Supplementary Material

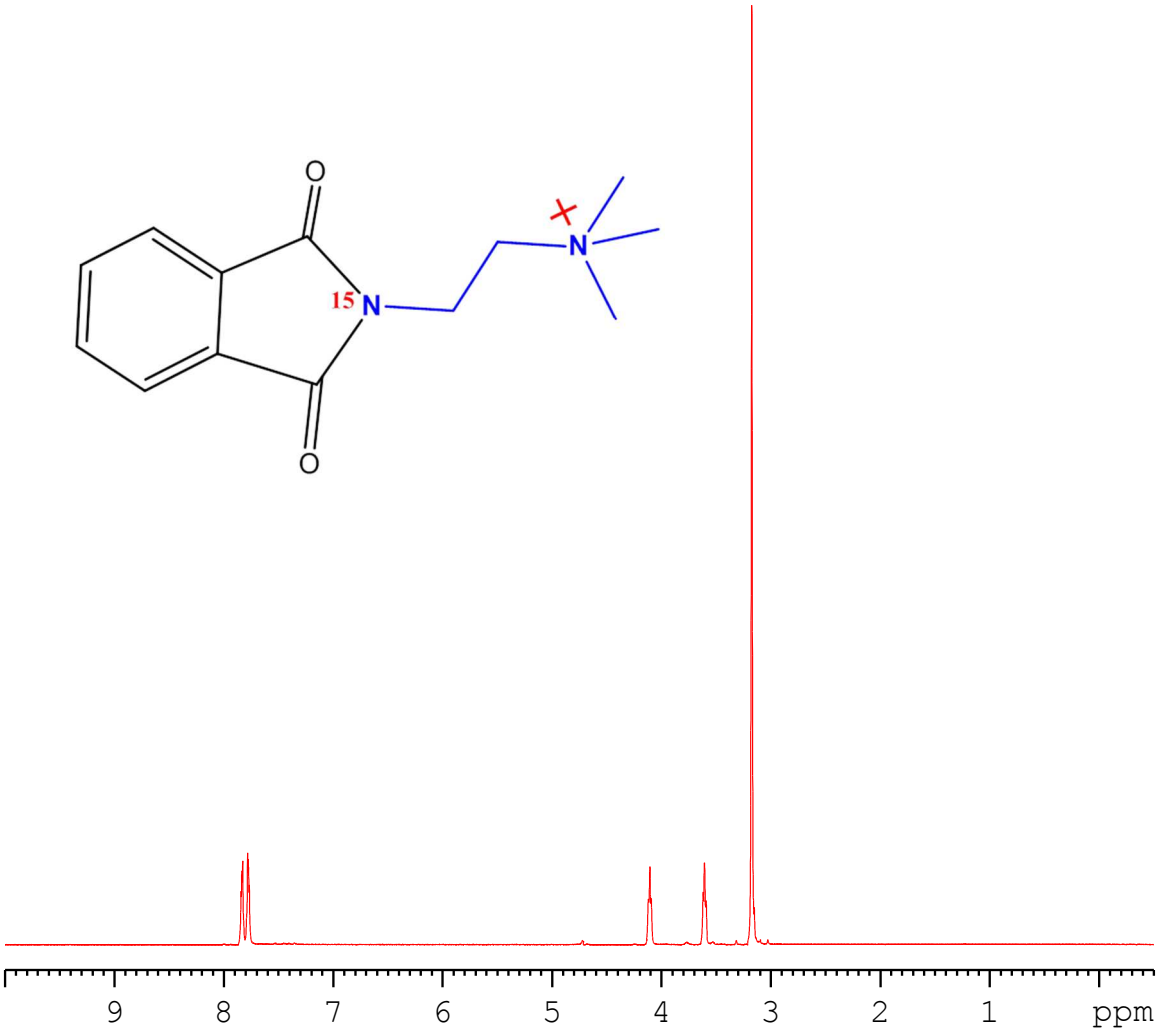
^{15}N-Cholamine – A Smart Isotope Smart Tag for Combining NMR- and MS-Based Metabolite Profiling

Fariba Tayyari,[1] G. A. Nagana Gowda,[2] Haiwei Gu[2] and Daniel Raftery*[1,2,3]

