

**Supplemental Table S1. Association of Plasma Sphingolipid Species with Insulin Sensitivity**

<b>Sphingolipids (pmol/mL)</b>	<b>Mean ± SD</b>	<b>r</b>	<b>P value</b>
<b>Ceramides (Cer)</b>			
<b>C14:0</b>	12.6 ± 5.40	-0.06	0.45
<b>C16:0</b>	65.0 ± 26.9	0.14	0.084
<b>C18:1</b>	6.00 ± 3.48	-0.28	0.0003
<b>C18:0</b>	45.4 ± 28.2	0.04	0.61
<b>C20:0</b>	77.9 ± 40.2	0.11	0.16
<b>C22:0</b>	603 ± 311	0.14	0.072
<b>C24:1</b>	524 ± 265	0.23	0.0041
<b>C24:0</b>	1998 ± 994	0.37	<0.0001
<b>C26:1</b>	9.29 ± 5.99	0.28	0.0004
<b>C26:0</b>	17.4 ± 9.29	0.36	<0.0001
<b>C28:1</b>	0.72 ± 0.73	0.04	0.62
<b>C28:0</b>	0.87 ± 1.47	-0.10	0.22
<b>C30:1</b>	0.44 ± 0.44	-0.05	0.51
<b>C30:0</b>	0.08 ± 0.17	0.06	0.49
<b>C32:1</b>	1.43 ± 2.29	-0.11	0.17
<b>C32:0</b>	0.35 ± 0.55	-0.06	0.43
<b>C34:1</b>	0.67 ± 1.02	-0.11	0.17
<b>C34:0</b>	0.14 ± 0.25	-0.02	0.85
<b>Total Cer</b>	3363 ± 1478	0.33	<0.0001
<b>Total VLC</b>	4.71 ± 5.88	-0.09	0.28
<b>%Cer of SPL</b>	3.69 ± 1.75	0.30	0.0001
<b>Monohexosyl ceramides (MHC)</b>			
<b>C14:0</b>	8.10 ± 4.86	0.08	0.33
<b>C16:0</b>	952 ± 617	0.08	0.33
<b>C18:1</b>	59.2 ± 49.6	-0.25	0.0016
<b>C18:0</b>	48.0 ± 30.8	-0.03	0.75
<b>C20:0</b>	90.2 ± 64.7	0.12	0.12
<b>C22:0</b>	1204 ± 767	0.20	0.012
<b>C24:1</b>	796 ± 577	0.08	0.30
<b>C24:0</b>	1427 ± 943	0.23	0.0036
<b>C26:1</b>	13.4 ± 9.89	-0.04	0.65
<b>C26:0</b>	7.77 ± 5.57	0.31	<0.0001
<b>C28:1</b>	2.27 ± 1.87	0.38	<0.0001
<b>C28:0</b>	1.43 ± 1.40	0.43	<0.0001
<b>C30:1</b>	1.14 ± 0.98	0.15	0.067
<b>C30:0</b>	7.92 ± 5.93	0.19	0.019
<b>C32:1</b>	1.97 ± 2.61	0.14	0.072
<b>C32:0</b>	0.35 ± 0.59	0.20	0.013
<b>C34:1</b>	0.59 ± 0.50	0.42	<0.0001
<b>C34:0</b>	0.28 ± 0.28	0.49	<0.0001

<b>Total MHC</b>	4622 ± 2725	0.17	0.034
<b>Total VLC</b>	15.9 ± 10.5	0.33	<0.0001
<b>%MHC of SPL</b>	4.63 ± 2.05	0.28	0.0003

**Sphingomyelins  
(SM)**

<b>C14:0</b>	6271 ± 2145	0.08	0.32
<b>C16:0</b>	24287 ± 6963	-0.08	0.31
<b>C18:1</b>	6109 ± 2394	-0.27	0.0007
<b>C18:0</b>	7374 ± 2526	-0.23	0.0037
<b>C20:0</b>	6904 ± 2275	-0.03	0.72
<b>C22:0</b>	11971 ± 3893	-0.05	0.51
<b>C24:1</b>	15654 ± 5090	-0.05	0.57
<b>C24:0</b>	8620 ± 3189	-0.02	0.82
<b>C26:1</b>	130 ± 51.5	0.02	0.83
<b>C26:0</b>	43.9 ± 19.7	0.02	0.82
<b>C28:1</b>	18.5 ± 8.07	0.26	0.0009
<b>C28:0</b>	39.3 ± 20.7	0.26	0.0012
<b>C30:1</b>	10.1 ± 4.39	0.23	0.0030
<b>C30:0</b>	8.35 ± 3.89	0.26	0.0008
<b>C32:1</b>	1.36 ± 0.74	0.18	0.022
<b>C32:0</b>	2.74 ± 1.49	0.41	<0.0001
<b>C34:1</b>	0.99 ± 0.51	0.38	<0.0001
<b>C34:0</b>	1.22 ± 0.61	0.41	<0.0001
<b>Total SM</b>	87446 ± 23734	-0.09	0.25
<b>Total VLC</b>	82.5 ± 36.2	0.29	0.0002
<b>%SM of SPL</b>	91.0 ± 2.99	-0.38	<0.0001

<b>Sphingosine</b>	121 ± 54.8	0.32	<0.0001
<b>Dh-Sphingosine</b>	9.89 ± 19.9	0.055	0.594
<b>S1P</b>	412 ± 187	0.06	0.46
<b>Dh-S1P</b>	70.7 ± 33.2	0.20	0.012
<b>SPL (Total)</b>	96045 ± 25667	-0.05	0.55

Dh, dihydro; SIP, sphingosine-1-phosphate; SPL, sphingolipids; VLC, very-long-chain

