Supplemental Information

Polyamines are traps for reactive intermediates in furan metabolism

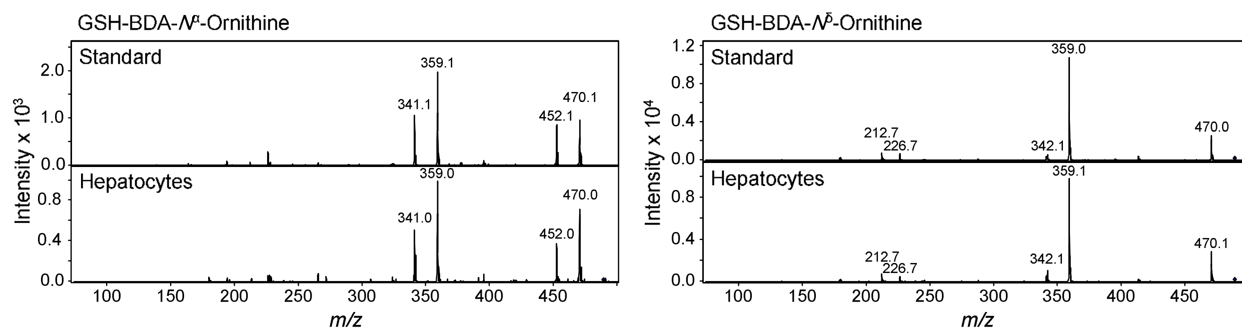
Lisa A. Peterson, Martin B. Phillips, Ding Lu, and Mathilde M. Sullivan

Supplemental Table 1.

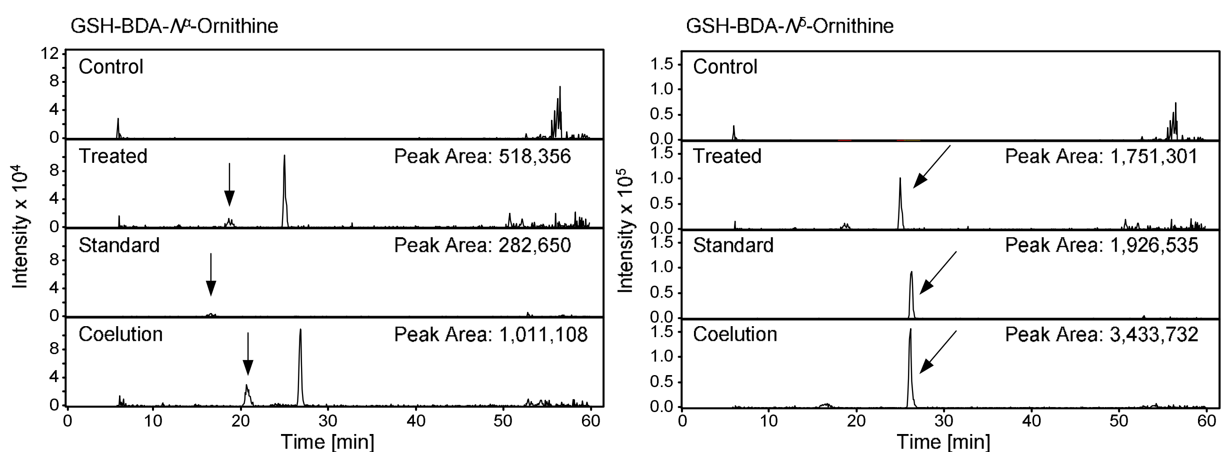
Ion-suppression correction factors for LC/MS analyses.

Amine	Water	Buffer	Media
GSH-BDA-putrescine	0.92	0.82	0.86
GSH-BDA-cadaverine	0.67	0.59	0.63
GSH-BDA-N^{α}-ornithine	1.62	9.17	1.91
GSH-BDA-N^{δ}-ornithine	1.09	1.03	1.02
GSH-BDA-spermine	2.09	2.70	2.61
GSH-BDA-N^{1}-spermidine	0.83	0.85	0.87
GSH-BDA-N^{8}-spermidine	0.93	0.83	0.92
GSH-BDA-N^{α}-lysine	1.09	1.06	1.04
GSH-BDA-N^{ϵ}-lysine	0.83	0.76	0.86

A.

