculations

Tryptic digest of RNAse A will result to 45 peptide fragments as predicted by the UCSF MS Digest website: <http://prospector.ucsf.edu/prospector/cgibin/msform.cgi?form=msdigest>

The peptides are listed in Column B in the following table and their mono protonated mass to charge ratios are listed in Column C. Lysine containing peptides are predicted to form adducts with guanine in DNA. Addition of one dG molecule will result in Δm/z of 281.07. Because there are multiple lysine residues in the RNAse A sequence, each of these residues can potentially form adducts with dG resulting to peptide fragment cross-linking with multiple equivalents of dG.

For example, if the molecular weight of one peptide is M, it is possible to observe [M-H-ndG]+, [M-2H-ndG]++, and [M-3H-ndG]+++ (n could be 1 or 2 or 3). Let’s take the first peptide **ETGSSKYPNTCAYKTTQANK** with no carboaminomethyl modification as an example. The mono protoned m/z of this peptide ([M-H]+) is 2090.98. Since there are three lysines in this peptide, one or two or three dG can be crosslinked with the peptide. If there is only one dG crosslinked with the peptide, the calculation will be as follows:

[M-H]+=2090.98

[M-H-dG]+=2090.98+281.07= 2372.05

[M-H-2dG]+= 2090.98+281.07\*2= 2653.12

In addition, each of the M-dG, M-2dG, M-3dG can also be ionized with two or three protons (the mass of one proton is 1.007825). In this case, the calculation will be:

[M-2H-dG]++= (2090.98+1.007825+281.07)/2= 1186.53

[M-2H-2dG]++ = (2090.98+1.007825+281.07\*2)/2= 1327.07

[M-2H-3dG]++ = (2090.98+1.007825+281.07\*3)/2= 1467.61

[M-3H-dG]+++ = (2090.98+1.007825+281.07)/3= 791.36

[M-3H-2dG]+++ = (2090.98+1.007825+281.07)/3= 885.05

[M-3H-3dG]+++ = (2090.98+1.007825+281.07)/3= 978.75

In the above calculation all possible combinations of m/z values of dG-peptide cross-links within **ETGSSKYPNTCAYKTTQANK** have been calculated. Similar tables were accomplished for the remaining 44 expected peptide. The data is shown in Table S-1 and was used to identify the site of cross-linking.