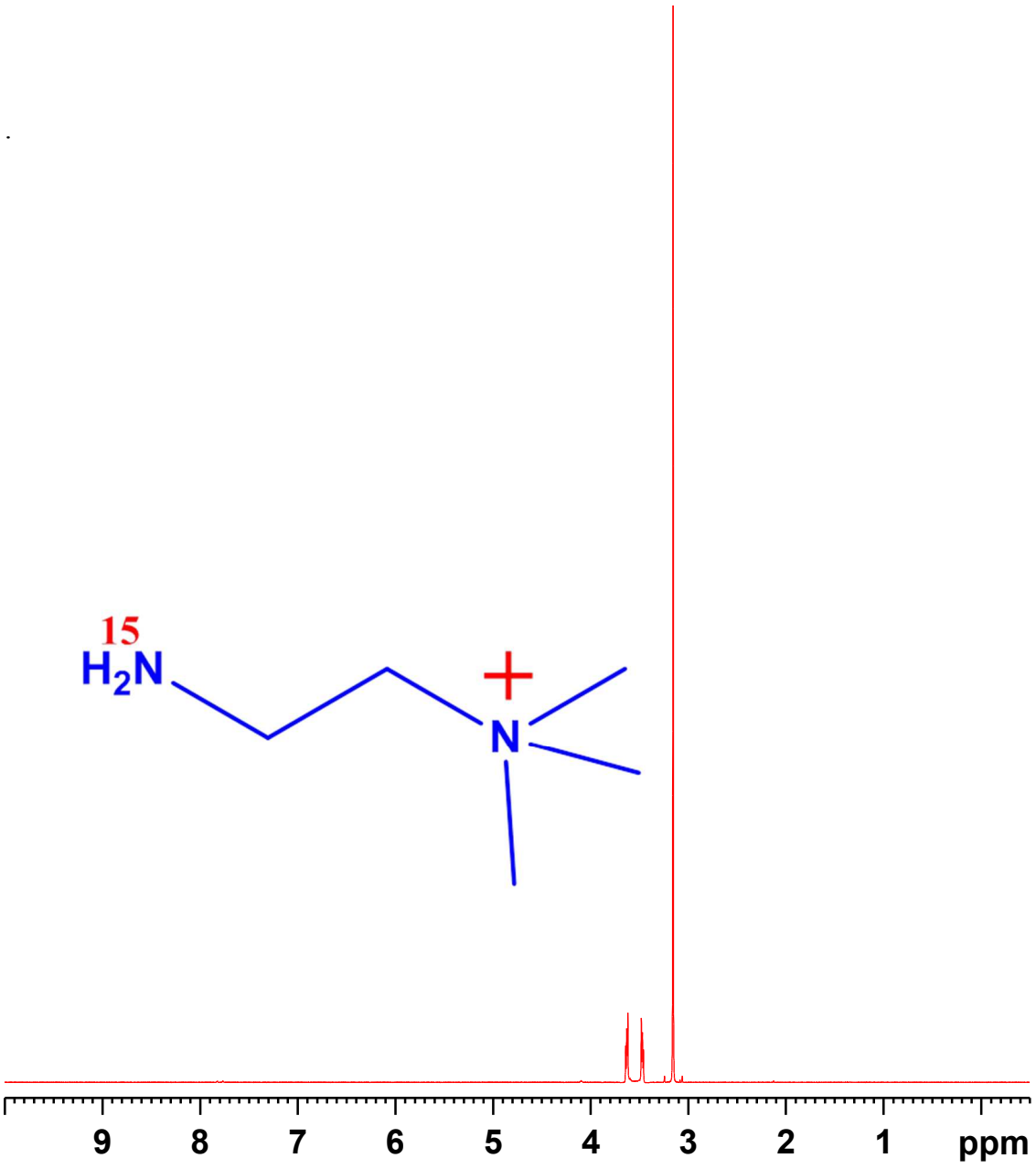
[1]Department of Chemistry, Purdue University, West Lafayette, IN 47907

[2]Northwest Metabolomics Research Center, Anesthesiology and Pain Medicine, University of Washington, Seattle, WA 98109

