

**Supplemental Data for: Lipidomics profile of a NAPE-PLD KO mouse  
provides evidence of a broader role of this enzyme in lipid metabolism  
in the brain**

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**Supplemental Tables 1-16; 25 pages**

All lipid levels are expressed in moles per gram of tissue.

**Supplemental Table 1: Lipid levels (moles per gram tissue) in the striatum of WT and NAPE-PLD KO mice**

	Striatum					
	WT			NAPE-PLD KO		
<b>N-acyl alanine</b>	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<i>N</i> -palmitoyl alanine	3.88E-12	1.65E-12	6.73E-13	2.95E-12	1.09E-12	4.47E-13
<i>N</i> -stearoyl alanine	1.97E-12	5.68E-13	2.32E-13	1.81E-12	9.36E-13	3.82E-13
<i>N</i> -oleoyl alanine	8.84E-13	2.88E-13	1.18E-13	6.70E-13	2.90E-13	1.18E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	BDL			BDL		
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b>N-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	5.07E-11	8.35E-12	3.41E-12	4.46E-11	9.87E-12	4.03E-12
<b>N-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	1.98E-10	3.22E-11	1.32E-11	1.09E-10	5.74E-12	2.35E-12
<i>N</i> -stearoyl ethanolamine	1.37E-10	4.29E-11	1.75E-11	5.38E-11	9.01E-12	3.68E-12
<i>N</i> -oleoyl ethanolamine	2.85E-10	5.33E-11	2.18E-11	1.64E-10	6.41E-12	2.62E-12
<i>N</i> -linoleoyl ethanolamine	1.25E-10	2.64E-11	1.08E-11	1.24E-11	1.94E-12	7.93E-13
<i>N</i> -arachidonoyl ethanolamine	2.60E-11	5.87E-12	2.40E-12	5.96E-12	5.98E-13	2.44E-13
<i>N</i> -docosahexaenoyl ethanolamine	7.93E-11	1.51E-11	6.17E-12	2.20E-11	2.22E-12	9.04E-13
<b>N-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	3.10E-12	6.49E-13	2.65E-13	2.80E-12	4.57E-13	1.87E-13
<i>N</i> -stearoyl GABA	4.14E-12	4.85E-13	1.98E-13	3.42E-12	1.64E-12	6.69E-13
<i>N</i> -oleoyl GABA	9.38E-13	3.37E-13	1.37E-13	7.28E-13	2.40E-13	9.82E-14
<i>N</i> -linoleoyl GABA	BDL			BDL		
<i>N</i> -arachidonoyl GABA	7.74E-12	2.53E-12	1.03E-12	6.81E-12	1.58E-12	6.46E-13
<i>N</i> -docosahexaenoyl GABA	BDL			BDL		
<b>N-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	3.73E-11	4.19E-12	1.71E-12	3.70E-11	3.97E-12	1.62E-12
<i>N</i> -stearoyl glycine	5.88E-12	2.21E-12	9.04E-13	5.86E-12	2.14E-12	8.75E-13
<i>N</i> -oleoyl glycine	7.33E-12	1.32E-12	5.37E-13	6.45E-12	1.79E-12	7.30E-13
<i>N</i> -linoleoyl glycine	2.27E-12	1.46E-12	5.97E-13	1.76E-12	1.23E-12	5.03E-13
<i>N</i> -arachidonoyl glycine	9.52E-12	3.04E-12	1.24E-12	1.15E-11	1.94E-12	7.93E-13
<i>N</i> -docosahexaenoyl glycine	2.04E-12	1.36E-12	5.57E-13	4.12E-12	1.94E-12	7.90E-13
<b>N-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	2.02E-12	4.80E-13	1.96E-13	1.77E-12	3.91E-13	1.60E-13
<i>N</i> -stearoyl leucine	3.73E-12	9.29E-13	3.79E-13	3.69E-12	8.62E-13	3.52E-13
<i>N</i> -oleoyl leucine	1.57E-12	6.18E-13	2.52E-13	1.82E-12	5.22E-13	2.13E-13
<i>N</i> -linoleoyl leucine	BDL			BDL		
<i>N</i> -docosahexaenoyl leucine	BDL			BDL		
<b>N-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	4.32E-12	1.36E-12	5.55E-13	4.39E-12	1.55E-12	6.31E-13
<i>N</i> -stearoyl methionine	1.27E-12	3.00E-13	1.22E-13	1.19E-12	5.32E-13	2.17E-13
<i>N</i> -oleoyl methionine	2.21E-12	9.20E-13	3.76E-13	2.08E-12	1.29E-12	5.25E-13
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b>N-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	2.44E-12	6.79E-13	2.77E-13	2.59E-12	7.34E-13	3.00E-13
<i>N</i> -stearoyl phenylalanine	1.79E-12	8.84E-13	3.61E-13	1.69E-12	6.13E-13	2.50E-13
<i>N</i> -oleoyl phenylalanine	6.97E-13	2.23E-13	9.09E-14	6.44E-13	2.23E-13	9.12E-14
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	8.56E-13	6.29E-13	2.57E-13	3.30E-13	2.48E-13	1.01E-13
<i>N</i> -docosahexaenoyl phenylalanine	BDL			BDL		

## Supplemental Table 1: Continued

	Striatum					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	8.98E-13	1.16E-13	4.73E-14	1.02E-12	4.51E-13	1.84E-13
<i>N</i> -stearoyl proline	BDL			BDL		
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	4.21E-11	6.59E-12	2.69E-12	3.98E-11	2.31E-12	9.41E-13
<i>N</i> -stearoyl serine	2.52E-11	7.22E-12	2.95E-12	1.92E-11	4.13E-12	1.69E-12
<i>N</i> -oleoyl serine	4.74E-10	6.54E-11	2.67E-11	4.50E-10	4.99E-11	2.04E-11
<i>N</i> -linoleoyl serine	3.26E-11	9.09E-12	3.71E-12	3.16E-11	6.70E-12	2.74E-12
<i>N</i> -arachidonoyl serine	1.02E-12	6.56E-13	2.68E-13	1.08E-12	8.31E-14	3.39E-14
<i>N</i> -docosahexaenoyl serine	1.54E-11	3.95E-12	1.61E-12	1.36E-11	5.06E-12	2.07E-12
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	3.18E-10	6.16E-11	2.52E-11	3.37E-10	3.19E-11	1.30E-11
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	2.92E-12	8.78E-13	3.58E-13	2.65E-12	1.33E-12	5.43E-13
<i>N</i> -stearoyl tryptophan	2.90E-12	4.60E-13	1.88E-13	2.50E-12	7.94E-13	3.24E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.27E-12	3.26E-13	1.33E-13	1.22E-12	3.55E-13	1.45E-13
<i>N</i> -stearoyl tyrosine	BDL			BDL		
<i>N</i> -oleoyl tyrosine	6.49E-13	2.89E-13	1.18E-13	7.14E-13	3.09E-13	1.26E-13
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	BDL			BDL		
<i>N</i> -docosahexaenoyl tyrosine	BDL			BDL		
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	1.86E-12	8.24E-13	3.36E-13	1.79E-12	6.59E-13	2.69E-13
<i>N</i> -stearoyl valine	1.16E-12	6.99E-13	2.85E-13	1.28E-12	4.71E-13	1.92E-13
<i>N</i> -oleoyl valine	BDL			BDL		
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	8.87E-10	1.65E-10	6.75E-11	8.50E-10	1.03E-10	4.20E-11
Arachidonic acid	1.26E-08	1.26E-09	5.14E-10	1.33E-08	5.65E-10	2.31E-10
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	1.10E-09	2.39E-10	9.77E-11	1.11E-09	1.51E-10	6.15E-11
2-linoleoyl- <i>sn</i> -glycerol	3.40E-10	9.56E-11	3.90E-11	2.30E-10	2.41E-11	9.85E-12
2-oleoyl- <i>sn</i> -glycerol	5.30E-08	2.05E-08	8.37E-09	4.80E-08	1.33E-08	5.44E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	1.70E-10	4.21E-11	1.72E-11	3.20E-10	4.46E-11	1.82E-11
PGF <sub>2α</sub>	1.92E-10	2.41E-11	9.82E-12	2.13E-10	6.89E-12	2.81E-12

**Supplemental Table 2: List of lipids in the striatum significantly affected by NAPE-PLD deletion**

Striatum Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl ethanolamine	45.237	0	↓	0.55
<i>N</i> -stearoyl ethanolamine	21.476	0.001	↓	0.39
<i>N</i> -oleoyl ethanolamine	30.76	0	↓	0.57
<i>N</i> -linoleoyl ethanolamine	108.365	0	↓	0.1
<i>N</i> -arachidonoyl ethanolamine	69.129	0	↓	0.23
<i>N</i> -docosahexaenoyl ethanolamine	84.371	0	↓	0.28
<i>N</i> -docosahexaenoyl glycine	4.62	0.057	↑	1.97
<i>N</i> -arachidonoyl phenylalanine	3.635	0.086	↓	0.45
2-linoleoyl- <i>sn</i> -glycerol	7.415	0.021	↓	0.68
PGE <sub>2</sub>	35.756	0	↑	1.88
PGF <sub>2α</sub>	4.166	0.069	↑	1.11