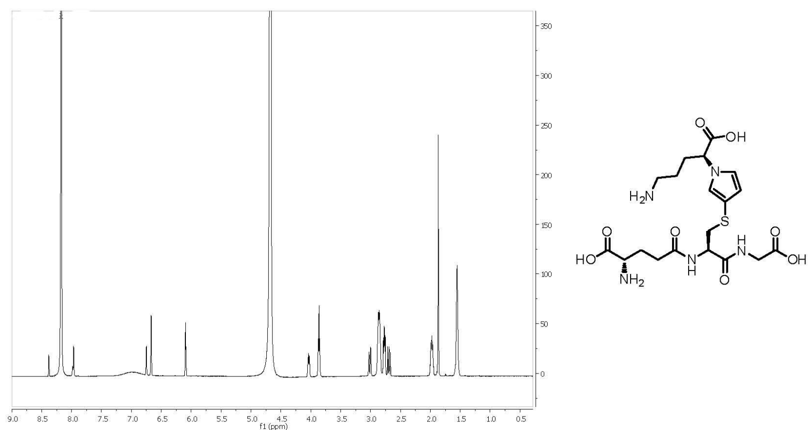


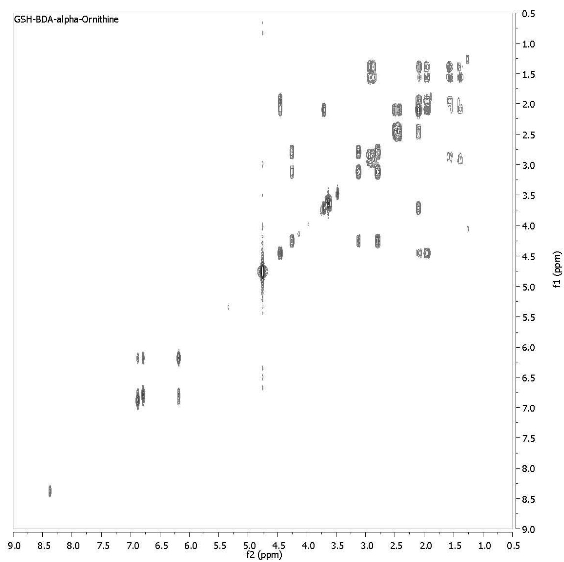
B.



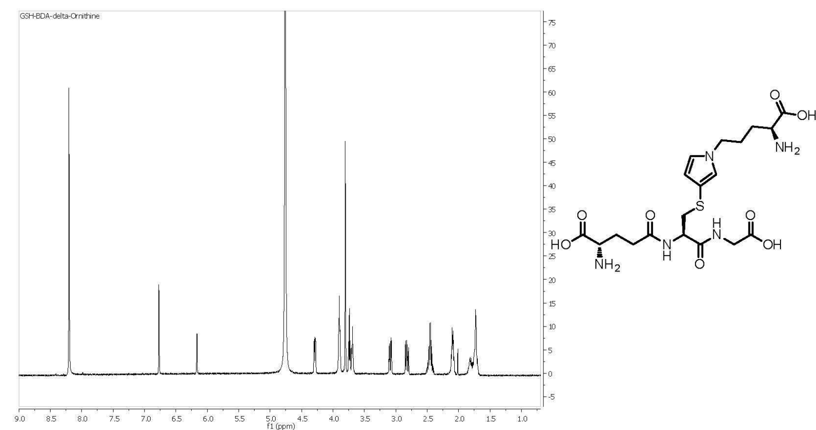
Supplemental Figure 1. A. Mass spectra of GSH-BDA-N^{α}-ornithine and GSH-BDA-N^{δ}-ornithine. B. LC/MS chromatograms demonstrating co-elution of the synthetic GSH-BDA-ornithine isomers with the hepatocyte metabolites of furan. The mixtures were eluted from the HPLC column with the following gradient: after ten minutes in 10 mM ammonium formate, pH 2.8, a 16 minute linear gradient was run to 10 mM ammonium formate, pH 2.8, containing 12.5% acetonitrile followed by a 10 minute linear gradient to 25% acetonitrile.