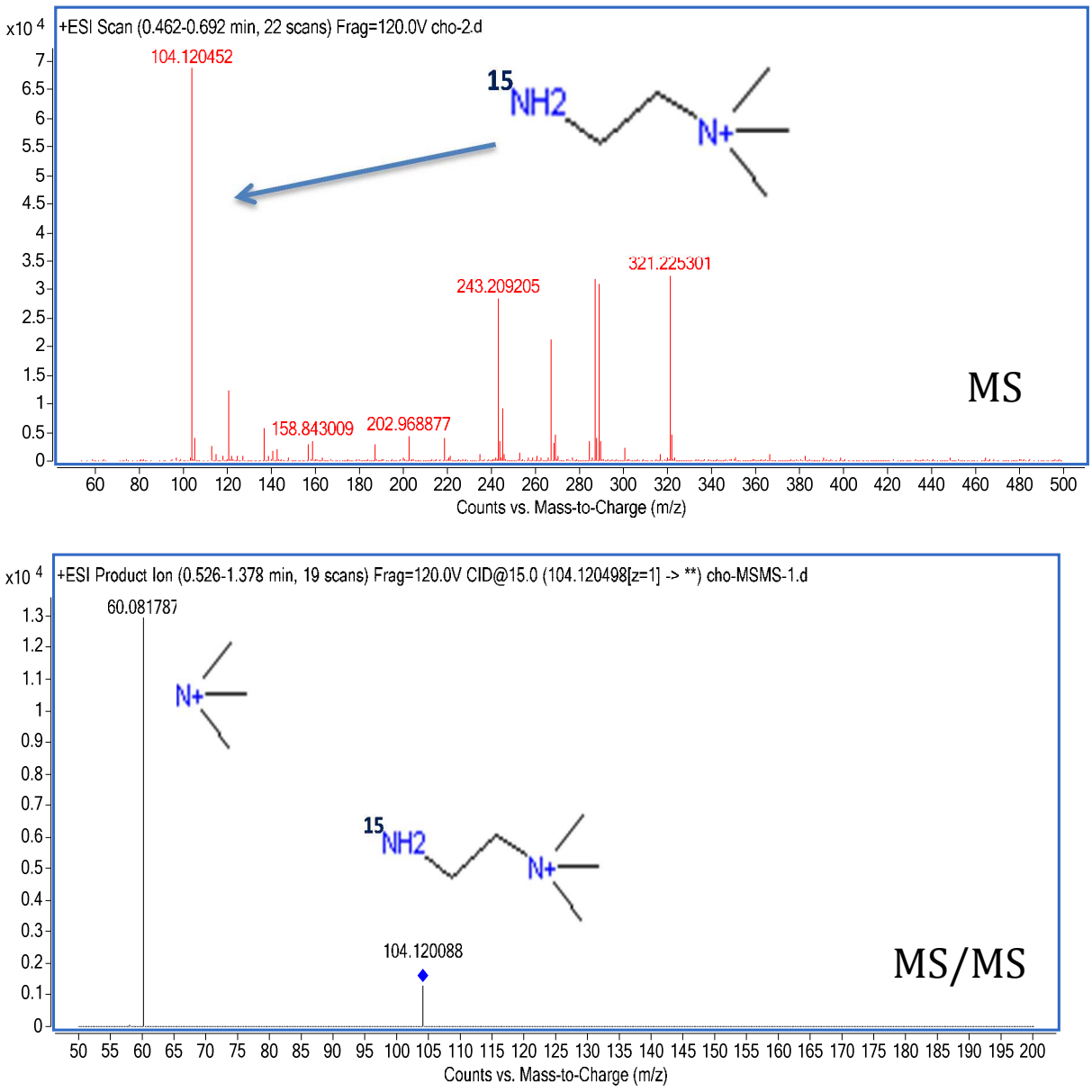
[3] Fred Hutchinson Cancer Research Center, Seattle, WA 98109