**Supplemental Table 3: Lipid levels (moles per gram tissue) in the hippocampus of WT and NAPE-PLD KO mice**

	Hippocampus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b><i>N</i>-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	3.80E-12	4.96E-13	2.02E-13	2.81E-12	1.03E-12	4.21E-13
<i>N</i> -stearoyl alanine	2.47E-12	7.25E-13	2.96E-13	1.94E-12	1.04E-12	4.24E-13
<i>N</i> -oleoyl alanine	9.27E-13	3.78E-13	1.54E-13	8.15E-13	3.81E-13	1.55E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	1.57E-12	5.11E-13	2.09E-13	2.32E-12	1.18E-12	4.83E-13
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b><i>N</i>-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b><i>N</i>-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	1.31E-10	1.84E-11	7.49E-12	6.86E-11	7.33E-12	2.99E-12
<i>N</i> -stearoyl ethanolamine	8.77E-11	1.26E-11	5.16E-12	3.61E-11	6.62E-12	2.70E-12
<i>N</i> -oleoyl ethanolamine	1.64E-10	3.16E-11	1.29E-11	9.27E-11	1.63E-11	6.64E-12
<i>N</i> -linoleoyl ethanolamine	8.40E-11	1.10E-11	4.47E-12	1.08E-11	3.34E-12	1.36E-12
<i>N</i> -arachidonoyl ethanolamine	3.97E-11	3.60E-12	1.47E-12	1.13E-11	2.73E-12	1.12E-12
<i>N</i> -docosahexaenoyl ethanolamine	8.29E-11	1.48E-11	6.05E-12	2.10E-11	5.35E-12	2.19E-12
<b><i>N</i>-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	3.11E-12	5.89E-13	2.40E-13	2.92E-12	7.67E-13	3.13E-13
<i>N</i> -stearoyl GABA	4.11E-12	1.88E-12	7.67E-13	3.92E-12	9.78E-13	3.99E-13
<i>N</i> -oleoyl GABA	1.70E-12	4.80E-13	1.96E-13	1.27E-12	3.42E-13	1.40E-13
<i>N</i> -linoleoyl GABA	BDL			BDL		
<i>N</i> -arachidonoyl GABA	2.55E-11	2.70E-12	1.10E-12	2.64E-11	4.30E-12	1.76E-12
<i>N</i> -docosahexaenoyl GABA	9.97E-12	3.03E-12	1.24E-12	1.29E-11	5.64E-12	2.30E-12
<b><i>N</i>-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	3.76E-11	3.76E-12	1.53E-12	4.04E-11	8.09E-12	3.30E-12
<i>N</i> -stearoyl glycine	8.09E-12	2.66E-12	1.09E-12	8.13E-12	2.64E-12	1.08E-12
<i>N</i> -oleoyl glycine	8.28E-12	2.03E-12	8.30E-13	1.11E-11	1.08E-12	4.40E-13
<i>N</i> -linoleoyl glycine	2.32E-12	1.38E-12	5.62E-13	2.35E-12	1.49E-12	6.07E-13
<i>N</i> -arachidonoyl glycine	3.06E-11	4.05E-12	1.65E-12	3.66E-11	4.47E-12	1.83E-12
<i>N</i> -docosahexaenoyl glycine	4.23E-12	2.10E-12	8.58E-13	5.65E-12	7.12E-13	2.91E-13
<b><i>N</i>-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	1.95E-12	6.54E-13	2.67E-13	2.04E-12	2.12E-13	8.66E-14
<i>N</i> -stearoyl leucine	4.16E-12	9.51E-13	3.88E-13	4.20E-12	1.06E-12	4.35E-13
<i>N</i> -oleoyl leucine	1.47E-12	4.62E-13	1.88E-13	1.32E-12	6.12E-13	2.50E-13
<i>N</i> -linoleoyl leucine	BDL			BDL		
<i>N</i> -docosahexaenoyl leucine	1.28E-12	4.70E-13	1.92E-13	1.40E-12	3.92E-13	1.60E-13
<b><i>N</i>-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	BDL			BDL		
<i>N</i> -stearoyl methionine	1.45E-12	8.45E-13	3.45E-13	1.23E-12	3.25E-13	1.33E-13
<i>N</i> -oleoyl methionine	1.85E-12	8.52E-13	3.48E-13	1.77E-12	7.43E-13	3.03E-13
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b><i>N</i>-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	3.19E-12	7.75E-13	3.16E-13	2.65E-12	5.08E-13	2.07E-13
<i>N</i> -stearoyl phenylalanine	2.69E-12	1.07E-12	4.35E-13	1.69E-12	5.32E-13	2.17E-13
<i>N</i> -oleoyl phenylalanine	6.28E-13	1.87E-13	7.63E-14	5.73E-13	1.36E-13	5.54E-14
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	9.33E-13	4.21E-13	1.72E-13	6.57E-13	1.60E-13	6.51E-14
<i>N</i> -docosahexaenoyl phenylalanine	1.42E-12	6.38E-13	2.60E-13	7.79E-13	3.57E-13	1.46E-13

### Supplemental Table 3: Continued

	Hippocampus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	1.14E-12	3.83E-13	1.56E-13	9.91E-13	7.32E-13	2.99E-13
<i>N</i> -stearoyl proline	BDL			BDL		
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	3.64E-11	3.20E-12	1.31E-12	3.57E-11	4.20E-12	1.72E-12
<i>N</i> -stearoyl serine	1.64E-11	2.50E-12	1.02E-12	1.20E-11	3.08E-12	1.26E-12
<i>N</i> -oleoyl serine	3.82E-10	4.68E-11	1.91E-11	4.17E-10	7.37E-11	3.01E-11
<i>N</i> -linoleoyl serine	2.89E-11	4.41E-12	1.80E-12	3.13E-11	5.97E-12	2.44E-12
<i>N</i> -arachidonoyl serine	2.19E-12	8.58E-13	3.50E-13	1.80E-12	2.95E-13	1.20E-13
<i>N</i> -docosahexaenoyl serine	7.18E-12	4.55E-12	1.86E-12	1.02E-11	3.55E-12	1.45E-12
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	9.89E-10	1.65E-10	6.75E-11	1.12E-09	1.39E-10	5.68E-11
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	BDL			BDL		
<i>N</i> -stearoyl tryptophan	3.42E-12	1.60E-12	6.53E-13	2.79E-12	5.97E-13	2.44E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.40E-12	4.93E-13	2.01E-13	1.79E-12	7.61E-13	3.11E-13
<i>N</i> -stearoyl tyrosine	BDL			BDL		
<i>N</i> -oleoyl tyrosine	BDL			BDL		
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	1.84E-12	9.33E-13	3.81E-13	1.38E-12	3.46E-13	1.41E-13
<i>N</i> -docosahexaenoyl tyrosine	BDL			BDL		
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	1.43E-12	2.18E-13	8.91E-14	1.95E-12	7.75E-13	3.17E-13
<i>N</i> -stearoyl valine	1.60E-12	7.04E-13	2.88E-13	1.30E-12	2.37E-13	9.69E-14
<i>N</i> -oleoyl valine	1.54E-12	8.07E-13	3.30E-13	1.25E-12	5.51E-13	2.25E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	9.85E-10	2.17E-10	8.86E-11	9.61E-10	1.86E-10	7.59E-11
Arachidonic acid	1.84E-08	2.77E-09	1.13E-09	1.98E-08	2.66E-09	1.09E-09
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	1.07E-09	3.84E-10	1.57E-10	9.07E-10	2.12E-10	8.67E-11
2-linoleoyl- <i>sn</i> -glycerol	2.52E-10	5.90E-11	2.41E-11	2.15E-10	3.10E-11	1.26E-11
2-oleoyl- <i>sn</i> -glycerol	3.30E-08	5.18E-09	2.11E-09	3.62E-08	5.17E-09	2.11E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	4.33E-10	1.25E-10	5.09E-11	8.67E-10	1.64E-10	6.69E-11
PGF <sub>2α</sub>	3.94E-10	4.79E-11	1.96E-11	5.17E-10	6.62E-11	2.70E-11

**Supplemental Table 4: List of lipids in the hippocampus significantly affected by NAPE-PLD deletion**

Hippocampus Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl alanine	4.485	0.06	↓	0.75
<i>N</i> -palmitoyl ethanolamine	59.873	0	↓	0.52
<i>N</i> -stearoyl ethanolamine	78.591	0	↓	0.41
<i>N</i> -oleoyl ethanolamine	23.995	0.001	↓	0.57
<i>N</i> -linoleoyl ethanolamine	244.898	0	↓	0.13
<i>N</i> -arachidonoyl ethanolamine	237.231	0	↓	0.29
<i>N</i> -docosahexaenoyl ethanolamine	92.725	0	↓	0.12
<i>N</i> -oleoyl glycine	8.867	0.014	↑	1.33
<i>N</i> -arachidonoyl glycine	5.821	0.037	↑	1.19
<i>N</i> -stearoyl phenylalanine	4.216	0.067	↓	0.64
<i>N</i> -docosahexaenoyl phenylalanine	4.558	0.059	↓	0.58
<i>N</i> -stearoyl serine	7.408	0.021	↓	0.73
PGE <sub>2</sub>	26.612	0	↑	2
PGF <sub>2α</sub>	13.647	0.004	↑	1.31