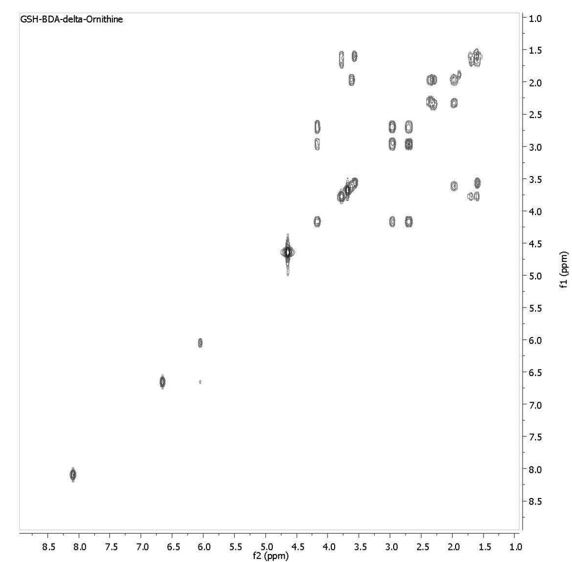
A





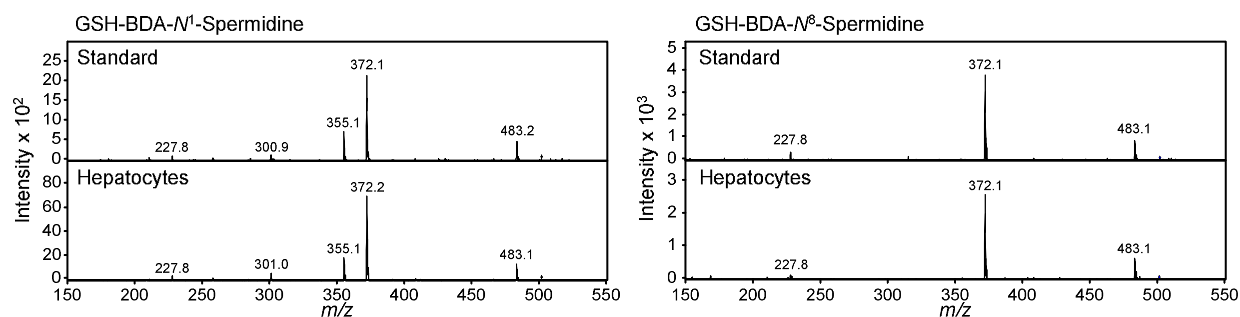
B



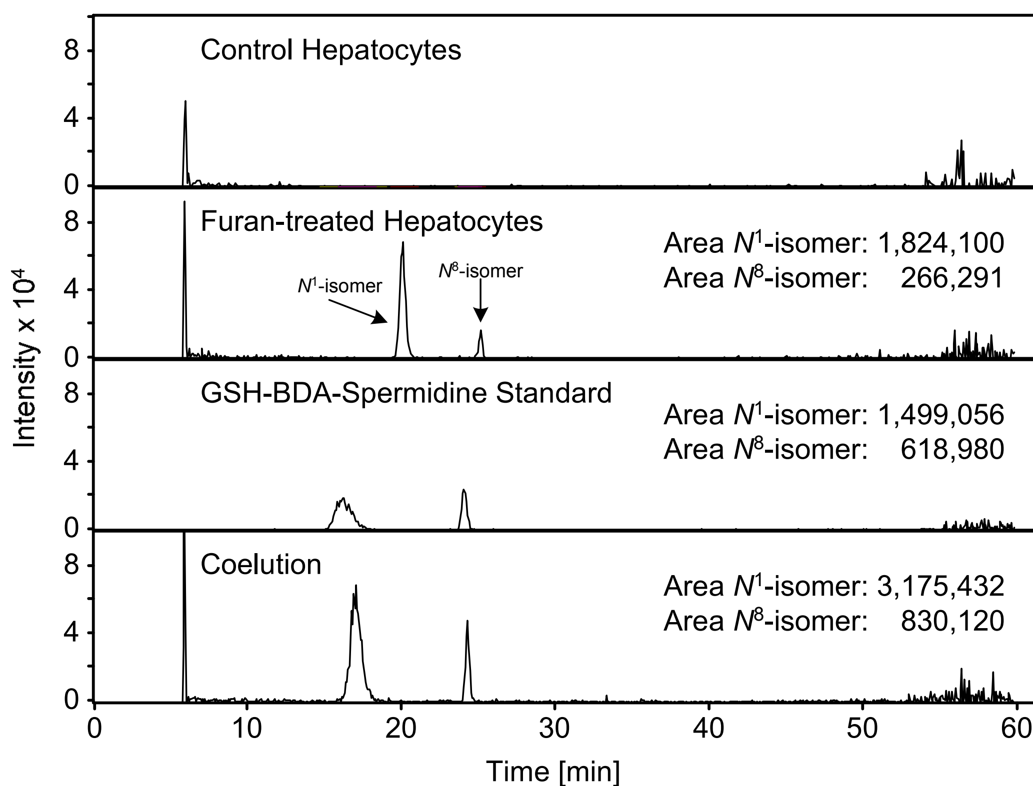


Supplemental Figure 2. COSY NMR spectra for