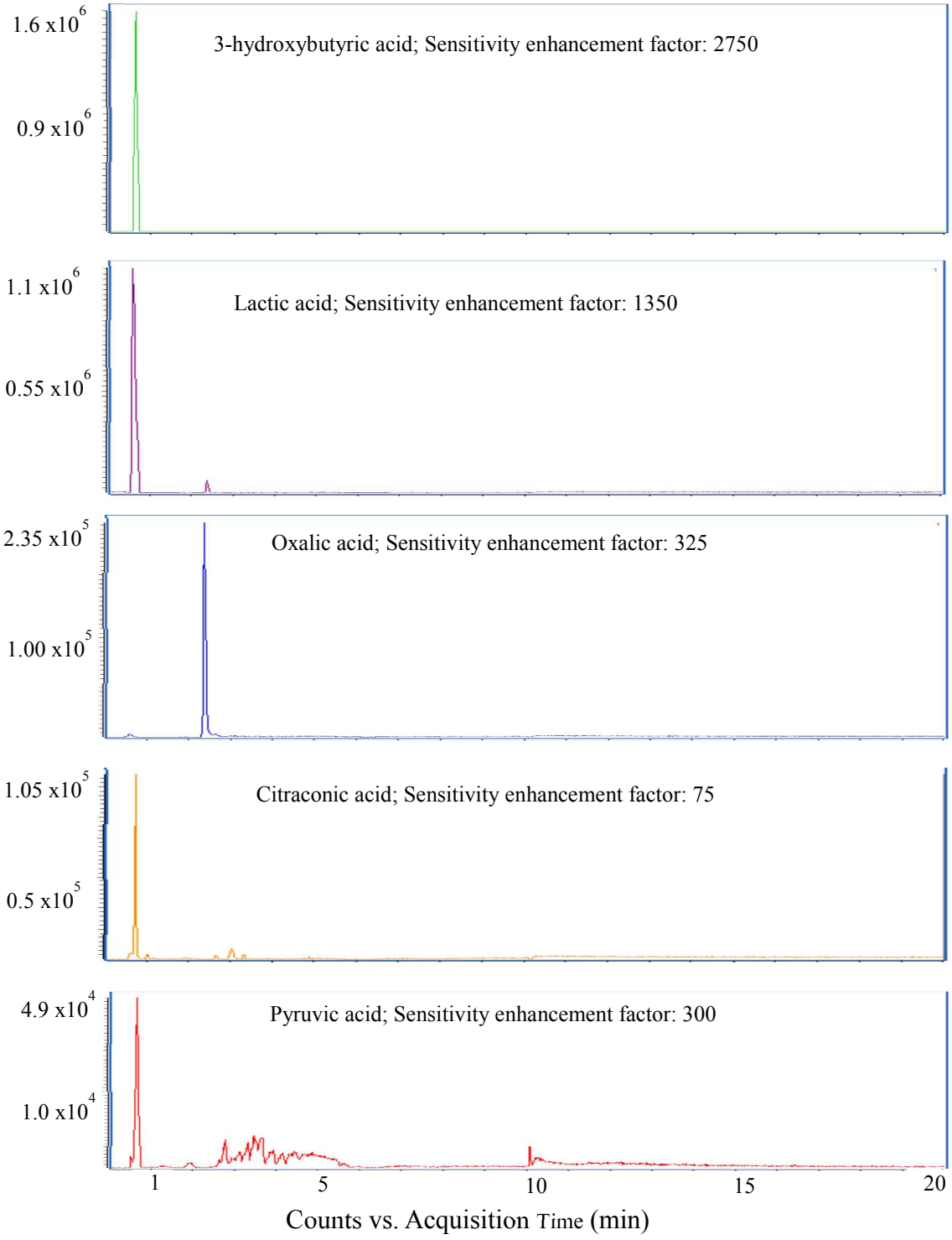
Supplementary Figure S1. ^{1}H NMR spectrum of ^{15}N-substituted phthalimide intermediate compound, obtained for the synthesis of ^{15}N-cholamine, and recorded on a Bruker DRX 499 MHz NMR spectrometer.