**Supplemental Table 5: Lipid levels (moles per gram tissue) in the cerebellum of WT and NAPE-PLD KO mice**

	Cerebellum					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b><i>N</i>-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	1.13E-11	6.00E-12	2.68E-12	7.14E-12	2.22E-12	9.07E-13
<i>N</i> -stearoyl alanine	1.42E-11	6.78E-12	3.03E-12	1.00E-11	9.84E-13	4.02E-13
<i>N</i> -oleoyl alanine	3.30E-12	2.10E-12	9.41E-13	2.09E-12	6.23E-13	2.54E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	BDL			BDL		
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b><i>N</i>-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b><i>N</i>-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	2.99E-10	6.31E-11	2.82E-11	1.54E-10	8.54E-12	3.49E-12
<i>N</i> -stearoyl ethanolamine	3.13E-10	8.12E-11	3.63E-11	1.18E-10	1.57E-11	6.42E-12
<i>N</i> -oleoyl ethanolamine	5.54E-10	6.63E-11	2.97E-11	3.70E-10	5.23E-11	2.14E-11
<i>N</i> -linoleoyl ethanolamine	7.47E-11	8.63E-12	3.86E-12	1.47E-11	2.12E-12	8.66E-13
<i>N</i> -arachidonoyl ethanolamine	1.68E-11	3.10E-12	1.39E-12	5.71E-12	7.60E-13	3.10E-13
<i>N</i> -docosahexaenoyl ethanolamine	1.26E-10	2.95E-11	1.32E-11	2.83E-11	4.69E-12	1.92E-12
<b><i>N</i>-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	1.21E-11	5.55E-12	2.48E-12	9.50E-12	2.76E-12	1.13E-12
<i>N</i> -stearoyl GABA	1.17E-11	5.62E-12	2.51E-12	8.52E-12	1.79E-12	7.29E-13
<i>N</i> -oleoyl GABA	5.37E-12	2.50E-12	1.12E-12	3.75E-12	7.92E-13	3.23E-13
<i>N</i> -linoleoyl GABA	1.20E-12	6.91E-13	3.09E-13	7.14E-13	3.22E-13	1.31E-13
<i>N</i> -arachidonoyl GABA	7.81E-12	2.03E-12	9.08E-13	6.94E-12	1.82E-12	7.41E-13
<i>N</i> -docosahexaenoyl GABA	7.55E-11	4.05E-11	1.81E-11	5.16E-11	1.49E-11	6.09E-12
<b><i>N</i>-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	4.71E-11	1.69E-11	7.57E-12	3.95E-11	4.71E-12	1.92E-12
<i>N</i> -stearoyl glycine	1.82E-11	8.31E-12	3.72E-12	1.35E-11	2.87E-12	1.17E-12
<i>N</i> -oleoyl glycine	1.21E-11	2.98E-12	1.33E-12	1.03E-11	1.70E-12	6.96E-13
<i>N</i> -linoleoyl glycine	1.82E-12	1.26E-12	5.62E-13	1.38E-12	9.68E-13	3.95E-13
<i>N</i> -arachidonoyl glycine	8.17E-12	1.22E-12	5.45E-13	1.02E-11	1.95E-12	7.98E-13
<i>N</i> -docosahexaenoyl glycine	7.22E-12	2.71E-12	1.21E-12	7.13E-12	1.26E-12	5.14E-13
<b><i>N</i>-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	9.76E-13	5.36E-13	2.40E-13	8.10E-13	1.53E-13	6.23E-14
<i>N</i> -stearoyl leucine	4.93E-13	2.12E-13	9.50E-14	3.72E-13	1.15E-13	4.69E-14
<i>N</i> -oleoyl leucine	3.86E-13	1.65E-13	7.37E-14	4.05E-13	1.52E-13	6.19E-14
<i>N</i> -linoleoyl leucine	BDL			BDL		
<i>N</i> -docosahexaenoyl leucine	BDL			BDL		
<b><i>N</i>-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	BDL			BDL		
<i>N</i> -stearoyl methionine	1.54E-12	4.20E-13	1.88E-13	1.19E-12	3.75E-13	1.53E-13
<i>N</i> -oleoyl methionine	8.91E-13	3.32E-13	1.49E-13	BDL		
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b><i>N</i>-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	4.01E-12	1.17E-12	5.22E-13	4.10E-12	5.48E-13	2.24E-13
<i>N</i> -stearoyl phenylalanine	2.36E-12	5.43E-13	2.43E-13	2.30E-12	3.49E-13	1.43E-13
<i>N</i> -oleoyl phenylalanine	2.43E-12	5.54E-13	2.48E-13	2.88E-12	4.06E-13	1.66E-13
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	1.36E-12	1.09E-12	4.86E-13	7.92E-13	3.35E-13	1.37E-13
<i>N</i> -docosahexaenoyl phenylalanine	1.33E-12	4.92E-13	2.20E-13	1.31E-12	4.76E-13	1.94E-13



**Supplemental Table 5: Continued**

	Cerebellum					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	3.56E-11	1.24E-11	5.53E-12	2.81E-11	8.34E-12	3.40E-12
<i>N</i> -stearoyl proline	2.06E-11	8.04E-12	3.60E-12	1.48E-11	2.14E-12	8.73E-13
<i>N</i> -oleoyl proline	3.43E-11	1.61E-11	7.20E-12	2.50E-11	2.52E-12	1.03E-12
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	4.93E-11	1.04E-11	4.63E-12	4.29E-11	4.82E-12	1.97E-12
<i>N</i> -stearoyl serine	4.35E-11	7.33E-12	3.28E-12	3.73E-11	3.86E-12	1.58E-12
<i>N</i> -oleoyl serine	4.26E-10	1.09E-10	4.86E-11	3.60E-10	3.05E-11	1.24E-11
<i>N</i> -linoleoyl serine	4.93E-11	1.58E-11	7.04E-12	3.79E-11	8.67E-12	3.54E-12
<i>N</i> -arachidonoyl serine	2.17E-12	6.41E-13	2.87E-13	1.43E-12	5.36E-13	2.19E-13
<i>N</i> -docosahexaenoyl serine	2.46E-11	1.44E-11	6.44E-12	1.75E-11	6.47E-12	2.64E-12
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	1.92E-10	3.01E-11	1.35E-11	2.18E-10	3.77E-11	1.54E-11
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	3.97E-12	2.96E-12	1.33E-12	2.88E-12	5.56E-13	2.27E-13
<i>N</i> -stearoyl tryptophan	7.46E-12	4.09E-12	1.83E-12	4.16E-12	1.44E-12	5.87E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	3.05E-12	1.39E-12	6.23E-13	3.31E-12	1.84E-13	7.51E-14
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.57E-12	2.76E-13	1.23E-13	1.31E-12	2.33E-13	9.51E-14
<i>N</i> -stearoyl tyrosine	1.06E-12	2.50E-13	1.12E-13	9.05E-13	3.47E-13	1.42E-13
<i>N</i> -oleoyl tyrosine	1.47E-12	5.04E-13	2.25E-13	1.26E-12	2.03E-13	8.27E-14
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	9.49E-12	1.60E-12	7.16E-13	1.14E-11	2.81E-12	1.15E-12
<i>N</i> -docosahexaenoyl tyrosine	1.11E-12	3.03E-13	1.35E-13	1.10E-12	4.42E-13	1.80E-13
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	4.01E-12	2.33E-12	1.04E-12	3.48E-12	1.87E-12	7.62E-13
<i>N</i> -stearoyl valine	1.20E-12	4.60E-13	2.06E-13	1.35E-12	5.78E-13	2.36E-13
<i>N</i> -oleoyl valine	3.15E-12	8.31E-13	3.72E-13	2.43E-12	7.26E-13	2.96E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	1.32E-08	3.05E-09	1.36E-09	1.16E-08	1.45E-09	5.94E-10
Arachidonic acid	2.60E-09	6.38E-10	2.85E-10	2.46E-09	1.16E-10	4.73E-11
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	1.21E-08	3.09E-09	1.38E-09	1.64E-08	5.17E-09	2.11E-09
2-linoleoyl- <i>sn</i> -glycerol	9.53E-10	2.98E-10	1.33E-10	6.54E-10	6.46E-11	2.64E-11
2-oleoyl- <i>sn</i> -glycerol	9.08E-09	2.95E-09	1.32E-09	7.68E-09	6.73E-10	2.75E-10
<b>Prostaglandins</b>						
PGE <sub>2</sub>	3.80E-10	7.55E-11	3.38E-11	4.23E-10	8.81E-11	3.60E-11
PGF <sub>2α</sub>	1.53E-10	4.03E-11	1.80E-11	1.59E-10	3.48E-11	1.42E-11

**Supplemental Table 6: List of lipids in the cerebellum significantly affected by NAPE-PLD deletion**

Cerebellum Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl ethanolamine	31.547	0	↓	0.52
<i>N</i> -stearoyl ethanolamine	33.817	0	↓	0.38
<i>N</i> -oleoyl ethanolamine	26.454	0.001	↓	0.69
<i>N</i> -linoleoyl ethanolamine	275.918	0	↓	0.2
<i>N</i> -arachidonoyl ethanolamine	73.245	0	↓	0.34
<i>N</i> -docosahexaenoyl ethanolamine	65.333	0	↓	0.22
<i>N</i> -arachidonoyl glycine	4.244	0.069	↑	1.25
<i>N</i> -arachidonoyl serine	4.395	0.065	↓	0.67
<i>N</i> -stearoyl tryptophan	3.447	0.096	↓	0.56
2-linoleoyl- <i>sn</i> -glycerol	5.833	0.039	↓	0.69