A) GSH-BDA-N^{α}-ornithine and B) GSH-BDA-N^{δ}-ornithine. The C2 proton of the pyridine ring in both compounds exchanged rapidly with D_2O.

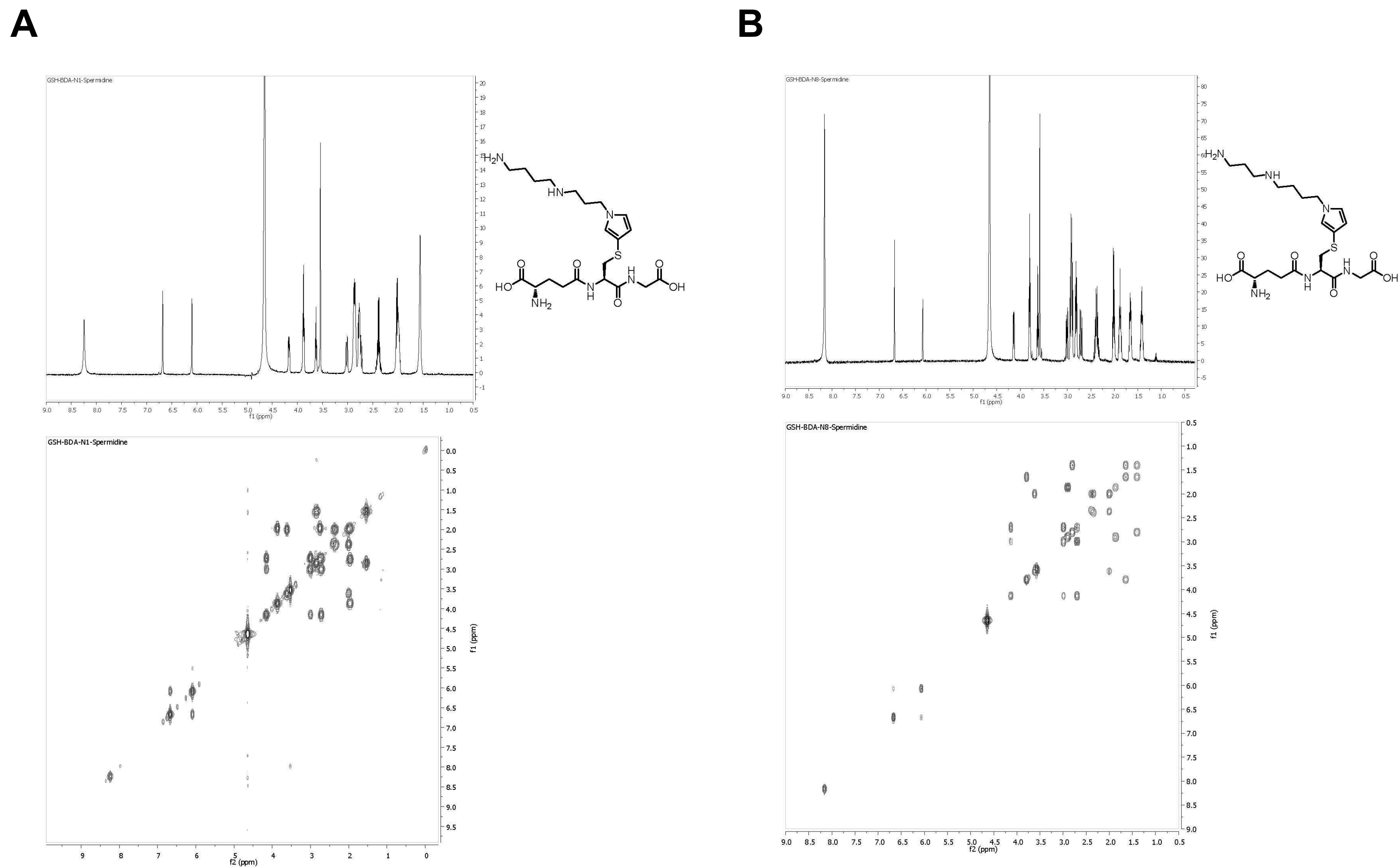
A.