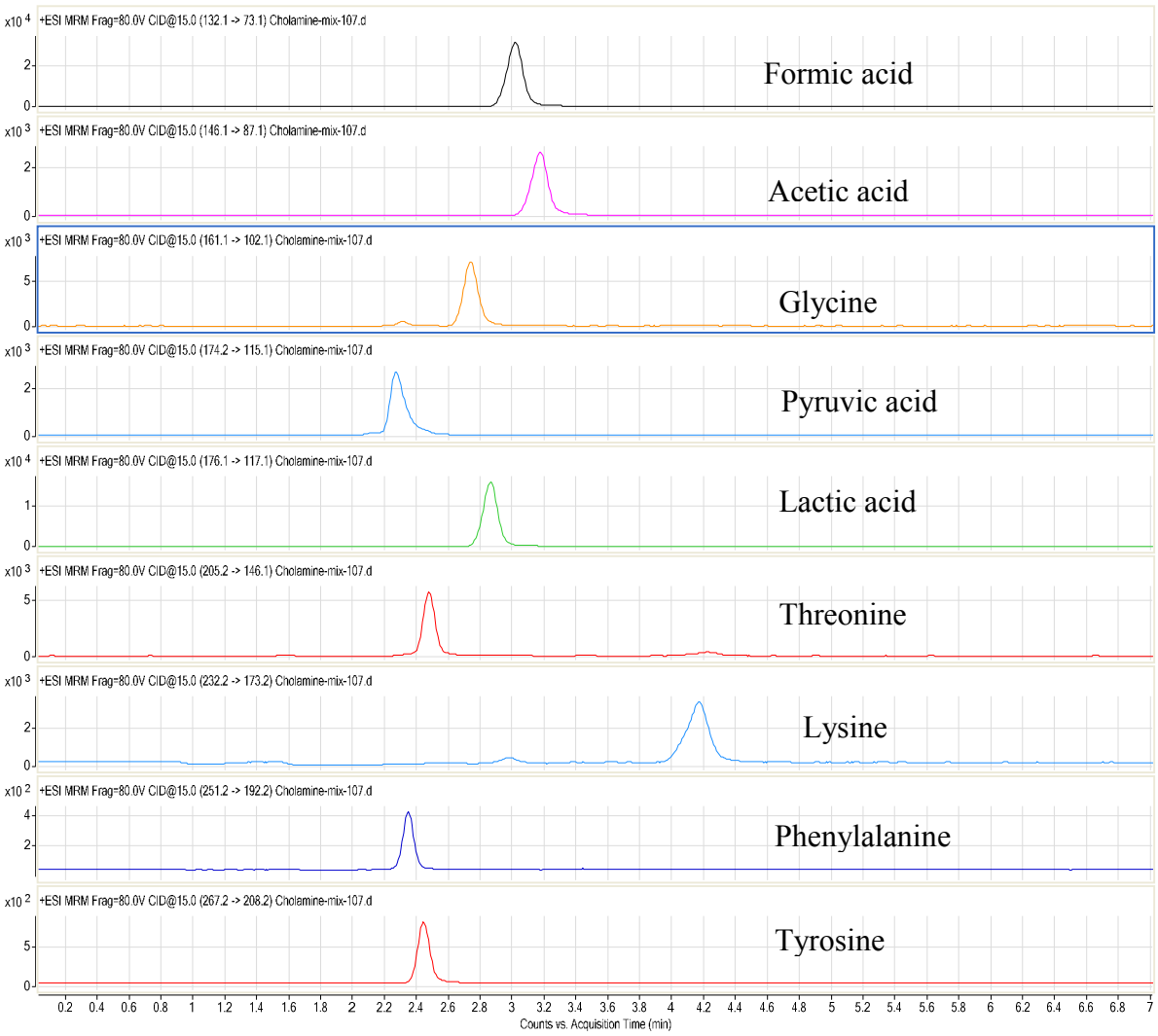
Supplementary Figure S2. ^{1}H NMR spectrum of the synthesized ^{15}N-cholamine obtained on a Bruker Avance III 800 MHz NMR spectrometer.