**Supplemental Table 7: Lipid levels (moles per gram tissue) in the thalamus of WT and NAPE-PLD KO mice**

	Thalamus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	3.68E-12	1.10E-12	4.49E-13	2.90E-12	7.90E-13	3.23E-13
<i>N</i> -stearoyl alanine	2.04E-12	4.21E-13	1.72E-13	1.98E-12	8.90E-13	3.63E-13
<i>N</i> -oleoyl alanine	9.60E-13	3.67E-13	1.50E-13	9.32E-13	2.92E-13	1.19E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	BDL			BDL		
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b>N-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b>N-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	2.10E-10	3.78E-11	1.54E-11	1.40E-10	2.68E-11	1.10E-11
<i>N</i> -stearoyl ethanolamine	1.42E-10	1.58E-11	6.43E-12	4.82E-11	5.95E-12	2.43E-12
<i>N</i> -oleoyl ethanolamine	2.28E-10	4.24E-11	1.73E-11	1.91E-10	3.01E-11	1.23E-11
<i>N</i> -linoleoyl ethanolamine	4.87E-11	7.84E-12	3.20E-12	1.40E-11	2.32E-12	9.49E-13
<i>N</i> -arachidonoyl ethanolamine	2.25E-11	3.44E-12	1.41E-12	1.19E-11	1.93E-12	7.87E-13
<i>N</i> -docosahexaenoyl ethanolamine	8.37E-11	1.36E-11	5.55E-12	2.94E-11	2.17E-12	8.87E-13
<b>N-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	7.34E-12	1.38E-12	5.64E-13	7.39E-12	4.52E-13	1.84E-13
<i>N</i> -stearoyl GABA	8.52E-12	3.24E-12	1.32E-12	7.84E-12	7.24E-13	2.96E-13
<i>N</i> -oleoyl GABA	2.30E-12	4.42E-13	1.80E-13	2.33E-12	1.75E-13	7.14E-14
<i>N</i> -linoleoyl GABA	BDL			BDL		
<i>N</i> -arachidonoyl GABA	1.83E-11	3.70E-12	1.51E-12	1.83E-11	1.38E-12	5.63E-13
<i>N</i> -docosahexaenoyl GABA	1.87E-11	5.24E-12	2.14E-12	1.78E-11	4.45E-12	1.82E-12
<b>N-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	4.22E-11	2.06E-12	8.41E-13	4.35E-11	5.46E-12	2.23E-12
<i>N</i> -stearoyl glycine	1.12E-11	1.77E-12	7.23E-13	1.01E-11	1.90E-12	7.74E-13
<i>N</i> -oleoyl glycine	1.40E-11	1.48E-12	6.02E-13	1.52E-11	1.96E-12	7.98E-13
<i>N</i> -linoleoyl glycine	3.51E-12	1.29E-12	5.25E-13	2.35E-12	9.54E-13	3.90E-13
<i>N</i> -arachidonoyl glycine	2.05E-11	3.04E-12	1.24E-12	2.43E-11	3.56E-12	1.45E-12
<i>N</i> -docosahexaenoyl glycine	3.06E-12	1.18E-12	4.80E-13	4.04E-12	9.16E-13	3.74E-13
<b>N-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	2.37E-12	4.80E-13	1.96E-13	2.35E-12	3.54E-13	1.45E-13
<i>N</i> -stearoyl leucine	3.49E-12	7.13E-13	2.91E-13	3.54E-12	4.89E-13	2.00E-13
<i>N</i> -oleoyl leucine	1.83E-12	5.25E-13	2.14E-13	2.20E-12	4.38E-13	1.79E-13
<i>N</i> -linoleoyl leucine	3.26E-13	1.59E-13	6.48E-14	4.10E-13	2.62E-13	1.07E-13
<i>N</i> -docosahexaenoyl leucine	1.38E-12	4.27E-13	1.74E-13	1.26E-12	3.57E-13	1.46E-13
<b>N-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	3.64E-12	1.24E-12	5.06E-13	4.77E-12	1.04E-12	4.24E-13
<i>N</i> -stearoyl methionine	1.69E-12	3.79E-13	1.55E-13	1.70E-12	6.01E-13	2.45E-13
<i>N</i> -oleoyl methionine	2.21E-12	1.21E-12	4.93E-13	3.04E-12	1.20E-12	4.89E-13
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b>N-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	3.75E-12	1.30E-12	5.32E-13	3.89E-12	6.89E-13	2.81E-13
<i>N</i> -stearoyl phenylalanine	2.66E-12	8.29E-13	3.38E-13	2.21E-12	4.89E-13	2.00E-13
<i>N</i> -oleoyl phenylalanine	1.01E-12	3.83E-13	1.56E-13	1.07E-12	2.53E-13	1.03E-13
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	7.90E-13	3.03E-13	1.24E-13	9.39E-13	3.89E-13	1.59E-13
<i>N</i> -docosahexaenoyl phenylalanine	7.25E-13	2.99E-13	1.22E-13	9.12E-13	3.42E-13	1.40E-13

## Supplemental Table 7: Continued

	Thalamus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	9.64E-13	2.85E-13	1.16E-13	1.04E-12	4.43E-13	1.81E-13
<i>N</i> -stearoyl proline	2.38E-13	3.94E-14	1.61E-14	2.65E-13	5.87E-14	2.39E-14
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	8.53E-11	2.37E-12	9.67E-13	8.01E-11	8.27E-12	3.38E-12
<i>N</i> -stearoyl serine	6.78E-11	6.09E-12	2.49E-12	5.01E-11	6.20E-12	2.53E-12
<i>N</i> -oleoyl serine	4.46E-10	2.28E-11	9.32E-12	4.37E-10	5.09E-11	2.08E-11
<i>N</i> -linoleoyl serine	4.06E-11	5.93E-12	2.42E-12	4.04E-11	4.26E-12	1.74E-12
<i>N</i> -arachidonoyl serine	1.13E-12	5.31E-13	2.17E-13	1.46E-12	4.07E-13	1.66E-13
<i>N</i> -docosahexaenoyl serine	1.24E-11	3.31E-12	1.35E-12	1.20E-11	2.33E-12	9.52E-13
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	3.23E-10	3.44E-11	1.40E-11	3.61E-10	3.35E-11	1.37E-11
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	2.39E-12	9.08E-13	3.71E-13	1.70E-12	6.49E-13	2.65E-13
<i>N</i> -stearoyl tryptophan	3.57E-12	8.33E-13	3.40E-13	2.68E-12	3.29E-13	1.34E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	2.16E-12	2.82E-13	1.15E-13	2.38E-12	2.75E-13	1.12E-13
<i>N</i> -stearoyl tyrosine	2.42E-13	8.08E-14	3.30E-14	2.17E-13	8.11E-14	3.31E-14
<i>N</i> -oleoyl tyrosine	1.04E-12	4.38E-13	1.79E-13	1.43E-12	4.04E-13	1.65E-13
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	1.57E-12	3.51E-13	1.43E-13	1.19E-12	3.03E-13	1.24E-13
<i>N</i> -docosahexaenoyl tyrosine	3.40E-13	1.62E-13	6.62E-14	3.51E-13	1.99E-13	8.11E-14
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	1.98E-12	3.08E-13	1.26E-13	2.40E-12	4.18E-13	1.71E-13
<i>N</i> -stearoyl valine	1.68E-12	7.30E-13	2.98E-13	1.46E-12	2.86E-13	1.17E-13
<i>N</i> -oleoyl valine	2.29E-12	8.29E-13	3.38E-13	2.64E-12	5.36E-13	2.19E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	2.74E-09	7.59E-10	3.10E-10	1.95E-09	5.30E-10	2.16E-10
Arachidonic acid	1.28E-07	1.09E-08	4.46E-09	1.23E-07	1.12E-08	4.58E-09
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	2.80E-09	4.16E-10	1.70E-10	3.14E-09	5.90E-10	2.41E-10
2-linoleoyl- <i>sn</i> -glycerol	6.73E-10	1.62E-10	6.60E-11	5.20E-10	1.01E-10	4.14E-11
2-oleoyl- <i>sn</i> -glycerol	8.29E-08	1.23E-08	5.03E-09	8.21E-08	1.83E-08	7.46E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	2.62E-10	2.18E-11	8.90E-12	3.89E-10	4.16E-11	1.70E-11
PGF <sub>2α</sub>	1.96E-10	2.07E-11	8.45E-12	2.57E-10	3.13E-11	1.28E-11

**Supplemental Table 8: List of lipids in the thalamus significantly affected by NAPE-PLD deletion**

Thalamus Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl ethanolamine	13.513	0.004	↓	0.67
<i>N</i> -stearoyl ethanolamine	186.804	0	↓	0.34
<i>N</i> -linoleoyl ethanolamine	108.142	0	↓	0.29
<i>N</i> -arachidonoyl ethanolamine	43.313	0	↓	0.53
<i>N</i> -docosahexaenoyl ethanolamine	93.228	0	↓	0.35
<i>N</i> -arachidonoyl glycine	4.007	0.073	↑	1.19
<i>N</i> -stearoyl serine	24.819	0.001	↓	0.74
<i>N</i> -arachidonoyl taurine	3.801	0.08	↑	1.12
<i>N</i> -stearoyl tryptophan	5.967	0.035	↓	0.76
<i>N</i> -arachidonoyl tyrosine	4.051	0.072	↓	0.77
<i>N</i> -palmitoyl valine	3.931	0.076	↑	1.2
Linoleic acid	4.409	0.062	↓	0.71
2-linoleoyl- <i>sn</i> -glycerol	3.835	0.079	↓	0.77
PGE <sub>2</sub>	44.176	0	↑	1.49
PGF <sub>2α</sub>	15.706	0.003	↑	1.31