**Supplemental Table S2. Association of Plasma Sphingolipid Species with Insulin Secretion**

<b>Sphingolipids (pmol/mL)</b>	<b>Mean ± SD</b>	<b>r</b>	<b>P value</b>
<b>Ceramides (Cer)</b>			
<b>C14:0</b>	12.6 ± 5.40	-0.07	0.32
<b>C16:0</b>	65.0 ± 26.9	-0.01	0.88
<b>C18:1</b>	6.00 ± 3.48	0.06	0.40
<b>C18:0</b>	45.4 ± 28.2	0.07	0.34
<b>C20:0</b>	77.9 ± 40.2	0.01	0.93
<b>C22:0</b>	603 ± 311	-0.03	0.72
<b>C24:1</b>	524 ± 265	-0.05	0.49
<b>C24:0</b>	1998 ± 994	-0.16	0.024
<b>C26:1</b>	9.29 ± 5.99	-0.14	0.051
<b>C26:0</b>	17.4 ± 9.29	-0.16	0.018
<b>C28:1</b>	0.72 ± 0.73	-0.11	0.10
<b>C28:0</b>	0.87 ± 1.47	-0.02	0.83
<b>C30:1</b>	0.44 ± 0.44	-0.09	0.20
<b>C30:0</b>	0.08 ± 0.17	0.02	0.76
<b>C32:1</b>	1.43 ± 2.29	-0.02	0.79
<b>C32:0</b>	0.35 ± 0.55	-0.07	0.31
<b>C34:1</b>	0.67 ± 1.02	-0.002	0.97
<b>C34:0</b>	0.14 ± 0.25	-0.02	0.77
<b>Total Cer</b>	3363 ± 1478	-0.12	0.084
<b>Total VLC</b>	4.71 ± 5.88	-0.04	0.56
<b>%Cer of SPL</b>	3.69 ± 1.75	-0.18	0.009
<b>Monohexosyl ceramides (MHC)</b>			
<b>C14:0</b>	8.10 ± 4.86	-0.11	0.11
<b>C16:0</b>	952 ± 617	0.01	0.89
<b>C18:1</b>	59.2 ± 49.6	0.06	0.37
<b>C18:0</b>	48.0 ± 30.8	0.03	0.64
<b>C20:0</b>	90.2 ± 64.7	-0.05	0.50
<b>C22:0</b>	1204 ± 767	0.001	0.98
<b>C24:1</b>	796 ± 577	0.02	0.81
<b>C24:0</b>	1427 ± 943	-0.05	0.47
<b>C26:1</b>	13.4 ± 9.89	0.05	0.46
<b>C26:0</b>	7.77 ± 5.57	0.05	0.46
<b>C28:1</b>	2.27 ± 1.87	-0.16	0.024
<b>C28:0</b>	1.43 ± 1.40	-0.06	0.42
<b>C30:1</b>	1.14 ± 0.98	-0.10	0.15
<b>C30:0</b>	7.92 ± 5.93	-0.08	0.23
<b>C32:1</b>	1.97 ± 2.61	-0.07	0.31
<b>C32:0</b>	0.35 ± 0.59	0.002	0.97
<b>C34:1</b>	0.59 ± 0.50	-0.08	0.28
<b>C34:0</b>	0.28 ± 0.28	-0.12	0.086

<b>Total MHC</b>	4622 ± 2725	-0.01	0.86
<b>Total VLC</b>	15.9 ± 10.5	-0.12	0.096
<b>%MHC of SPL</b>	4.63 ± 2.05	-0.10	0.14
<b>Sphingomyelins (SM)</b>			
<b>C14:0</b>	6271 ± 2145	-0.12	0.086
<b>C16:0</b>	24287 ± 6963	0.12	0.076
<b>C18:1</b>	6109 ± 2394	0.23	0.0009
<b>C18:0</b>	7374 ± 2526	0.22	0.0012
<b>C20:0</b>	6904 ± 2275	0.08	0.26
<b>C22:0</b>	11971 ± 3893	0.16	0.018
<b>C24:1</b>	15654 ± 5090	0.11	0.13
<b>C24:0</b>	8620 ± 3189	0.12	0.089
<b>C26:1</b>	130 ± 51.5	0.05	0.50
<b>C26:0</b>	43.9 ± 19.7	0.02	0.82
<b>C28:1</b>	18.5 ± 8.07	-0.03	0.64
<b>C28:0</b>	39.3 ± 20.7	-0.25	0.0003
<b>C30:1</b>	10.1 ± 4.39	-0.27	<0.0001
<b>C30:0</b>	8.35 ± 3.89	-0.20	0.0044
<b>C32:1</b>	1.36 ± 0.74	-0.13	0.057
<b>C32:0</b>	2.74 ± 1.49	-0.16	0.024
<b>C34:1</b>	0.99 ± 0.51	-0.12	0.086
<b>C34:0</b>	1.22 ± 0.61	-0.06	0.39
<b>Total SM</b>	87446 ± 23734	0.14	0.038
<b>Total VLC</b>	82.5 ± 36.2	-0.27	<0.0001
<b>%SM of SPL</b>	91.0 ± 2.99	0.18	0.011
<b>Sphingosine</b>			
<b>Dh-Sphingosine</b>	121 ± 54.8	0.09	0.18
<b>S1P</b>	9.89 ± 19.9	0.03	0.72
<b>Dh-S1P</b>	412 ± 187	0.04	0.55
<b>SPL (Total)</b>	70.7 ± 33.2	0.09	0.20
	96045 ± 25667	0.13	0.070

Dh, dihydro; SIP, sphingosine-1-phosphate; SPL, sphingolipids; VLC, very-long-chain