

Table S1.

Phospholipid internal calibrants used for measuring phospholipid CCS values directly from tissue sections. These values were originally published by Fenn et al.<sup>1</sup>

Species	Ion Type	$m/z$	CCS ( $\text{\AA}^2$ )
SM 18:0	$[\text{M} + \text{H}]^+$	731.6	221.1
	$[\text{M} + \text{Na}]^+$	753.6	221.3
PC 34:2	$[\text{M} + \text{H}]^+$	758.6	217.4
	$[\text{M} + \text{Na}]^+$	780.6	218.9
SM 20:0	$[\text{M} + \text{H}]^+$	759.7	229.8
	$[\text{M} + \text{Na}]^+$	781.6	231.3
PC 34:1	$[\text{M} + \text{H}]^+$	760.6	219.1
	$[\text{M} + \text{Na}]^+$	782.6	221.7
PC 36:2	$[\text{M} + \text{H}]^+$	786.6	222.6
	$[\text{M} + \text{Na}]^+$	808.6	226.7
PC 36:1	$[\text{M} + \text{H}]^+$	788.6	227.4
	$[\text{M} + \text{Na}]^+$	810.6	228.1
PC 42:0	$[\text{M} + \text{Na}]^+$	896.7	246.3

Table S2.

BSA tryptic peptide CCS external calibrants used for measuring phospholipid CCS values directly from tissue sections. These values were originally published by Tao et al. and measured by MALDI drift cell IM-TOFMS.<sup>2</sup>

Peptide Amino Acid Sequence	$m/z$ [M + H] <sup>+</sup>	CCS (Å <sup>2</sup> )
VASLR <sup>ab</sup>	545.66	159
CASIQK <sup>ab</sup>	649.33	182
AWSVAR <sup>a</sup>	689.37	189
SEIAHR <sup>a</sup>	712.37	188
AEFVEVTK <sup>a</sup>	922.49	231
YLYEIAR <sup>a</sup>	927.49	244
CCTESLVNR <sup>a</sup>	1024.46	252
LVNELTEFAK	1163.63	279
FKDLGEEHFK <sup>a</sup>	1249.62	290
HPEYAVSVLLR <sup>a</sup>	1283.71	309
HLVDEPQNLIK	1305.72	301
RHPEYAVSVLLR	1439.81	321
LGEYGFQNALIVR	1479.80	331
DAFLGSFLYEYSR	1567.74	343
KVPQVSTPTLVEVSR	1639.94	349
RPCSALTPDETYVPK	1823.90	364
HPYFYAPELLYYANK	1888.93	384
RHPYFYAPELLYYANK	2045.03	397

<sup>a</sup>Peptide CCS calibrants used for determining phospholipid CCS values. CCS values of these peptides measured using ESI IM-TOFMS and reported by Valentine et al.<sup>3</sup> were used for comparison.

<sup>b</sup>Peptide CCS Calibrants used only for determining phospholipid CCS values and not tryptic peptide CCS values.