**Supplemental Table 9: Lipid levels (moles per gram tissue) in the cortex  
of WT and NAPE-PLD KO mice**

	Cortex					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b><i>N</i>-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	1.31E-12	5.00E-13	2.04E-13	1.53E-12	4.38E-13	1.79E-13
<i>N</i> -stearoyl alanine	2.98E-12	1.99E-12	8.13E-13	2.55E-12	6.32E-13	2.58E-13
<i>N</i> -oleoyl alanine	4.47E-13	1.60E-13	6.55E-14	5.36E-13	7.10E-14	2.90E-14
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	BDL			BDL		
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b><i>N</i>-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b><i>N</i>-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	5.17E-11	4.40E-12	1.80E-12	4.12E-11	4.59E-12	1.88E-12
<i>N</i> -stearoyl ethanolamine	4.32E-11	3.92E-12	1.60E-12	2.23E-11	3.64E-12	1.48E-12
<i>N</i> -oleoyl ethanolamine	7.92E-11	7.86E-12	3.21E-12	6.29E-11	7.16E-12	2.92E-12
<i>N</i> -linoleoyl ethanolamine	3.87E-11	4.65E-12	1.90E-12	8.84E-12	1.58E-12	6.43E-13
<i>N</i> -arachidonoyl ethanolamine	1.33E-11	1.82E-12	7.43E-13	6.16E-12	9.40E-13	3.84E-13
<i>N</i> -docosahexaenoyl ethanolamine	3.58E-11	4.48E-12	1.83E-12	1.38E-11	1.42E-12	5.79E-13
<b><i>N</i>-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	2.34E-12	2.94E-13	1.20E-13	2.61E-12	2.94E-13	1.20E-13
<i>N</i> -stearoyl GABA	3.83E-12	7.81E-13	3.19E-13	4.12E-12	5.29E-13	2.16E-13
<i>N</i> -oleoyl GABA	1.07E-12	1.46E-13	5.97E-14	9.95E-13	1.14E-13	4.66E-14
<i>N</i> -linoleoyl GABA	2.64E-13	1.07E-13	4.35E-14	1.86E-13	1.26E-13	5.13E-14
<i>N</i> -arachidonoyl GABA	1.45E-11	2.38E-12	9.71E-13	1.53E-11	2.53E-12	1.03E-12
<i>N</i> -docosahexaenoyl GABA	7.38E-12	1.82E-12	7.42E-13	7.75E-12	2.49E-12	1.02E-12
<b><i>N</i>-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	1.42E-11	1.48E-12	6.06E-13	1.63E-11	8.08E-13	3.30E-13
<i>N</i> -stearoyl glycine	6.02E-12	6.63E-13	2.71E-13	7.05E-12	8.93E-13	3.65E-13
<i>N</i> -oleoyl glycine	6.44E-12	4.14E-13	1.69E-13	7.32E-12	2.78E-13	1.13E-13
<i>N</i> -linoleoyl glycine	2.14E-12	2.54E-13	1.04E-13	1.92E-12	6.25E-13	2.55E-13
<i>N</i> -arachidonoyl glycine	1.77E-11	9.39E-13	3.83E-13	2.25E-11	3.61E-12	1.47E-12
<i>N</i> -docosahexaenoyl glycine	2.16E-12	4.04E-13	1.65E-13	2.86E-12	5.61E-13	2.29E-13
<b><i>N</i>-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	1.58E-12	3.51E-13	1.43E-13	1.52E-12	1.31E-13	5.37E-14
<i>N</i> -stearoyl leucine	3.29E-12	5.96E-13	2.43E-13	3.28E-12	2.09E-13	8.55E-14
<i>N</i> -oleoyl leucine	1.28E-12	3.10E-13	1.27E-13	1.21E-12	2.18E-13	8.89E-14
<i>N</i> -linoleoyl leucine	2.38E-13	1.63E-13	6.64E-14	2.51E-13	9.27E-14	3.78E-14
<i>N</i> -docosahexaenoyl leucine	9.06E-13	1.80E-13	7.35E-14	9.74E-13	1.05E-13	4.27E-14
<b><i>N</i>-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	BDL			BDL		
<i>N</i> -stearoyl methionine	1.06E-12	2.04E-13	8.34E-14	9.47E-13	2.37E-13	9.68E-14
<i>N</i> -oleoyl methionine	9.44E-13	3.57E-13	1.46E-13	1.27E-12	4.86E-13	1.98E-13
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b><i>N</i>-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	1.61E-12	6.15E-13	2.51E-13	2.20E-12	5.52E-13	2.26E-13
<i>N</i> -stearoyl phenylalanine	1.93E-12	5.12E-13	2.09E-13	2.11E-12	2.51E-13	1.02E-13
<i>N</i> -oleoyl phenylalanine	4.41E-13	9.84E-14	4.02E-14	6.01E-13	1.09E-13	4.47E-14
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	3.40E-13	2.50E-13	1.02E-13	3.79E-13	1.91E-13	7.81E-14
<i>N</i> -docosahexaenoyl phenylalanine	4.08E-13	2.03E-13	8.27E-14	4.83E-13	2.17E-13	8.84E-14

## Supplemental Table 9: Continued

	Cortex					
	WT			NAPE-PLD KO		
<b>N-acyl proline</b>	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<i>N</i> -palmitoyl proline	3.92E-13	1.24E-13	5.06E-14	4.36E-13	5.59E-14	2.28E-14
<i>N</i> -stearoyl proline	1.32E-13	5.73E-14	2.34E-14	1.65E-13	2.83E-14	1.15E-14
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	3.23E-11	1.59E-12	6.49E-13	3.16E-11	2.64E-12	1.08E-12
<i>N</i> -stearoyl serine	3.01E-11	2.94E-12	1.20E-12	2.78E-11	1.70E-12	6.95E-13
<i>N</i> -oleoyl serine	1.24E-10	1.77E-11	7.23E-12	1.46E-10	1.77E-11	7.22E-12
<i>N</i> -linoleoyl serine	1.19E-11	2.62E-12	1.07E-12	1.33E-11	1.85E-12	7.55E-13
<i>N</i> -arachidonoyl serine	8.60E-13	1.60E-13	6.55E-14	9.79E-13	1.52E-13	6.21E-14
<i>N</i> -docosahexaenoyl serine	9.41E-12	2.85E-12	1.16E-12	8.38E-12	1.82E-12	7.44E-13
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	8.06E-10	6.60E-11	2.69E-11	7.61E-10	8.51E-11	3.48E-11
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	8.49E-13	3.29E-13	1.34E-13	1.08E-12	4.56E-13	1.86E-13
<i>N</i> -stearoyl tryptophan	1.93E-12	6.64E-13	2.71E-13	2.10E-12	2.64E-13	1.08E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	9.43E-13	3.71E-13	1.52E-13	1.13E-12	4.04E-13	1.65E-13
<i>N</i> -stearoyl tyrosine	3.36E-13	4.98E-14	2.03E-14	2.60E-13	7.87E-14	3.21E-14
<i>N</i> -oleoyl tyrosine	5.67E-13	3.59E-13	1.47E-13	6.50E-13	1.55E-13	6.32E-14
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	5.94E-13	2.05E-13	8.36E-14	8.59E-13	2.42E-13	9.90E-14
<i>N</i> -docosahexaenoyl tyrosine	1.71E-13	8.08E-14	3.30E-14	2.65E-13	8.24E-14	3.36E-14
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	1.14E-12	4.68E-13	1.91E-13	1.05E-12	2.32E-13	9.48E-14
<i>N</i> -stearoyl valine	9.35E-13	3.12E-13	1.28E-13	8.93E-13	1.16E-13	4.74E-14
<i>N</i> -oleoyl valine	1.17E-12	3.57E-13	1.46E-13	1.15E-12	2.69E-13	1.10E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	2.37E-09	7.16E-10	2.92E-10	2.17E-09	4.77E-10	1.95E-10
Arachidonic acid	1.25E-07	1.46E-08	5.97E-09	1.32E-07	1.17E-08	4.77E-09
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	1.06E-09	2.83E-10	1.15E-10	1.12E-09	3.15E-10	1.29E-10
2-linoleoyl- <i>sn</i> -glycerol	2.08E-10	4.53E-11	1.85E-11	2.10E-10	2.77E-11	1.13E-11
2-oleoyl- <i>sn</i> -glycerol	1.99E-08	2.65E-09	1.08E-09	2.33E-08	3.13E-09	1.28E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	4.47E-10	4.55E-11	1.86E-11	6.55E-10	9.72E-11	3.97E-11
PGF <sub>2α</sub>	2.39E-10	2.11E-11	8.60E-12	2.82E-10	2.76E-11	1.12E-11

**Supplemental Table 10: List of lipids in the cortex significantly affected by NAPE-PLD deletion**

Cortex Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl ethanolamine	16.407	0.002	↓	0.8
<i>N</i> -stearoyl ethanolamine	91.684	0	↓	0.52
<i>N</i> -oleoyl ethanolamine	14.185	0.004	↓	0.79
<i>N</i> -linoleoyl ethanolamine	221.023	0	↓	0.23
<i>N</i> -arachidonoyl ethanolamine	73.166	0	↓	0.47
<i>N</i> -docosahexaenoyl ethanolamine	132.305	0	↓	0.39
<i>N</i> -palmitoyl glycine	9.814	0.011	↑	1.15
<i>N</i> -stearoyl glycine	5.161	0.046	↑	1.17
<i>N</i> -oleoyl glycine	18.732	0.001	↑	1.13
<i>N</i> -arachidonoyl glycine	10.007	0.01	↑	1.27
<i>N</i> -docosahexaenoyl glycine	6.172	0.032	↑	1.31
<i>N</i> -oleoyl phenylalanine	7.077	0.024	↑	1.3
<i>N</i> -oleoyl serine	4.264	0.066	↑	1.17
<i>N</i> -stearoyl tyrosine	4.012	0.073	↓	0.83
<i>N</i> -arachidonoyl tyrosine	4.162	0.069	↑	1.38
<i>N</i> -docosahexaenoyl tyrosine	3.996	0.074	↑	1.35
2-oleoyl- <i>sn</i> -glycerol	4.065	0.071	↑	1.17
PGE <sub>2</sub>	22.63	0.001	↑	1.47
PGF <sub>2α</sub>	9.098	0.013	↑	1.18