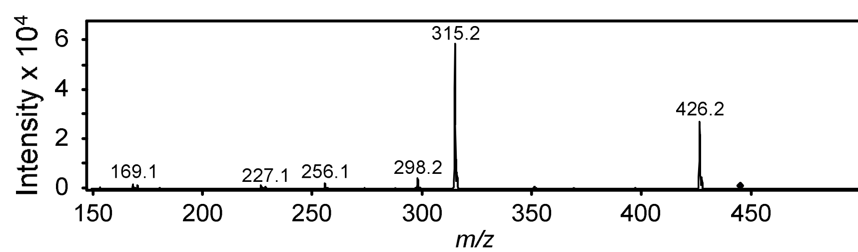
B.



Supplemental Figure 3. A. Mass spectra of GSH-BDA-N^1-spermidine and GSH-BDA-N^8-spermidine. B. LC/MS chromatograms demonstrating co-elution of the synthetic GSH-BDA-spermidine isomers with the hepatocyte metabolites of furan. The mixtures were eluted from the HPLC column with the following gradient: after ten minutes in 10 mM ammonium formate, pH 2.8, a 16 minute linear gradient was run to 10 mM ammonium formate, pH 2.8, containing 12.5% acetonitrile followed by a 10 minute linear gradient to 25% acetonitrile.