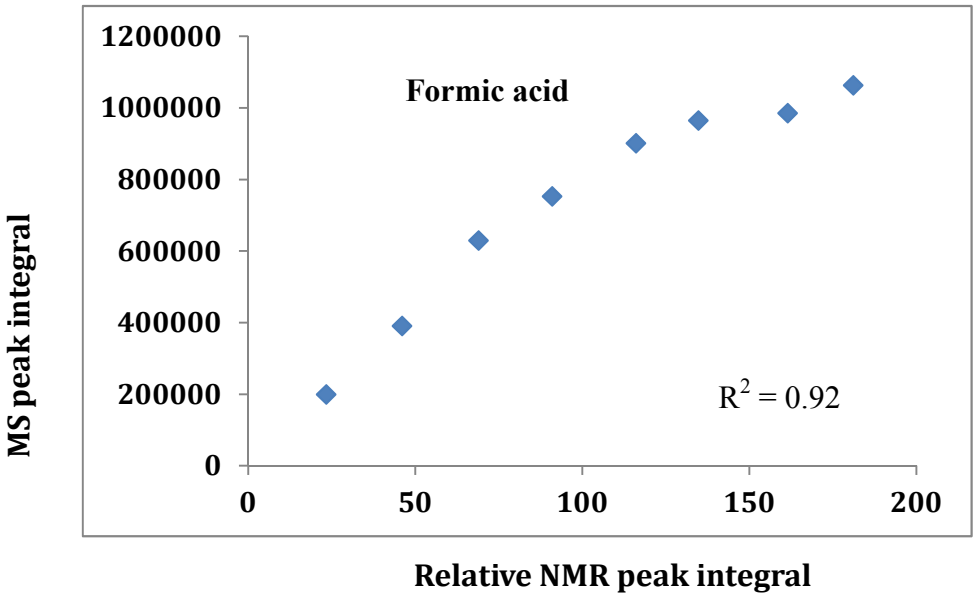
Supplementary Figure S3. MS and MS/MS spectra of the synthesized ^{15}N-cholamine.

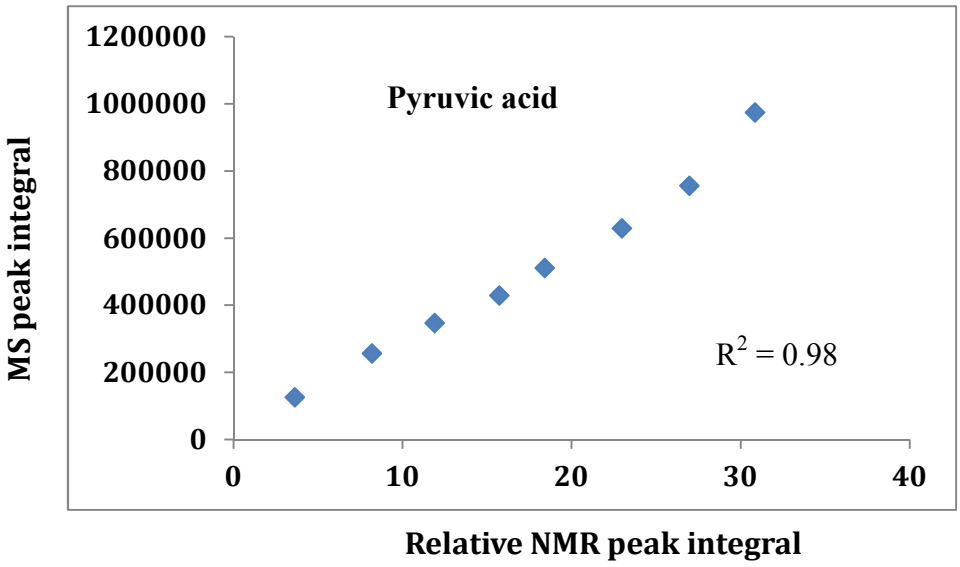


Supplementary Figure S4. Accurate mass extracted ion chromatograms for a few carboxylic acids detected in serum in positive ion mode after tagging with ^{15}N-cholamine. The sensitivity enhancement factor indicates the ratio of peak area obtained with ^{15}N-cholamine tag to the peak area for the same acid detected without tagging (in negative ion mode), in the same serum sample.



Supplementary Figure S5. MRM chromatograms for a mixture of cholamine tagged carboxylic and amino acids detected after separation using an HILIC column, without attempting to optimize chromatography conditions. Considering that all metabolites have the same permanently charged cholamine tag, the separation achieved in a quick experiment which is still not well optimized may be remarkable.





Supplementary Figure S6. Two examples comparing the MS and NMR peak integral intensities for formic and pyruvic acids at different concentrations. Eight mixtures with random concentrations of various synthetic compounds were tagged with ^{15}N-cholamine and analyzed using NMR and MS methods. Good correlation between the NMR and MS measurements, as seen in the two figures, suggest the potential of using the new tagging approach for direct comparisons of the data from the two analytical platforms.