**Supplemental Table 11: Lipid levels in the hypothalamus (moles per gram) of WT and NAPE-PLD KO mice**

	Hypothalamus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl alanine</b>						
N-palmitoyl alanine	3.38E-12	7.77E-13	3.17E-13	3.94E-12	6.67E-13	2.72E-13
N-stearoyl alanine	5.86E-12	1.84E-12	7.52E-13	5.69E-12	2.26E-12	9.21E-13
N-oleoyl alanine	BDL			BDL		
N-linoleoyl alanine	BDL			BDL		
N-arachidonoyl alanine	BDL			BDL		
N-docosahexaenoyl alanine	BDL			BDL		
<b>N-acyl dopamine</b>						
N-oleoyl dopamine	BDL			BDL		
N-arachidonoyl dopamine	BDL			BDL		
<b>N-acyl ethanolamine</b>						
N-palmitoyl ethanolamine	1.05E-10	1.50E-11	6.12E-12	7.56E-11	2.01E-11	8.20E-12
N-stearoyl ethanolamine	9.49E-11	1.26E-11	5.13E-12	6.35E-11	3.24E-11	1.32E-11
N-oleoyl ethanolamine	2.10E-10	2.32E-11	9.47E-12	1.35E-10	3.66E-11	1.49E-11
N-linoleoyl ethanolamine	4.51E-11	1.11E-11	4.51E-12	2.90E-11	6.41E-12	2.62E-12
N-arachidonoyl ethanolamine	1.44E-11	2.93E-12	1.19E-12	5.25E-12	1.06E-12	4.34E-13
N-docosahexaenoyl ethanolamine	4.72E-11	1.11E-11	4.52E-12	1.57E-11	2.31E-12	9.42E-13
<b>N-acyl GABA</b>						
N-palmitoyl GABA	6.58E-12	7.66E-13	3.13E-13	6.71E-12	1.87E-12	7.65E-13
N-stearoyl GABA	7.89E-12	1.57E-12	6.42E-13	8.67E-12	2.71E-12	1.11E-12
N-oleoyl GABA	1.54E-12	4.29E-13	1.75E-13	1.22E-12	5.56E-13	2.27E-13
N-linoleoyl GABA	BDL			BDL		
N-arachidonoyl GABA	1.26E-11	4.41E-12	1.80E-12	1.28E-11	3.54E-12	1.44E-12
N-docosahexaenoyl GABA	BDL			BDL		
<b>N-acyl glycine</b>						
N-palmitoyl glycine	3.77E-11	4.89E-12	2.00E-12	4.12E-11	5.06E-12	2.06E-12
N-stearoyl glycine	1.09E-11	3.87E-12	1.58E-12	1.05E-11	2.85E-12	1.16E-12
N-oleoyl glycine	9.20E-12	3.07E-12	1.26E-12	1.20E-11	4.03E-12	1.64E-12
N-linoleoyl glycine	BDL			BDL		
N-arachidonoyl glycine	6.59E-12	2.94E-12	1.20E-12	5.49E-12	2.96E-12	1.21E-12
N-docosahexaenoyl glycine	BDL			BDL		
<b>N-acyl leucine</b>						
N-palmitoyl leucine	2.02E-12	6.00E-13	2.45E-13	1.99E-12	6.13E-13	2.50E-13
N-stearoyl leucine	3.07E-12	1.04E-12	4.26E-13	2.89E-12	8.40E-13	3.43E-13
N-oleoyl leucine	1.09E-12	3.80E-13	1.55E-13	9.63E-13	4.35E-13	1.77E-13
N-linoleoyl leucine	BDL			BDL		
N-docosahexaenoyl leucine	BDL			BDL		
<b>N-acyl methionine</b>						
N-palmitoyl methionine	BDL			BDL		
N-stearoyl methionine	BDL			BDL		
N-oleoyl methionine	BDL			BDL		
N-linoleoyl methionine	BDL			BDL		
N-arachidonoyl methionine	BDL			BDL		
N-docosahexaenoyl methionine	BDL			BDL		
<b>N-acyl phenylalanine</b>						
N-palmitoyl phenylalanine	2.45E-12	7.26E-13	2.96E-13	2.09E-12	6.78E-13	2.77E-13
N-stearoyl phenylalanine	1.77E-12	5.14E-13	2.10E-13	1.84E-12	3.02E-13	1.23E-13
N-oleoyl phenylalanine	6.29E-13	2.73E-13	1.12E-13	3.95E-13	2.22E-13	9.06E-14
N-linoleoyl phenylalanine	BDL			BDL		
N-arachidonoyl phenylalanine	BDL			BDL		
N-docosahexaenoyl phenylalanine	BDL			BDL		

**Supplemental Table 11: Continued**

	Hypothalamus					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	BDL			BDL		
<i>N</i> -stearoyl proline	BDL			BDL		
<i>N</i> -oleoyl proline	2.24E-12	6.20E-13	2.53E-13	2.53E-12	8.93E-13	3.64E-13
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	1.78E-11	2.41E-12	9.85E-13	1.27E-11	3.30E-12	1.35E-12
<i>N</i> -stearoyl serine	1.90E-11	4.36E-12	1.78E-12	1.77E-11	2.96E-12	1.21E-12
<i>N</i> -oleoyl serine	6.47E-10	1.41E-10	5.75E-11	7.00E-10	1.08E-10	4.42E-11
<i>N</i> -linoleoyl serine	4.67E-11	1.43E-11	5.85E-12	4.76E-11	5.41E-12	2.21E-12
<i>N</i> -arachidonoyl serine	BDL			BDL		
<i>N</i> -docosahexaenoyl serine	BDL			BDL		
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	3.75E-11	8.59E-12	3.51E-12	4.73E-11	1.98E-11	8.10E-12
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	BDL			BDL		
<i>N</i> -stearoyl tryptophan	BDL			BDL		
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.15E-12	5.05E-13	2.06E-13	8.68E-13	4.70E-13	1.92E-13
<i>N</i> -stearoyl tyrosine	BDL			BDL		
<i>N</i> -oleoyl tyrosine	BDL			BDL		
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	BDL			BDL		
<i>N</i> -docosahexaenoyl tyrosine	BDL			BDL		
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	1.83E-12	1.15E-12	4.71E-13	1.70E-12	4.67E-13	1.91E-13
<i>N</i> -stearoyl valine	1.59E-12	7.20E-13	2.94E-13	1.53E-12	4.34E-13	1.77E-13
<i>N</i> -oleoyl valine	BDL			BDL		
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	3.75E-10	1.20E-10	4.90E-11	3.96E-10	1.30E-10	5.30E-11
Arachidonic acid	9.92E-09	1.06E-09	4.34E-10	1.00E-08	3.30E-09	1.35E-09
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	2.76E-09	8.09E-10	3.30E-10	2.59E-09	7.22E-10	2.95E-10
2-linoleoyl- <i>sn</i> -glycerol	2.86E-10	5.55E-11	2.26E-11	2.62E-10	5.61E-11	2.29E-11
2-oleoyl- <i>sn</i> -glycerol	5.33E-08	2.91E-08	1.19E-08	4.97E-08	3.39E-08	1.38E-08
<b>Prostaglandins</b>						
PGE <sub>2</sub>	9.54E-11	4.67E-11	1.91E-11	1.46E-10	7.44E-11	3.04E-11
PGF <sub>2α</sub>	2.20E-10	4.54E-11	1.85E-11	2.49E-10	8.37E-11	3.42E-11

**Supplemental Table 12: List of lipids in the hypothalamus significantly affected by NAPE-PLD deletion**

Hypothalamus Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl ethanolamine	8.217	0.017	↓	0.72
<i>N</i> -stearoyl ethanolamine	4.908	0.051	↓	0.67
<i>N</i> -oleoyl ethanolamine	17.694	0.002	↓	0.65
<i>N</i> -linoleoyl ethanolamine	9.54	0.011	↓	0.64
<i>N</i> -arachidonoyl ethanolamine	52.147	0	↓	0.37
<i>N</i> -docosahexaenoyl ethanolamine	46.277	0	↓	0.33
<i>N</i> -palmitoyl serine	9.422	0.012	↓	0.71

**Supplemental Table 13: Lipid levels in the midbrain (moles per gram)  
of WT and NAPE-PLD KO mice**

	Midbrain					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b><i>N</i>-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	3.37E-12	8.87E-13	3.62E-13	2.78E-12	5.15E-13	2.10E-13
<i>N</i> -stearoyl alanine	2.19E-12	6.90E-13	2.82E-13	1.66E-12	4.00E-13	1.63E-13
<i>N</i> -oleoyl alanine	1.19E-12	2.54E-13	1.04E-13	8.85E-13	3.17E-13	1.29E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	BDL			BDL		
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b><i>N</i>-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b><i>N</i>-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	1.73E-10	2.18E-11	8.88E-12	1.15E-10	1.10E-11	4.49E-12
<i>N</i> -stearoyl ethanolamine	9.88E-11	2.07E-11	8.46E-12	4.34E-11	6.84E-12	2.79E-12
<i>N</i> -oleoyl ethanolamine	2.42E-10	3.77E-11	1.54E-11	1.85E-10	1.22E-11	4.99E-12
<i>N</i> -linoleoyl ethanolamine	4.48E-11	5.69E-12	2.32E-12	1.66E-11	1.71E-12	7.00E-13
<i>N</i> -arachidonoyl ethanolamine	2.14E-11	3.47E-12	1.42E-12	1.05E-11	1.13E-12	4.61E-13
<i>N</i> -docosahexaenoyl ethanolamine	9.35E-11	1.54E-11	6.27E-12	2.82E-11	3.39E-12	1.38E-12
<b><i>N</i>-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	5.98E-12	4.59E-13	1.88E-13	5.89E-12	4.26E-13	1.74E-13
<i>N</i> -stearoyl GABA	6.68E-12	1.41E-12	5.76E-13	6.07E-12	1.15E-12	4.70E-13
<i>N</i> -oleoyl GABA	1.75E-12	3.47E-13	1.42E-13	1.72E-12	3.44E-13	1.40E-13
<i>N</i> -linoleoyl GABA	BDL			BDL		
<i>N</i> -arachidonoyl GABA	1.55E-11	2.31E-12	9.43E-13	1.61E-11	2.06E-12	8.42E-13
<i>N</i> -docosahexaenoyl GABA	1.26E-11	2.80E-12	1.14E-12	1.42E-11	1.44E-12	5.90E-13
<b><i>N</i>-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	3.06E-11	4.95E-12	2.02E-12	3.19E-11	3.50E-12	1.43E-12
<i>N</i> -stearoyl glycine	1.04E-11	1.83E-12	7.46E-13	7.09E-12	1.25E-12	5.12E-13
<i>N</i> -oleoyl glycine	1.14E-11	1.43E-12	5.83E-13	1.09E-11	2.27E-12	9.25E-13
<i>N</i> -linoleoyl glycine	BDL			BDL		
<i>N</i> -arachidonoyl glycine	1.86E-11	4.19E-12	1.71E-12	1.93E-11	4.07E-12	1.66E-12
<i>N</i> -docosahexaenoyl glycine	2.34E-12	6.46E-13	2.64E-13	2.81E-12	1.09E-12	4.43E-13
<b><i>N</i>-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	1.86E-12	3.72E-13	1.52E-13	1.64E-12	2.81E-13	1.15E-13
<i>N</i> -stearoyl leucine	2.14E-12	4.12E-13	1.68E-13	2.08E-12	4.87E-13	1.99E-13
<i>N</i> -oleoyl leucine	1.23E-12	2.37E-13	9.66E-14	1.42E-12	4.66E-13	1.90E-13
<i>N</i> -linoleoyl leucine	BDL			BDL		
<i>N</i> -docosahexaenoyl leucine	8.87E-13	2.65E-13	1.08E-13	1.10E-12	3.92E-13	1.60E-13
<b><i>N</i>-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	BDL			BDL		
<i>N</i> -stearoyl methionine	9.45E-13	5.62E-13	2.30E-13	6.94E-13	4.54E-13	1.85E-13
<i>N</i> -oleoyl methionine	BDL			BDL		
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b><i>N</i>-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	2.36E-12	3.36E-13	1.37E-13	2.51E-12	5.77E-13	2.36E-13
<i>N</i> -stearoyl phenylalanine	1.59E-12	2.90E-13	1.18E-13	1.25E-12	5.57E-13	2.27E-13
<i>N</i> -oleoyl phenylalanine	6.57E-13	5.05E-14	2.06E-14	6.75E-13	1.41E-13	5.77E-14
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	9.48E-13	5.82E-13	2.38E-13	6.86E-13	2.73E-13	1.12E-13
<i>N</i> -docosahexaenoyl phenylalanine	5.66E-13	2.07E-13	8.46E-14	1.15E-12	2.99E-13	1.22E-13