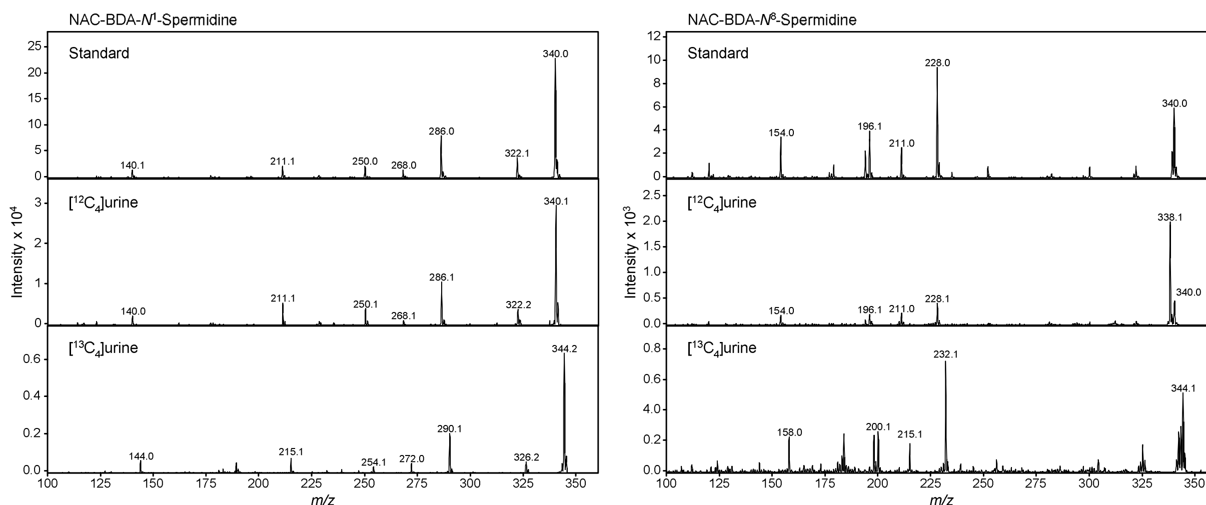


Supplemental Figure 4. COSY NMR of A) GSH-BDA-N^1-spermidine and B) GSH-BDA-N^8-spermidine. The C2 proton of the pyridine ring in both compounds exchanged rapidly with D_2O.



Supplemental Figure 5. Mass spectrum of synthetic GSH-BDA-putrescine.

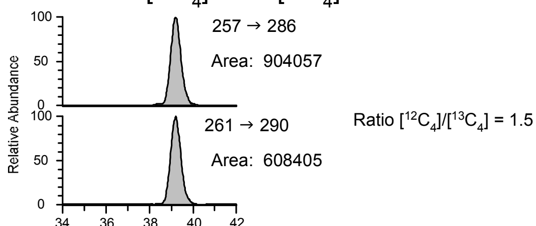
A.



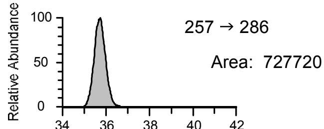
B.

NAC-BDA-N^1-spermidine

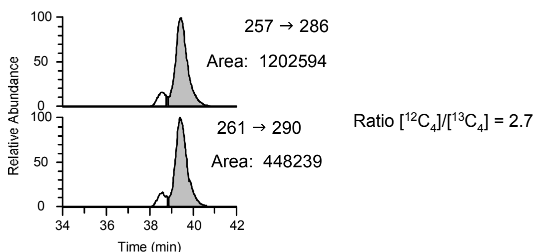
Urine from $[^{12}C_4]$- and $[^{13}C_4]$furan-treated rats



Standard alone

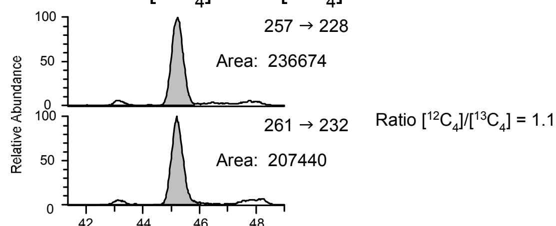


Co-elution of standard with urine

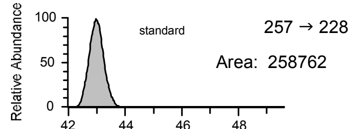


NAC-BDA-N^8-spermidine

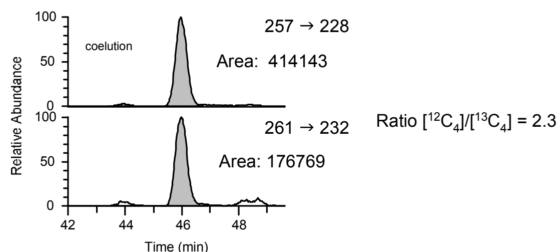
Urine from $[^{12}C_4]$- and $[^{13}C_4]$furan-treated rats



Standard alone



Co-elution of standard with urine



Supplemental Figure 6. A. Mass spectrum for the NAC-BDA-spermidine standards and metabolites observed in urine from $[^{12}C_4]$- and $[^{13}C_4]$furan-treated rats. The fragment at *m/z* 338 in the mass spectrum for the urinary metabolite, $[^{12}C_4]$NAC-BDA-N^8-spermidine, is from a co-eluting peak that also has a molecular ion at *m/z* 357. B. LC/MS chromatograms obtained with a mixture of urine from $[^{12}C_4]$- and $[^{13}C_4]$furan-treated rats demonstrating co-elution of these metabolites with the synthetic standards of the NAC-BDA-spermidine isomers. HPLC method 1

was employed using 10 mM ammonium formate, pH 2.8.