**Supplemental Table 13: Continued**

	Midbrain					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	1.23E-12	3.96E-13	1.61E-13	1.04E-12	4.03E-13	1.65E-13
<i>N</i> -stearoyl proline	BDL			BDL		
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	4.04E-11	5.57E-12	2.27E-12	3.98E-11	4.89E-12	2.00E-12
<i>N</i> -stearoyl serine	2.81E-11	8.57E-12	3.50E-12	2.45E-11	3.76E-12	1.54E-12
<i>N</i> -oleoyl serine	2.72E-10	2.51E-11	1.02E-11	3.06E-10	3.94E-11	1.61E-11
<i>N</i> -linoleoyl serine	2.27E-11	4.42E-12	1.80E-12	3.28E-11	6.36E-12	2.60E-12
<i>N</i> -arachidonoyl serine	4.24E-13	3.54E-13	1.45E-13	7.38E-13	1.88E-13	7.67E-14
<i>N</i> -docosahexaenoyl serine	3.35E-12	1.18E-12	4.82E-13	4.81E-12	3.05E-12	1.24E-12
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	1.01E-10	1.44E-11	5.88E-12	1.12E-10	1.71E-11	6.97E-12
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	1.68E-12	2.78E-13	1.14E-13	1.30E-12	5.61E-13	2.29E-13
<i>N</i> -stearoyl tryptophan	1.49E-12	5.18E-13	2.11E-13	1.54E-12	4.60E-13	1.88E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.28E-12	2.63E-13	1.07E-13	1.22E-12	1.16E-13	4.73E-14
<i>N</i> -stearoyl tyrosine	BDL			BDL		
<i>N</i> -oleoyl tyrosine	5.14E-13	2.10E-13	8.58E-14	6.22E-13	4.89E-13	2.00E-13
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	1.91E-12	3.59E-13	1.47E-13	1.45E-12	7.66E-13	3.13E-13
<i>N</i> -docosahexaenoyl tyrosine	BDL			BDL		
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	2.02E-12	5.26E-13	2.15E-13	1.67E-12	6.97E-13	2.84E-13
<i>N</i> -stearoyl valine	1.09E-12	1.64E-13	6.71E-14	9.77E-13	2.71E-13	1.11E-13
<i>N</i> -oleoyl valine	1.40E-12	4.67E-13	1.91E-13	2.27E-12	6.87E-13	2.80E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	1.57E-09	3.45E-10	1.41E-10	1.37E-09	2.58E-10	1.06E-10
Arachidonic acid	1.01E-07	1.38E-08	5.65E-09	1.08E-07	1.18E-08	4.83E-09
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	3.04E-09	4.28E-10	1.75E-10	3.47E-09	5.41E-10	2.21E-10
2-linoleoyl- <i>sn</i> -glycerol	6.42E-10	1.02E-10	4.15E-11	5.26E-10	5.12E-11	2.09E-11
2-oleoyl- <i>sn</i> -glycerol	7.99E-08	1.91E-08	7.78E-09	8.26E-08	1.29E-08	5.28E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	2.75E-10	6.80E-11	2.77E-11	3.49E-10	5.93E-11	2.42E-11
PGF <sub>2α</sub>	1.81E-10	4.06E-11	1.66E-11	2.01E-10	3.08E-11	1.26E-11

**Supplemental Table 14: List of lipids in the midbrain significantly affected by NAPE-PLD deletion**

Midbrain Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -oleoyl alanine	3.42	0.094	↓	0.76
<i>N</i> -palmitoyl ethanolamine	33.455	0	↓	0.67
<i>N</i> -stearoyl ethanolamine	38.682	0	↓	0.44
<i>N</i> -oleoyl ethanolamine	12.745	0.005	↓	0.76
<i>N</i> -linoleoyl ethanolamine	135.356	0	↓	0.37
<i>N</i> -arachidonoyl ethanolamine	53.58	0	↓	0.49
<i>N</i> -docosahexaenoyl ethanolamine	103.4	0	↓	0.3
<i>N</i> -stearoyl glycine	13.46	0.004	↓	0.68
<i>N</i> -docosahexaenoyl phenylalanine	15.305	0.003	↑	1.87
<i>N</i> -linoleoyl serine	10.15	0.01	↑	1.44
<i>N</i> -arachidonoyl serine	3.678	0.084	↑	1.6
<i>N</i> -oleoyl valine	6.636	0.028	↑	1.58
2-linoleoyl- <i>sn</i> -glycerol	6.244	0.032	↓	0.82
PGE <sub>2</sub>	4.019	0.073	↑	1.27

**Supplemental Table 15: Lipid levels in the brainstem (moles per gram tissue) of WT and NAPE-PLD KO mice**

	Brainstem					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b><i>N</i>-acyl alanine</b>						
<i>N</i> -palmitoyl alanine	1.21E-11	7.40E-12	3.02E-12	5.87E-12	2.33E-12	9.52E-13
<i>N</i> -stearoyl alanine	1.36E-11	7.18E-12	2.93E-12	8.99E-12	2.90E-12	1.18E-12
<i>N</i> -oleoyl alanine	5.06E-12	3.02E-12	1.23E-12	2.95E-12	1.11E-12	4.52E-13
<i>N</i> -linoleoyl alanine	BDL			BDL		
<i>N</i> -arachidonoyl alanine	1.46E-12	1.20E-12	4.88E-13	4.98E-13	1.74E-13	7.09E-14
<i>N</i> -docosahexaenoyl alanine	BDL			BDL		
<b><i>N</i>-acyl dopamine</b>						
<i>N</i> -oleoyl dopamine	BDL			BDL		
<i>N</i> -arachidonoyl dopamine	BDL			BDL		
<b><i>N</i>-acyl ethanolamine</b>						
<i>N</i> -palmitoyl ethanolamine	5.74E-10	7.61E-11	3.11E-11	3.32E-10	2.80E-11	1.14E-11
<i>N</i> -stearoyl ethanolamine	4.11E-10	8.23E-11	3.36E-11	1.46E-10	2.07E-11	8.45E-12
<i>N</i> -oleoyl ethanolamine	9.51E-10	1.28E-10	5.25E-11	7.03E-10	8.47E-11	3.46E-11
<i>N</i> -linoleoyl ethanolamine	4.87E-11	9.73E-12	3.97E-12	1.42E-11	9.14E-13	3.73E-13
<i>N</i> -arachidonoyl ethanolamine	2.23E-11	4.22E-12	1.72E-12	9.24E-12	8.66E-13	3.54E-13
<i>N</i> -docosahexaenoyl ethanolamine	2.39E-10	4.43E-11	1.81E-11	4.14E-11	5.74E-12	2.34E-12
<b><i>N</i>-acyl GABA</b>						
<i>N</i> -palmitoyl GABA	1.11E-11	4.68E-12	1.91E-12	8.56E-12	1.57E-12	6.42E-13
<i>N</i> -stearoyl GABA	1.42E-11	7.54E-12	3.08E-12	9.95E-12	2.18E-12	8.89E-13
<i>N</i> -oleoyl GABA	7.15E-12	3.92E-12	1.60E-12	5.11E-12	8.51E-13	3.48E-13
<i>N</i> -linoleoyl GABA	1.18E-12	7.27E-13	2.97E-13	7.27E-13	2.47E-13	1.01E-13
<i>N</i> -arachidonoyl GABA	7.02E-12	1.97E-12	8.06E-13	5.47E-12	7.36E-13	3.00E-13
<i>N</i> -docosahexaenoyl GABA	7.40E-11	4.45E-11	1.82E-11	4.41E-11	1.03E-11	4.22E-12
<b><i>N</i>-acyl glycine</b>						
<i>N</i> -palmitoyl glycine	3.55E-11	8.33E-12	3.40E-12	2.76E-11	4.68E-12	1.91E-12
<i>N</i> -stearoyl glycine	3.52E-11	1.26E-11	5.16E-12	2.66E-11	6.89E-12	2.81E-12
<i>N</i> -oleoyl glycine	3.26E-11	1.18E-11	4.82E-12	2.42E-11	5.61E-12	2.29E-12
<i>N</i> -linoleoyl glycine	4.30E-12	1.69E-12	6.90E-13	3.00E-12	1.23E-12	5.03E-13
<i>N</i> -arachidonoyl glycine	2.01E-11	3.35E-12	1.37E-12	2.34E-11	2.99E-12	1.22E-12
<i>N</i> -docosahexaenoyl glycine	1.50E-11	5.67E-12	2.32E-12	1.42E-11	5.59E-12	2.28E-12
<b><i>N</i>-acyl leucine</b>						
<i>N</i> -palmitoyl leucine	8.94E-13	2.99E-13	1.22E-13	7.28E-13	1.71E-13	6.99E-14
<i>N</i> -stearoyl leucine	4.48E-13	1.43E-13	5.85E-14	3.18E-13	1.61E-13	6.56E-14
<i>N</i> -oleoyl leucine	8.54E-13	5.61E-13	2.29E-13	4.46E-13	1.28E-13	5.24E-14
<i>N</i> -linoleoyl leucine	BDL			BDL		
<i>N</i> -docosahexaenoyl leucine	BDL			BDL		
<b><i>N</i>-acyl methionine</b>						
<i>N</i> -palmitoyl methionine	3.00E-12	1.26E-12	5.15E-13	3.00E-12	8.96E-13	3.66E-13
<i>N</i> -stearoyl methionine	2.51E-12	8.14E-13	3.32E-13	2.04E-12	5.26E-13	2.15E-13
<i>N</i> -oleoyl methionine	1.17E-12	3.49E-13	1.42E-13	9.73E-13	4.54E-13	1.86E-13
<i>N</i> -linoleoyl methionine	BDL			BDL		
<i>N</i> -arachidonoyl methionine	BDL			BDL		
<i>N</i> -docosahexaenoyl methionine	BDL			BDL		
<b><i>N</i>-acyl phenylalanine</b>						
<i>N</i> -palmitoyl phenylalanine	3.92E-12	5.48E-13	2.24E-13	3.71E-12	2.25E-13	9.20E-14
<i>N</i> -stearoyl phenylalanine	2.15E-12	4.01E-13	1.64E-13	1.67E-12	4.64E-13	1.89E-13
<i>N</i> -oleoyl phenylalanine	2.31E-12	6.05E-13	2.47E-13	2.20E-12	5.24E-13	2.14E-13
<i>N</i> -linoleoyl phenylalanine	BDL			BDL		
<i>N</i> -arachidonoyl phenylalanine	1.08E-12	3.09E-13	1.26E-13	8.81E-13	1.98E-13	8.08E-14
<i>N</i> -docosahexaenoyl phenylalanine	1.07E-12	3.68E-13	1.50E-13	7.81E-13	1.61E-13	6.56E-14

**Supplemental Table 15: Continued**

	Brainstem					
	WT			NAPE-PLD KO		
	Mean	Std Dev	Std Error	Mean	Std Dev	Std Error
<b>N-acyl proline</b>						
<i>N</i> -palmitoyl proline	3.24E-11	8.64E-12	3.53E-12	2.17E-11	3.54E-12	1.45E-12
<i>N</i> -stearoyl proline	1.70E-11	5.53E-12	2.26E-12	1.33E-11	2.24E-12	9.15E-13
<i>N</i> -oleoyl proline	BDL			BDL		
<i>N</i> -linoleoyl proline	BDL			BDL		
<i>N</i> -arachidonoyl proline	BDL			BDL		
<i>N</i> -docosahexaenoyl proline	BDL			BDL		
<b>N-acyl serine</b>						
<i>N</i> -palmitoyl serine	9.33E-11	1.52E-11	6.20E-12	8.52E-11	7.15E-12	2.92E-12
<i>N</i> -stearoyl serine	7.30E-11	2.75E-11	1.12E-11	4.74E-11	7.78E-12	3.18E-12
<i>N</i> -oleoyl serine	4.65E-10	1.13E-10	4.59E-11	3.79E-10	3.85E-11	1.57E-11
<i>N</i> -linoleoyl serine	4.63E-11	1.68E-11	6.84E-12	4.09E-11	2.86E-12	1.17E-12
<i>N</i> -arachidonoyl serine	2.80E-12	1.80E-12	7.37E-13	2.04E-12	1.09E-12	4.47E-13
<i>N</i> -docosahexaenoyl serine	2.21E-11	1.57E-11	6.39E-12	1.57E-11	7.22E-12	2.95E-12
<b>N-acyl taurine</b>						
<i>N</i> -arachidonoyl taurine	6.55E-11	1.02E-11	4.16E-12	7.32E-11	8.68E-12	3.55E-12
<b>N-acyl tryptophan</b>						
<i>N</i> -palmitoyl tryptophan	3.71E-12	1.07E-12	4.38E-13	2.38E-12	4.93E-13	2.01E-13
<i>N</i> -stearoyl tryptophan	4.27E-12	9.65E-13	3.94E-13	3.60E-12	6.31E-13	2.57E-13
<i>N</i> -oleoyl tryptophan	BDL			BDL		
<i>N</i> -linoleoyl tryptophan	BDL			BDL		
<i>N</i> -arachidonoyl tryptophan	BDL			BDL		
<i>N</i> -docosahexaenoyl tryptophan	BDL			BDL		
<b>N-acyl tyrosine</b>						
<i>N</i> -palmitoyl tyrosine	1.69E-12	5.54E-13	2.26E-13	1.27E-12	2.63E-13	1.07E-13
<i>N</i> -stearoyl tyrosine	6.27E-13	1.59E-13	6.47E-14	7.35E-13	2.45E-13	9.98E-14
<i>N</i> -oleoyl tyrosine	9.86E-13	5.13E-13	2.09E-13	1.26E-12	3.23E-13	1.32E-13
<i>N</i> -linoleoyl tyrosine	BDL			BDL		
<i>N</i> -arachidonoyl tyrosine	BDL			BDL		
<i>N</i> -docosahexaenoyl tyrosine	8.78E-13	2.88E-13	1.18E-13	7.31E-13	3.33E-13	1.36E-13
<b>N-acyl valine</b>						
<i>N</i> -palmitoyl valine	3.89E-12	1.50E-12	6.13E-13	2.50E-12	1.19E-12	4.86E-13
<i>N</i> -stearoyl valine	1.31E-12	6.81E-13	2.78E-13	1.17E-12	6.15E-13	2.51E-13
<i>N</i> -oleoyl valine	3.25E-12	1.13E-12	4.62E-13	2.78E-12	8.99E-13	3.67E-13
<i>N</i> -nervonoyl valine	BDL			BDL		
<i>N</i> -linoleoyl valine	BDL			BDL		
<i>N</i> -docosahexaenoyl valine	BDL			BDL		
<b>Free Fatty Acids</b>						
Linoleic acid	1.43E-08	1.52E-09	6.20E-10	1.09E-08	2.32E-09	9.45E-10
Arachidonic acid	2.30E-09	4.19E-10	1.71E-10	1.86E-09	7.87E-11	3.21E-11
<b>2-acyl-<i>sn</i>-glycerol</b>						
2-arachidonoyl- <i>sn</i> -glycerol	1.16E-08	3.44E-09	1.40E-09	1.58E-08	2.89E-09	1.18E-09
2-linoleoyl- <i>sn</i> -glycerol	1.49E-09	3.07E-10	1.26E-10	1.18E-09	2.32E-10	9.47E-11
2-oleoyl- <i>sn</i> -glycerol	1.89E-08	3.19E-09	1.30E-09	1.84E-08	2.69E-09	1.10E-09
<b>Prostaglandins</b>						
PGE <sub>2</sub>	4.09E-10	1.06E-10	4.33E-11	5.39E-10	8.10E-11	3.31E-11
PGF <sub>2α</sub>	1.70E-10	4.17E-11	1.70E-11	2.24E-10	2.83E-11	1.16E-11



**Supplemental Table 16: List of lipids in the brainstem significantly affected by NAPE-PLD deletion**

Brainstem Significant Differences in One-Way ANOVA				
Lipid	F	p	Direction (relative to WT)	Magnitude (x WT level)
<i>N</i> -palmitoyl alanine	3.851	0.078	↓	0.49
<i>N</i> -arachidonoyl alanine	3.796	0.08	↓	0.38
<i>N</i> -palmitoyl ethanolamine	53.892	0	↓	0.58
<i>N</i> -stearoyl ethanolamine	58.7	0	↓	0.35
<i>N</i> -oleoyl ethanolamine	15.535	0.003	↓	0.74
<i>N</i> -linoleoyl ethanolamine	74.782	0	↓	0.29
<i>N</i> -arachidonoyl ethanolamine	54.875	0	↓	0.42
<i>N</i> -docosahexaenoyl ethanolamine	117.889	0	↓	0.17
<i>N</i> -palmitoyl glycine	4.103	0.07	↓	0.78
<i>N</i> -stearoyl phenylalanine	3.748	0.082	↓	0.78
<i>N</i> -palmitoyl proline	7.837	0.019	↓	0.67
<i>N</i> -stearoyl serine	4.797	0.053	↓	0.65
<i>N</i> -palmitoyl tryptophan	7.583	0.02	↓	0.65
Linoleic acid	9.069	0.013	↓	0.76
Arachidonic acid	6.453	0.029	↓	0.81
2-arachidonoyl- <i>sn</i> -glycerol	5.243	0.045	↑	1.36
2-linoleoyl- <i>sn</i> -glycerol	3.79	0.08	↓	0.79
PGE <sub>2</sub>	5.687	0.038	↑	1.32
PGF <sub>2α</sub>	7.027	0.024	↑	1.32